

# PLAYBOOK FOR STRATEGIC FORESIGHT AND INNOVATION

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A hands-on guide for modeling,  
designing, and leading your  
company's next radical innovation



# PLAYBOOK FOR STRATEGIC FORESIGHT AND INNOVATION

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## PLAYBOOK OVERVIEW

Welcome to a guide for the strategic manager, the person who is responsible for innovation—whether this means finding the next market, describing the future customer, or developing an amazing team who can reliably take new visions to new markets.

### **BENEFIT TO YOU**

This playbook addresses two essential topics:

- How to create a radical idea that becomes a new business, product, or service, and
- How to build an organization that supports the ongoing development of radical ideas.

For these topics, we provide multiple methods and techniques, step-by-step instructions, tips, examples, case studies, and more. The material is divided into multiple chapters for faster learning and use.

### **STRATEGIC FOCUS**

We focus on radical innovation. Why radical? Radical innovation is about changing the magnitude of your effort, either in terms of how your organization approaches innovation or in terms of the impact you would like to see in the market. We assume you are serious about making big changes. Most cases of radical innovation rely on a breakthrough in new technology, and technology investments are often big bets.

### **HOW TO USE IT**

All the material in the playbook is designed to be practical and straightforward for the self-guided learner. Those looking for quick solutions can start anywhere. Those looking to build an integrated and repeatable practice will want to start at the beginning to understand the broader framework.

Multiple ready-to-use templates are provided as worksheets that you can use directly, print out, or paste into your preferred software.

What you learn here will help you coach and inspire those around you, as well as advance your own efforts in strategic foresight and innovation.

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**CHAPTER 3. PERSPECTIVE ..... 58**

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**CHAPTER 4. OPPORTUNITY ..... 91**

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**CHAPTER 5. SOLUTION ..... 124**

The White Spots, Paper Mockups, and Change Path methods turn your idea into a tangible artifact and plan.

**CHAPTER 6. TEAM ..... 165**

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**CHAPTER 7. VISION ..... 200**

The Vision Statement, DARPA Hard Test, and Pathfinders methods set the right organizational vision to direct your team's efforts.

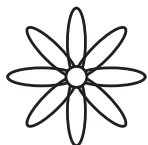
**APPENDIX ..... 240**

Supporting material includes a list of readings, suggested data sources, and other related items.



## METHOD SHORTCUTS

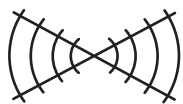
### PERSPECTIVE



**Context Map**  
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→ page 70

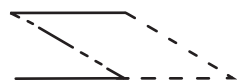


**Janus Cones**  
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### OPPORTUNITY



**Generational Arcs**  
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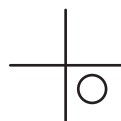


**Future User**  
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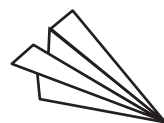


**Futuretelling**  
→ page 114

### SOLUTION



**White Spots**  
→ page 127

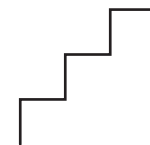


**Paper Mockups**  
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**Change Paths**  
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### TEAM



**Buddy Checks**  
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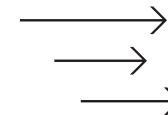


**VOICE Stars**  
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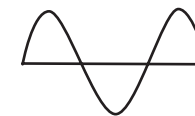
### VISION



**Vision Statement**  
→ page 203



**DARPA Hard Test**  
→ page 213



**Pathfinders**  
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## A VARIETY OF CASE STUDIES

Multiple case studies are presented throughout the playbook for deeper insight into how various organizations have applied the methods or approached long-range planning.

### **FUTURE VISION FOR PAPER**

Learn how one manufacturing company restarted an initially unfruitful planning process for its core business.  
→ page 24

### **10 WORKSHOP LESSONS FROM AN INDUSTRY VETERAN**

See what works and what doesn't when planning workshops for generating big ideas.  
→ page 53

### **A SECOND FUTURE FOR UBICOM**

Gain an in-depth look at updating the vision for one of Tekes' largest and most successful technology programs.  
→ page 78

### **HOW YLE DEFINED A NEW FORESIGHT CAPABILITY**

Follow one team's progress as they design a participatory model of foresight planning.  
→ page 158

### **SEEKING VISIONARIES AT DARPA**

Understand how DARPA attracts a certain type of person for radical innovation at a federal agency.  
→ page 177

### **PROGRAM MANAGERS AT DARPA**

Discover the basic profile for a DARPA program manager behind the agency's unique ethos.  
→ page 187

### **DARPA'S LESSONS FOR INDUSTRY**

Learn seven ways companies can benefit from DARPA's long track record for success.  
→ page 197

### **TECHNOLOGY VISIONS AT DARPA**

Review two examples of big technology-driven visions that are high risk and high reward.  
→ page 212

### **THE HEILMEIER CATECHISM AT DARPA**





Learn a well-known set of criteria that lets you test if your group's vision has practical application.  
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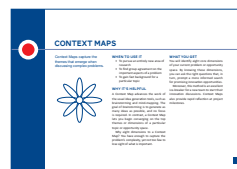
### **THE ORIGINAL VISION OF EPCOT**

Discover the real grand challenge for an idealized American city and how it was "DARPA Hard."  
→ page 228

## HOW TO USE THE PLAYBOOK

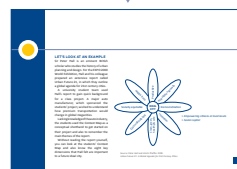
The playbook adopts two simple schemas to help you follow the material more quickly. The first schema is a set of colored dots that identify different types of content. The second schema applies to each method's presentation.

-  General information
-  Method overview, tips, and other items that require attention
-  Annotated diagrams, insights, and related material for suggested reflection
-  Method instructions and other items that encourage action



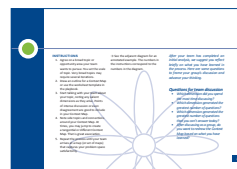
### OVERVIEW

An overview page introduces each method, describing why it is helpful, when to use it, and what you get.



### EXAMPLE

We walk you through an actual example using the method, showing a related diagram.



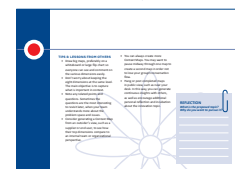
### INSTRUCTIONS

Step-by-step instructions are provided, which are then linked to the example diagram.



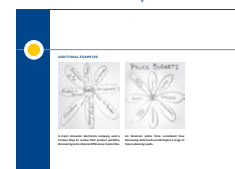
### INSIGHTS

We discuss how to draw insights and implications from the method, also linked to the example.



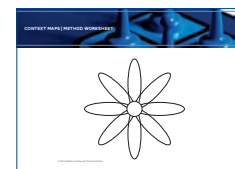
### TIPS

A tips page highlights lessons that others have learned using the method in different situations.



### PHOTOS

Real photos with short descriptions help show how different teams have used the method.



### TEMPLATE

A blank template is provided for each method as worksheets for personal or team use.

*“Innovation can be systematically managed  
if one knows where and how to look.”*

— *Peter Drucker, professor of management  
(Harvard Business Review, June 1985)*

*“The only way to discover the limits of the possible  
is to go beyond them into the impossible.”*

— *Arthur C. Clarke, science fiction writer  
("Profiles of the Future", 1977)*







# FORESIGHT FRAMEWORK

## CHAPTER I

### Shortcuts

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# THE FORESIGHT FRAMEWORK

What do you need to do to plan your next big idea?

This chapter will get you started. It walks you through the five planning phases in the Foresight Framework, which are designed to identify and assess new technologies; anticipate the current and emerging needs of your future customers; and address complex problems as quickly, creatively, and as systematically as possible.

The five phases build on each other:

- **Phase I: Perspective** shows you how to develop a long clear view based on patterns of history.
- **Phase II: Opportunity** explores new promising opportunities.
- **Phase III: Solution** builds a workable prototype for a future solution.
- **Phase IV: Team** addresses the talent behind your big idea.
- **Phase V: Vision** focuses on composing and communicating the innovation vision that will guide all future actions.

The Foresight Framework takes an action-oriented stance, focusing on very practical, hands-on tools. You will learn how to use multiple methods as building blocks for your innovation planning, which will help you move gradually from the big picture to a specific plan of action.

This model was developed by William Cockayne and Tamara Carleton at Stanford University and has been tested and validated with organizations around the world. Once you've mastered these methods, you can start at any point in the process and combine them as needed.



# FIVE PLANNING PHASES



The Foresight Framework is composed of five phases that guide innovation planning and action.

## PHASE I: PERSPECTIVE

We start with Perspective, so you understand what's been done before in your organization or industry. Perspective is focused on long-term strategy, what you might consider as three or more R&D cycles out in the future for your group.

## PHASE II: OPPORTUNITY

In the next phase of Opportunity, you develop an ability to see growth opportunities that exist today and extend into the future. Efforts during this phase often fall under research and development.

## PHASE III: SOLUTION

During the third phase, you define your solution's path to innovation. This phase is about prototyping your innovation

idea and understanding what you must build today to realize your desired future.

## PHASE IV: TEAM

Once you've outlined your solution, you now need to find more partners and team members. Not only will these people heartily embrace your vision, they will coordinate and support the critical details of execution.

## PHASE V: VISION

As a team, you will need to develop a strong vision that will guide everyone's actions forward to success.

*An easy way to remember the five phases is to know that, together, they give you a POSTV ("positive") path to the future.*

Different organizations will use different terms to describe these five phases, such as: Strategic Planning, Discovery, Envisioning, Design Thinking, New Technology Solutions, and more. Which terms does your organization prefer?

Also, there is no set time period for each phase because the duration depends on your industry, organization,

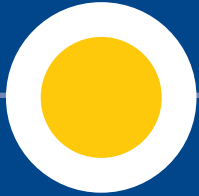
and opportunity. A typical innovation horizon encompasses everything from concept to launch, and as you know from experience, there are few shortcuts to innovation.

These five phases will give you a handle throughout the innovation planning horizon for long-term, mid-term, and short-term needs.



Source: Julien Vayssière, 2012

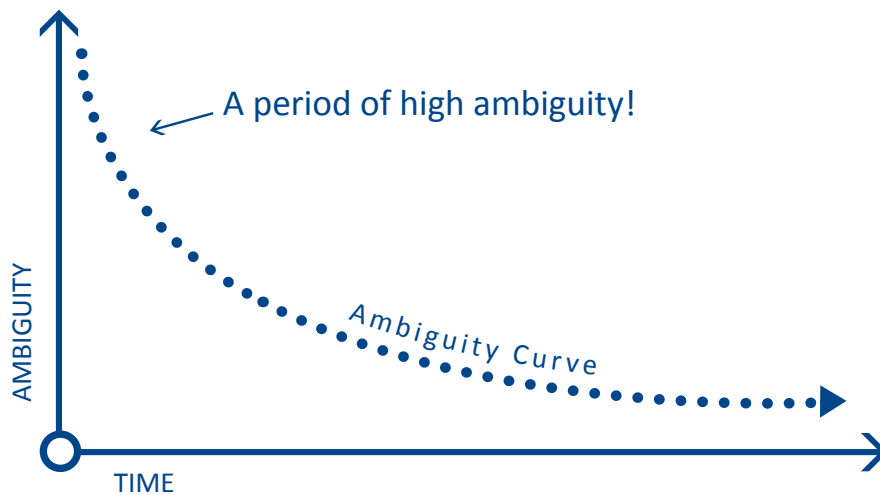




### THE AMBIGUITY CURVE

Although the three planning phases tend to overlap in real life, each phase involves a distinct set of activities within the broader lifecycle of long-range innovation.

Often the start of the process has the highest ambiguity for users. This is when the most number of questions and unknowns exist. As the innovation process progresses, participants gain more answers, which leads to a steady (and often comforting) drop in ambiguity.



© 2012 William Cockayne & Tamara Carleton

### REFLECTION

*Where would you put yourself on the Ambiguity Curve?*

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## TWO GUIDING PRINCIPLES

### Principle #1

#### **WHAT YOU FORESEE IS WHAT YOU GET**

People who believe that they can change the world already possess a long-term vision of change. The individuals who make a difference in the world are proactive at heart, linking thinking and doing. In other words, if you can imagine an improved future state, you can likely make it happen. Like an athlete, if you can picture yourself winning the race, you will increase your chances to realize the outcome you want.

### Principle #2

#### **YOU CAN'T PUT OFF TOMORROW**

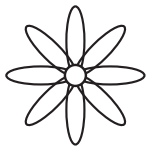
Procrastination does not stop the future from happening. Similar to the common phrase on a car's sideview mirror: Objects in the mirror are closer than they appear. The future takes time to build, and each day is an opportunity to reflect on and plan for the next day. By learning different methods of foresight and innovation strategy, you can enjoy more of the time you have today and also ensure a brighter tomorrow.



# THE METHODOLOGY

## PHASE I: PERSPECTIVE

Perspective gives you a broad frame of reference, holding up a mirror to the past so you may better anticipate the future.



**Context Maps**  
identify the main dimensions of your current problem or opportunity  
→ page 61



**Progression Curves** put event timelines, industry life-cycles, and other developments in context.  
→ page 70



**Janus Cones** let you to view multiple, overlapping, and intersecting events in a single framework.  
→ page 81



## PHASE II: OPPORTUNITY

The second phase develops an ability to see growth opportunities that exist today and extend into the future by understanding future customer changes.



**Generational Arcs** views the demographic changes and generational views of a target population.  
→ page 94



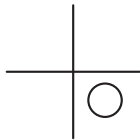
**Future User** profiles your future customer based on what will (and will not) change from today's customer.  
→ page 103



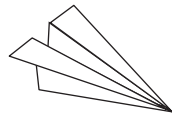
**Futuretelling** uses live theater to illustrate a particular user need as a realistic scene from the future.  
→ page 114

### PHASE III: SOLUTION

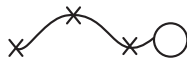
The third phase seeks to define the questions that exist along different paths to innovation, which are specific to your industry, customers, organization, and team skills.



**White Spots**  
finds hidden markets and provides a broad look at the competitor landscape.  
→ page 127



**Paper Mockups**  
create tangible models of your ideas that you can test at low cost for high learning value.  
→ page 136



**Change Paths**  
plot the major milestones that you will need to achieve on your path to action.  
→ page 149

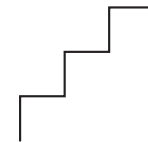


A specific iteration is the **Dark Horse Prototype**.  
→ page 145



### PHASE IV: TEAM

The fourth phase focuses on finding the talent and leadership your team needs to take an idea forward as a new innovation.



**Buddy Checks**  
helps you find good potential matches for more partners and teammates.  
→ page 168



**VOICE Stars**  
identifies your team's aptitude for radical innovation leadership.  
→ page 178

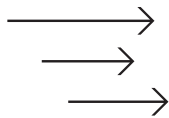


**Crowd Clovers**  
helps you map your team's innovation network to bring your idea to life.  
→ page 188

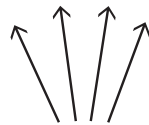


## PHASE V: VISION

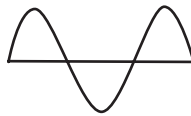
The fifth phase sharpens your team's vision so that it may take on a life of its own and guide everyone's actions forward.



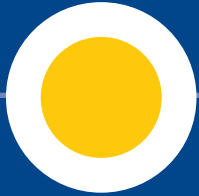
**The Vision Statement**  
helps you tell your idea as a clear and concise summary.  
→ page 203



**The DARPA Hard Test**  
measures the visionary potential of your team's radical innovation.  
→ page 213



**Pathfinders**  
determines an idea's best path through your organization or network.  
→ page 230

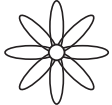



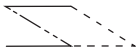




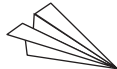


# UNDERLYING THEORIES






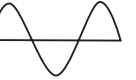
This playbook deliberately focuses on the application of the methods for radical innovation. All historical and theoretical details have been intentionally omitted, so the playbook feels more like a hands-on workbook and less like a textbook.

For those who like to understand the theoretical underpinnings, all the methods have been inspired or re-combined from the best in business strategy, industrial R&D, future studies, customer experience, design, and other related fields. It provides a robust handbook for the tactics, techniques, and procedures you will need to develop your innovation idea and team.

The adjacent table briefly explains how the methods here relate to existing techniques and tools.

Method	Related tools & techniques	Our unique benefit
 <b>Context Maps</b>	<ul style="list-style-type: none"><li>&gt; Brainstorming</li><li>&gt; Mind mapping</li></ul>	Retains complexity of topic, while beginning to converge on priority areas
 <b>Progression Curves</b>	<ul style="list-style-type: none"><li>&gt; S-curves (technology adoption)</li><li>&gt; Historical timelines</li></ul>	Connects multiple related events and highlights precedents
 <b>Janus Cones</b>	<ul style="list-style-type: none"><li>&gt; Cones of uncertainty</li><li>&gt; Milieu studies</li></ul>	Uncovers indirect influences and events within an era
 <b>Generational Arcs</b>	<ul style="list-style-type: none"><li>&gt; Population analytics (demographics)</li><li>&gt; Generational research</li></ul>	Identifies relevant population group and shared values
 <b>Future User</b>	<ul style="list-style-type: none"><li>&gt; User personas</li><li>&gt; “Voice of the customer” exercises</li><li>&gt; Need-finding</li></ul>	Describes future user needs without extrapolating biases from today’s users

Method	Related tools & techniques	Our unique benefit
 <p><b>Future-telling</b></p>	<ul style="list-style-type: none"> <li>&gt; Storytelling</li> <li>&gt; Experiential design</li> <li>&gt; Use cases</li> <li>&gt; Role-playing</li> </ul>	<p>Conveys nonverbal and contextual details about a future use case</p>
 <p><b>White Spots</b></p>	<ul style="list-style-type: none"> <li>&gt; Growth-share matrix (BCG matrix)</li> <li>&gt; Blue ocean strategy</li> </ul>	<p>Determines future focus of opportunity through iterative filters</p>
 <p><b>Paper Mockups</b></p>	<ul style="list-style-type: none"> <li>&gt; Product prototyping (low fidelity)</li> <li>&gt; Scale models (maquettes)</li> </ul>	<p>Produces system models that display the interactions and related components</p>
 <p><b>Dark Horse</b></p>	<ul style="list-style-type: none"> <li>&gt; Out-of-box thinking</li> </ul>	<p>Resets idea back to essential core innovation</p>
 <p><b>Change Paths</b></p>	<ul style="list-style-type: none"> <li>&gt; Backcasting</li> <li>&gt; Strategic inflection points</li> </ul>	<p>Prioritizes top decisions based on direct path to desired future</p>

Method	Related tools & techniques	Our unique benefit
 <b>Buddy Checks</b>	<ul style="list-style-type: none"> <li>&gt; Startup speed dating</li> <li>&gt; Role-playing</li> </ul>	<p>Lest you quickly filter promising innovation partners and teammates</p>
 <b>VOICE Stars</b>	<ul style="list-style-type: none"> <li>&gt; T-shaped people</li> <li>&gt; Career planning tests</li> <li>&gt; Creative leadership profiles</li> </ul>	<p>Describes the mix of traits needed for radical innovation leadership</p>
 <b>Crowd Clovers</b>	<ul style="list-style-type: none"> <li>&gt; Social network mapping</li> <li>&gt; Weak ties</li> <li>&gt; Collaborative Innovation Network (CoIN)</li> </ul>	<p>Identifies the types of relationships required for fostering a culture of innovation</p>
 <b>Vision Statement</b>	<ul style="list-style-type: none"> <li>&gt; Start-up elevator pitches</li> <li>&gt; Mission statements</li> </ul>	<p>Provides a simple formula to tell a future vision</p>
 <b>DARPA Hard Test</b>	<ul style="list-style-type: none"> <li>&gt; Technology readiness scales</li> </ul>	<p>Evaluates future vision in terms of its breakthrough potential</p>
 <b>Pathfinders</b>	<ul style="list-style-type: none"> <li>&gt; Wayfinding</li> <li>&gt; Diffusion of innovation</li> <li>&gt; Knowledge activists</li> </ul>	<p>Charts the most efficient success path for an innovation idea through an organization</p>





## AN INTEGRATED SYSTEM

All the methods are designed to integrate together as a complete, comprehensive, and coherent system. Think of creating a building by bringing the blocks together with the right fit.

Systems thinkers—those who approach problems as inter-related parts of an overall system—particularly enjoy understanding how the various methods work together and influence one another as a whole.

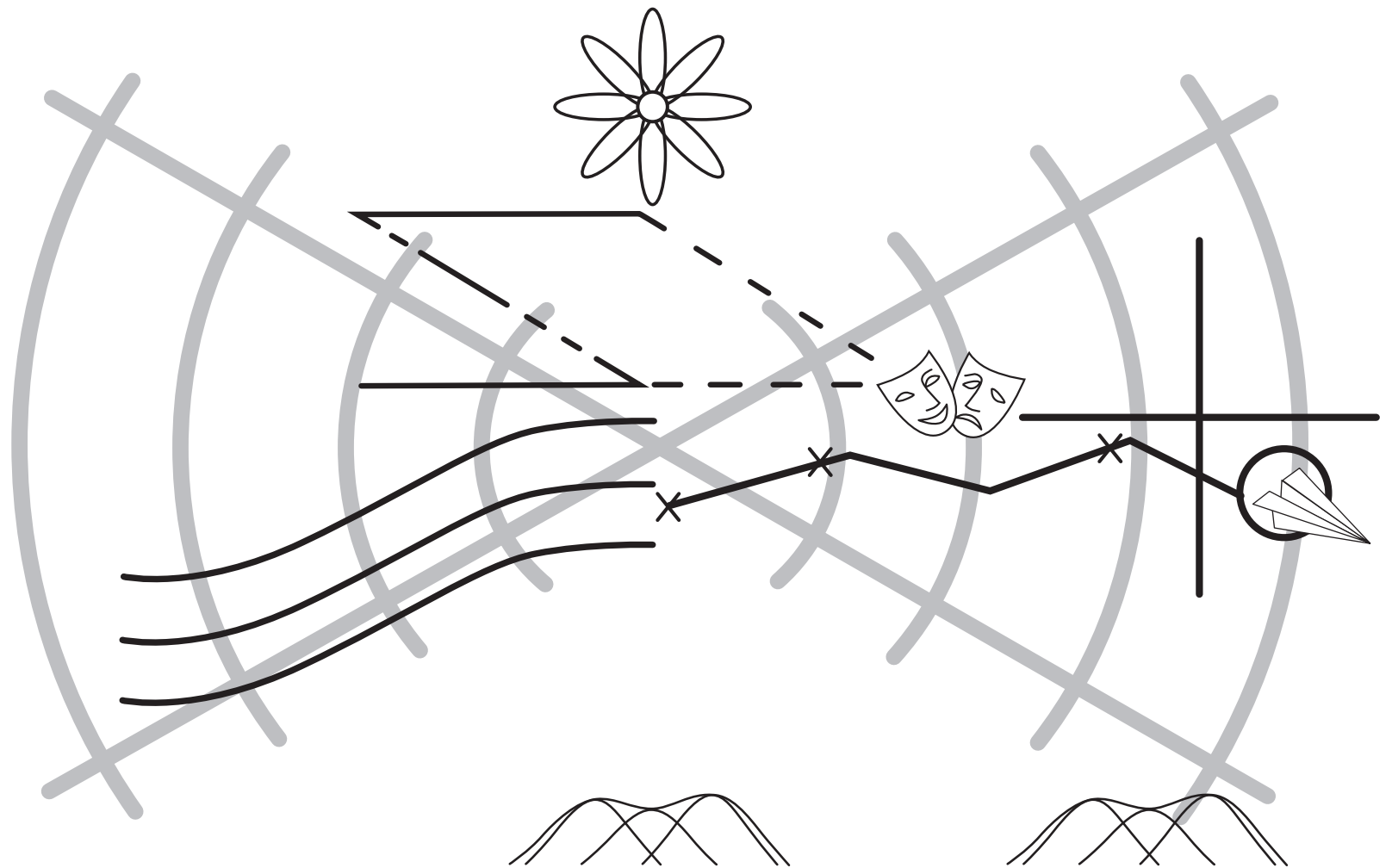
The methods can be layered on top of one another in terms of timing, intent, and theme. By layering, you can see how the different elements complement and extend from one another. This approach also allows you to see the complexity of your innovation idea.

The Janus Cones method provides the underlying baseline of time for all the other tools, and the center of it visually marks today. Methods in Phase I focus on reviewing past developments,

so users work on the left side of the Janus Cones. Then methods in Phase II connect today's knowledge to future expectations, so users begin to cross into the right side of the Janus Cones. By Phase III, users work entirely in the future, which is captured on the right side of the Janus Cones.

That said, without seeing the various methods in action, this integration may sound bewildering. We will show you how the methods fit together, as well as their placement in the overall system, through the next set of chapters.

You may wish to revisit this section to see how you can link some or all of the foresight methods together. Advanced users often take the next step, displaying the progress of their ideas on large flip charts and wall posters for input and reflection from the community. In many cases, thinking big requires drawing big.



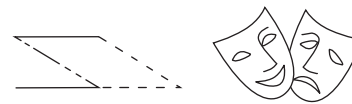
In addition, many of the methods work well as sub-sets. Some possible combinations include:



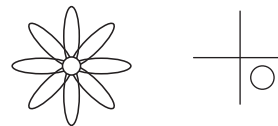
The Progression Curves method, which addresses the evolution of various events, may be effectively combined with the Janus Cones method, which provides a broader mapping of coinciding historical events.



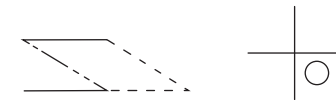
The Generational Arcs method takes a meta view of generational changes, while the Future User method takes a micro view of individual differences. By combining the two methods, the individual can then be placed within his or her generational context.



The Future User method may be combined with the Futuretelling method to make the insights more interactive and tangible.



The dimensions identified in the Context Maps exercise provide a fast way to determine the axes in the White Spots method.



Your Future User should exist in the vision you define in the White Spots method, and you should see the person's anticipated needs reflected in your analysis.



The solution embodied in the Paper Mockups method should exist either along the way or at the end point of a Change Path.



The opportunity in the White Spots method can be linked with the Change Paths method, showing the specific steps leading up to a desired future.

## CASE STUDY | FUTURE VISION FOR PAPER

Leaning back in her office chair, Anna Penrose (a pseudonym) reflected on her latest challenge with mixed feelings. Several weeks ago, she had agreed to lead a new task force at her company, a leader in the pulp and paper industry. Responding to the growing interest in cleaner and more sustainable paper production practices from customers and suppliers, her company's task force had the ambitious task to rework the long-term strategy of its core business of paper.

How could they rethink paper? Paper was a classic example of a mass produced, resource-intensive, and ultra-conventional commodity that thwarted positive environmental branding. Most workers and consumers were driven to minimize paper consumption, maximize recycled content and also had bigger needs on their mind at work and home.

Hence, Penrose knew they needed to reach out to the users and change their perceptions about paper. A bold challenge.

### HOW SHOULD MY TEAM BEGIN?

To succeed in reaching out to the user, Penrose decided the team's focus was on improving the future environmental communication about paper. Penrose and two of her colleagues narrowed down the task to the three most important guiding questions:

- Are there new ways of communicating the environmental friendliness of paper?
- If so, what type of messages would resonate most with which groups?
- How should the company convey the messages as part of their future business?

An eco-conscious communication strategy would fortify the company's brand and boost the competitiveness of the company's key product. While Penrose felt confident that the company was already going in the right direction in its general communication, she was sure there was much room for specific future improvements. Her key concern was to

make sure that the final proposal would address issues that really mattered to their customers and other stakeholders outside the company.

### HOW DO WE INTRODUCE NEW METHODS IN RADICAL INNOVATION?

Penrose recruited two colleagues to plan the next steps because they were already familiar with the *Playbook's* innovation methods. They would use the methods to structure a broader group ideation. Part of their philosophy was to elevate the usual discussions around future business communication by introducing a new set of methods that would serve as a neutral shared platform for innovative teamwork and prompt more out-of-box thinking.

Instead of a typical brainstorm, the team planned a foresight workshop to build shared awareness and commitment around the topic. They wanted to include and align diverse perspectives across different divisions, so they invited 16

directors, managers and experts from technical customer support, sales, communications, and production. Everyone had a different background and worked in a different business unit but was part of the same value chain that served the same customers. In a six-hour workshop, Penrose hoped to gain a portfolio of new ideas that could be carried forward into further development and, eventually, into implementation.

### **HOW CAN WE SET THE RIGHT FOCUS AND STILL EMBRACE AMBIGUITY?**

In the workshop, the task force set a loose objective to “improve the environmental communication of paper”, which they hoped would encourage creative freedom. However, the plan seemed to backfire.

Instead of creative freedom, participants wanted defined focused questions to guide their ideation. They were uncomfortable with the high level of ambiguity common to many early-stage investigations.

To add to the challenges, participant teams each identified a different target group, which created more ambiguity. They attempted to “hug the entire world,” said one facilitator. Since the planning team did not provide demographic or user data in advance, participants relied on personal experiences about their respective target groups to develop Future User profiles.

The fuzzy yield of the process discouraged many participants. Without a clear profile of the target group, teams struggled to develop compelling visions and future use scenarios with the Generational Arcs and Future User methods. They saw little value in scripting a scenario that would explore a future customer’s behavior and interaction in context with paper. Moreover, many had been technically trained, so they were confounded with a user-centric approach. The use of unfamiliar and very analytic tools was another challenge to the experts who were used to close in on problems using practical, hands-on approaches.

Penrose made an interim note to follow up on the Future User profiles at a later

date. She would invite representative customers to the discussion to help reset everyone’s understanding of current needs before anticipating future needs. Involving key stakeholders from outside the company would have redirected internal biases and infused more customer-driven thinking into the ideation sessions. The participants would have learned firsthand what customers appreciate and demand in terms of environmental communication.

After several unproductive attempts at defining the user of the future, Penrose’s team proceeded to the White Spots method. Despite eagerly experimenting with different dimensions to anchor their analysis, participants started to look for other familiar concepts to borrow from again. In the face of ambiguity created by the lack of a clearly defined target group, they converged on solutions that were not particularly innovative or well-defined. The discussion had shifted from addressing the rather ambiguous original three questions to exploring more tangible and easy to approach technological solutions for

conveying new communication messages. In the end, Penrose felt the generated ideas remained vague and gave little to establishing implementable actions.

Exhausted and looking at misdirected ideas, Penrose's team decided to end the workshop early. Focusing on the positive, the day had helped spawn many discussions that in turn had led to unexpected idea spillovers with great potential to be developed further, such as adopting principles of gamification and restructuring internal processes for client monitoring and data collection. Directed properly, maybe everyone could expand these concepts in light of environmental promotion.

### **HOW DO WE RESTART IF OUR FIRST GROUP DISCUSSIONS ARE UNINSPIRING?**

After an honest debrief, the task force decided to organize a second workshop several weeks later as a more structured deep dive. Penrose felt giving participants too much leeway resulted in overly long

and unproductive debates about the project's focus and context. A balance was needed between enabling creativity and demanding productivity. More importantly, a well-defined challenge would provide a strong foundation for developing innovative solutions with substance. While the future may often be fuzzy, she didn't want fuzzy plans.

This time, the workshop objective was clearly defined: her team of facilitators selected the most interesting topic leads from the first workshop and prepared questions intended to focus teams. Participants were tasked to provide detail, depth and actionability to these topics. In addition, the second workshop had a different mix of participants with an emphasis on customer communications experts. Penrose hoped the new voices would add fresh perspective.

Based on positive prior experiences, participants were organized according to the World Café concept, a methodology for effectively facilitating large group dialogue in a very limited amount of time.

Each team discussed one of the chosen topics. In a first 20-minute round, each team responded to a set of given questions to flesh out their respective topic with details. After the round, all but one member of each team switched to another table to form new groups. The remaining member played the role of the table host, updating her new team on the results of the first round. The new team members commented on the prior work and then collaborated for another 20 minutes on the topic. Mixing teams between rounds was intended to boost group sharing, recombining, and validating individual ideas, iteratively building on the results of the previous round. The teams then reshuffled again to repeat the process, before openly presenting the results to everyone.

To conclude the workshop with tangible output, the facilitators asked the teams to script stories based on the group presentations. The stories were used as an alternative to Future Telling and prototyping with Paper Mockups and Dark

Horse Prototypes. In this sense, the stories were narrative prototypes of the team visions in a real-world setting. Penrose collected the stories and thanked everyone for their input. It was now up to her team to integrate the stories into their planning.

### **HOW CAN WE TURN EXPERIENCES INTO LESSONS?**

Penrose leaned forward in her chair and focused on the pile of stories occupying the far corner of her desk. Now, several months after the workshops, she was able to assess their outcome more clearly.

The stories helped trap participants' beliefs and assumptions about what was important to them. The workshops also helped generate seedlings of ideas that could turn into action. For instance, the communication channels between production, sales, and customers had clearly seen improvements, including more customer-friendly IT solutions with better responsiveness to customer feedback and improved capabilities to collect and interpret it. One customer

information system was undergoing changes to more effectively target the communication of environmental messages.

Although Penrose did not gain innovative new ideas for the actual content of the company's environmental communication as hoped, she felt that the current improvements in the customer interface would result in feedback that could lead to future content opportunities—content that would be designed in co-operation with customers.

In hindsight, Penrose wished she had set participants' expectations better about the challenges inherent in long-range planning. Defining clear objectives was one lesson learned. She also knew it was dangerous to rely solely on personal assumptions about the state of things, which may cause groups to miss larger patterns or invent without context. For future meetings, her team would prepare more real-world data as input for the methods, as well as encourage time after the workshop to validate and supplement team guesses.

A final important learning was that a future challenge could not be “solved” in any single meeting. Instead, Penrose's experiences reminded her that the new innovation methods were useful to structure long-term group collaboration around complex problems. Discussions would need to be carried forward, as her team gained more insight and advanced their own thinking. In the spirit of the topic, she also needed to consider her future communication with different stakeholders, both internal and external, about the progress of this forward-looking initiative.

With these thoughts in mind, Penrose picked up the stories from her desk and walked out of her office. There still was a lot of unrealized potential preserved in the pile of paper tucked under her arm. This only meant that her work was far from finished. Penrose smiled as she determinedly walked down the corridor. She and her team had people to excite, and she would win them over one at a time, starting today.



*“We are what we think.  
All that we are arises with our thoughts.  
With our thoughts we make the world.”*

— **Buddha**, Indian spiritual teacher  
(*The Dhammapada*, c. 300 BCE)

*“Start where you are. Distant fields always look  
greener, but opportunity lies right where you are.”*

— **Robert Collier**, founder of Collier Publications  
(*The Law of the Higher Potential*, 1947)





# HOW TO START

## CHAPTER 2

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## LET'S START WITH QUESTIONS

With the basic framework in mind, how should you begin approaching your group's innovation process?

We provide some basic pointers on how to use it in your innovation work. This chapter serves more as a concise FAQ at the start of your own planning process, drawing from the questions other innovation managers commonly ask us.

First, we explain why we call it a playbook. Playbooks are used in many sports, and we consider innovation as a competitive sport that requires constant team training and preparation. Then slightly tongue in cheek, we give the skeptics 10 valid reasons not to use the playbook. We only want readers who will match inspiration with perspiration.

We also describe three paths to innovation in an organization, namely: core growth, new growth, and emerging

growth. These paths will help determine the value and impact you want to see over time.

We then outline several common roles and industry contexts for innovation efforts, suggesting specific ways each role can gain the most benefit with the methods.

So you can get a sense of the methods in action, several actual applications and problems are presented.

After reading this chapter, turn to Chapters 3, 4, and 5 to directly address the output and the nature of idea you would like to pursue. Then rely on Chapters 6 and 7 to focus on the underlying process and mindset that allows these types of ideas to flourish repeatedly.



## WHY A PLAYBOOK?

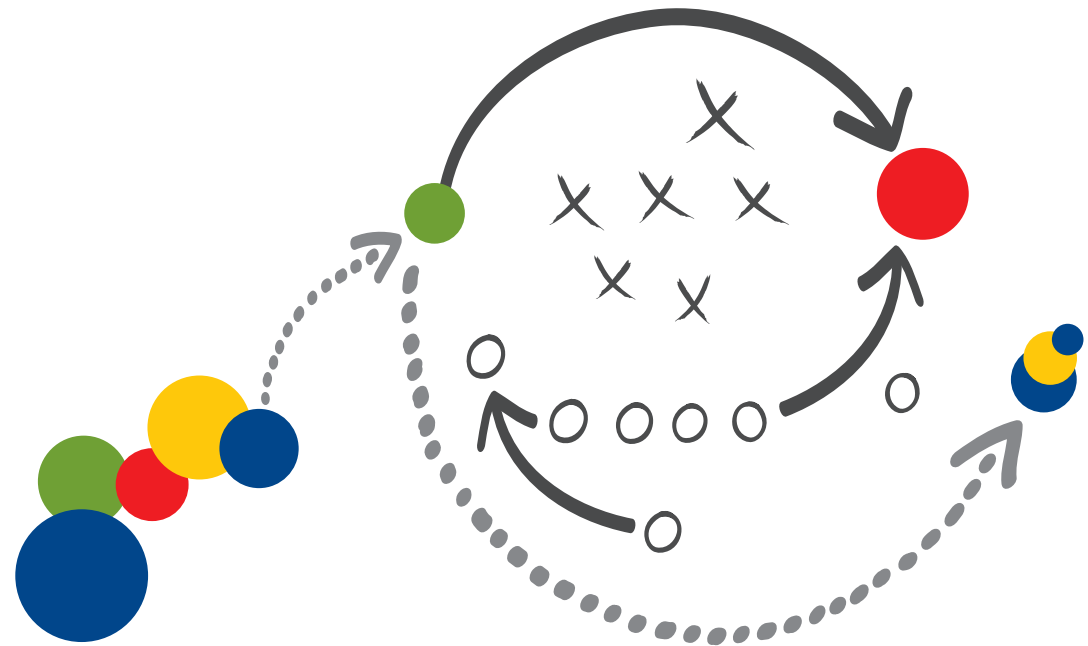
In sports, a playbook is a notebook containing the descriptions and diagrams of all the possible plays and strategies used by a team. Athletes study and memorize the playbook before their season begins.

Similarly, innovation in an organization requires a high-performance team to work seamlessly together to deliver on a new idea. Where do you go for your coaching? For your training and tips?

Following the spirit of this sports analogy, this playbook is your resource to help coach you and for you to learn how to coach others in radical innovation.

This playbook is designed for you, as they say in sports, to take the field. Most importantly, it is designed to be doable.

Another aspect of a playbook is about learning through play. Play is often overlooked or dismissed when innovating, and a sense of creativity and fun is required to release inhibitions and see things in a fresh light.



## **10 Reasons Not to Use This Playbook**

1. You will not find a single ready-to-use idea
2. Using this playbook is hard work
3. The playbook does not know your problem
4. You will make yourself and others uncomfortable
5. There is no guaranteed success in radical innovation
6. This playbook won't provide a quick fix
7. It is lengthy
8. Some academics were involved
9. It won't help you predict the future
10. You can't cheat at innovation

### **1. YOU WILL NOT FIND A SINGLE READY-TO-USE IDEA.**

Generating your next big idea is your job. This playbook is here to support and guide you in this daunting task by giving you practical tools and suggested steps towards making your vision real.

### **2. USING THIS PLAYBOOK IS HARD WORK.**

As a workbook, it is not called a WORKbook for nothing. Innovation is hard work. There really are no shortcuts to big ideas. Instead, we will show you how others have used the tools to approach and solve their problems, so you can benefit from multiple real-world examples and tips.

### **3. THE PLAYBOOK DOES NOT KNOW YOUR PROBLEM.**

You have to know your problem. Take the tools presented here and make them your own. Adapt them, use them

creatively, and make them work for you. The tools have been designed to work in diverse contexts and for diverse groups.

### **4. YOU WILL MAKE YOURSELF AND OTHERS UNCOMFORTABLE.**

Big ideas often require big changes, which can feel scary. Fortunately, this playbook gives you the tools to make your case against the resistance. You can use the tools to reason for the inevitability of changes and to show why the changes are not only justified but necessary.

### **5. THERE IS NO GUARANTEED SUCCESS IN RADICAL INNOVATION.**

Using this playbook will not change this fact. On the contrary, the book urges you to fail early and to fail often! By experimenting with ideas, you will eventually find a big and successful one. To help you fail more eagerly, the playbook offers a low-cost, low-risk environment to prototype and test.

### **6. THIS PLAYBOOK WON'T PROVIDE A QUICK FIX.**

The more radical your idea is, the bigger changes are required, and the longer it will take to execute. With this playbook, you can take the first concrete steps towards implementing your vision as soon as this afternoon. At a minimum, you will know what to do next and roughly how long it will take to do it.

### **7. IT IS LENGTHY.**

We don't expect you to wade through the playbook from cover to cover. You can grab what you need as you need it. All tools are designed to stand alone.

### **8. SOME ACADEMICS WERE INVOLVED.**

Many of these tools were taught and tested at universities. Our team regularly crosses academic and business settings with ease because, ideally, good theory and good practice should go hand in hand.

### 9. IT WON'T HELP YOU PREDICT THE FUTURE.


Like the weather report, you can trust a forecast only so much because things change. What you can do, however, is to plan ahead and prepare yourself. The tools in this playbook can help you out with this challenge and are specifically designed to be flexible as a situation changes.

### 10. YOU CAN'T CHEAT AT INNOVATION.

You may be tempted to take shortcuts or fake your analysis. Taking the same road or repeating old routines won't take you any further in your pursuit of anything radical. The same holds true for adopting what's popular. This is where you will need a lot of self-discipline and self-reflection. It's all up to you.

#### REFLECTION

*Which reason(s) resonated most with you? Why?*



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## WHAT DEFINITIONS ARE WE USING?

### STRATEGIC FORESIGHT

Foresight is the ability to plan for the future. It is a mix of mindset and methodology: a view of the future and the practice of looking forward.

In particular, organizations use strategic foresight to help them develop long-term plans for new business growth. Part of the premise is that future outcomes can be influenced by our choices in the present.

A key difference exists between foresight and prediction. Foresight acknowledges that the future is ambiguous and aims to prepare decision-makers for how the future may change. In contrast, predictions try to remove uncertainty from the future by forecasting what will happen based on the likelihood of certain events.

### INNOVATION

Fundamentally, innovation is about finding, building, and taking a new idea to the marketplace. Innovation allows all types of organizations—businesses, nonprofits, and government institutions—to create new customers, build stronger loyalty among current customers, and stay relevant in the world.

Moreover, innovation can describe either the output or the process. In this playbook, we focus on the process in order to improve the output.

### RADICAL INNOVATION

Radical innovation takes daily R&D and new product development efforts another step further. Radical innovation is a way of imagining big ideas that

ultimately can create big impact. It is about changing the magnitude of your effort, either in terms of how your group approaches innovation or in terms of the impact you would like to see in the market.

While scholars may refer to radical innovation by a variety of synonyms—such as disruptive, breakthrough, or revolutionary—all the terms share a core definition. Radical innovation is not incremental development; instead, it is a new technology or solution that creates an entirely new and often unexpected market. In some cases, the solution pushes the limits of previous inventions and may require the creation of new technologies in order to be built.



# WHAT TYPE OF GROWTH DO WE SEEK?

What do you see as the most rational path to innovation? What does your leadership team believe?

Ultimately, your organization has a viewpoint on innovation. There are three basic ways an organization can grow through innovation: core growth, new growth, and emerging growth. Each type will determine the approach and tools for innovation.

## CORE GROWTH

The goal of Core Growth is to strengthen the core business and enterprise mission by creating and delivering successful new products and services that fit the existing portfolio. This path is generally focused on short-term opportunities.

## NEW GROWTH

The goal of New Growth is to expand the business by developing new operations or finding new markets complementary to existing efforts. This path tends to focus on mid-term opportunities.


## EMERGING GROWTH

The goal of Emerging Growth is to capitalize on emerging areas and big bets that may be in entirely new or unrelated sectors. This path pursues long-term possibilities with potential high reward.

Radical innovation relies most on Emerging Growth because the aim is to generate the greatest impact. This path is not necessarily a high-risk strategy, although big bets in technology may be involved. Instead, risk is minimized by evaluating future possibilities systematically and then by taking deliberate and informed action. You know what you are doing next, even if the end results are not exactly clear yet.

## REFLECTION

*Which growth path does your work focus most on? Why?*



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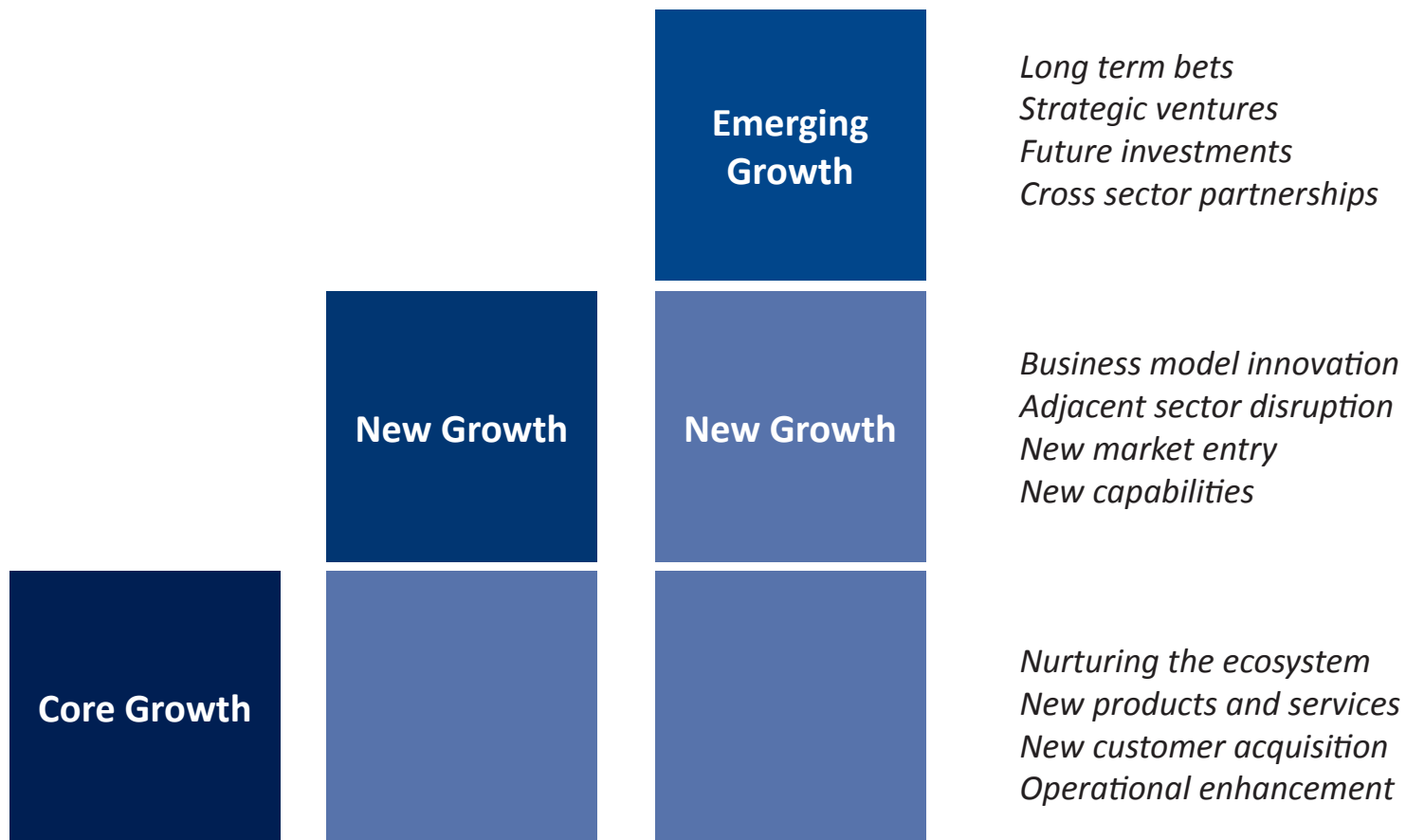
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# WHERE DO WE FIND INSPIRATION?

Where should we look for ideas?  
You may find your initial focus in three simple places.

## ORGANIZATIONAL START

In many cases, strategy or R&D teams are already working within an existing long-term roadmap. You thus know which emerging market needs and/or technology areas represent priorities to your organization. For example, as a financial services manager, you know you must start exploring the future of retail banking.

## INTERNAL START

In other cases, an innovator or team leader begins with a topic area that sounds promising. You may already have

some expertise in a particular space or feel personally motivated to pursue an area more deeply. You start with your gut and simply adjust from there. For example, you have a personal passion about high-tech hydroponic farming that you'd like to pursue.

## EXTERNAL START

Other times, you may have the fortune to start "de novo" without any corporate expectation or team goal. You can then look for nuggets of innovation ideas around you, and many sources are rich for discovery. The most common sources for finding future needs are statistics, field reports, future scenarios, history, and current niches. These sources are presented in the adjacent table.

Category	Example sources
Statistics	<ul style="list-style-type: none"><li>&gt; Product sales forecasts</li><li>&gt; Trend data</li><li>&gt; Simulations</li><li>&gt; Demographic reports</li></ul>
Statistics	<ul style="list-style-type: none"><li>&gt; User / expert interviews</li><li>&gt; Social network usage</li><li>&gt; Focus groups</li><li>&gt; Ethnography</li></ul>
Future scenarios	<ul style="list-style-type: none"><li>&gt; Role-playing</li><li>&gt; Delphi method</li><li>&gt; Movies</li><li>&gt; Science fiction</li></ul>
History	<ul style="list-style-type: none"><li>&gt; Archives</li><li>&gt; Case studies</li><li>&gt; Documents</li></ul>
Common niches	<ul style="list-style-type: none"><li>&gt; Early adopters</li><li>&gt; Trendsetters</li><li>&gt; Lead users</li><li>&gt; Thought leaders</li><li>&gt; Weak signals</li></ul>



## WHO LEADS CHANGE IN INNOVATION?

Multiple innovation roles—or what you might call personality types—coexist within an organization at any given time.

We present six common roles that you often find within an R&D endeavor or new innovation venture: the Pioneer, Problem Solver, Analyst, Producer, Rebel, and Pragmatist.

Each role takes a different approach to the innovation process and, thus, values different output. While one role may dominate your usual behavior, you likely share traits across several roles.

As an innovation manager, look to balance these roles within your team. Also consider the roles within your broader network, so that you may shape your group's communication strategically.

In addition, it helps to know how the various roles interact with one another. While each role has an important part to play in the pursuit for innovation, each role tends to see things very differently. A certain amount of creative friction is natural. As your team is put into stressful situations, you can help the other team members understand the value of bringing multiple minds together.

### THE PIONEER

You burn to find and conquer undiscovered opportunities. What matters most are fast results. You trust what you can see and follow your gut through trial and error. You learn best by doing and showing others.

- Scan the examples given to spark ideas
- Adopt the DARPA Hard Test



### THE PRODUCER

Ideas may start with one person, but they require a team to deliver. You rally others to a good cause and take pride in understanding the people behind the process. Innovation must be a shared mindset.

- Begin at Chapter 4 on Opportunity
- Evangelize the Futuretelling method



### THE PROBLEM SOLVER

You love a good challenge and won't back down until you solve it. You're good at identifying assumptions, constraints, and alternatives. Smart innovation requires setting goals so you can narrow your options wisely.

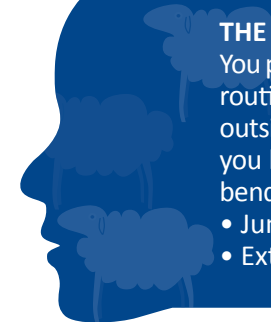
- Gain fast context with Chapter 3 on Perspective
- Adopt the Change Paths method



### THE REBEL

You put the radical in radical innovation. You consider routines as negotiable and often help others to think outside the proverbial box. What many miss is that you know the system closely so you know where to bend rules.

- Jump first to Chapter 7 on Vision
- Extend the Future User tool



### THE ANALYST

You like to see the facts first before jumping to conclusions. Asking the right questions matter when getting to the truth. You believe effective innovation takes discipline, and you appreciate systematic rigor.

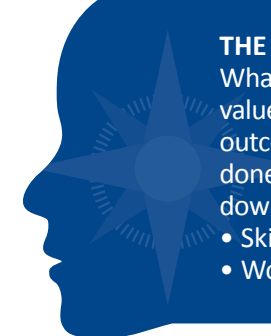
- Learn how to layer the Foresight methods
- Master the White Spots method

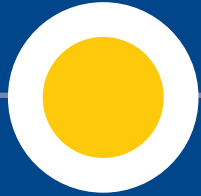


### THE PRAGMATIST

What some might call lazy, you call focused. You value taking the most efficient path to the desired outcome, and you help others to get the essentials done without creating extra work. Innovation comes down to execution.

- Skim the tips first for each method
- Work with the templates





# WHICH CONTEXTS OR INDUSTRIES WORK BEST?

This playbook can be applied easily to different types of organizations and contexts.

The methods have been deliberately designed to address the fundamentals of radical innovation in a business setting and have been tested with multiple companies and institutions around the world.

In other words, experience has shown us that anyone can use these methods. They are not limited to a particular industry, country, or type of organization.

In addition, the lessons and examples presented throughout the playbook are drawn from a variety of industries and companies. You can learn from others outside your field, which may help you see your own effort from a different angle.

## INDUSTRY SECTOR

Like the best tools, our methods are designed to be industry-agnostic. You don't follow the industry; you follow the opportunity. We've seen our methods used in healthcare, automotive, heavy industries, consumer electronics, software, financial services, and many other industrial sectors. Designed to be flexible, these methods support and help

structure your decision-making regardless of your content focus.

## TYPE OF ORGANIZATION

Frankly, we've seen the greatest use by companies. Some companies want to find the next big idea; some want to renew or improve their practice of innovation. Other organizations—including universities, nonprofits, governmental agencies, and foundations—have also found both the mindset and methodology valuable to their mission. We will try to highlight examples from all types of organizations in the playbook.

## COMPANY SIZE

Managers at large established corporations, small businesses (SMEs), and startups have all used and tested these methods in the last few years. While the level of bureaucracy and available resources may differ by company size, the underlying need to develop a discipline of innovation remains the same.



## VIEWPOINT | REVISIONIST THINKING

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### COUNTRY AND CULTURE

Our methods deliberately cross geographic boundaries. Playbook examples and tips come from Finland and the United States—as well as from multiple places in Europe, East Asia, Africa, and India. Our goal is to maximize learning, recognizing both similarities and differences across cultures.

I am a social scientist in Finland, and our usual Scandinavian planning principle is to plan rigorously and execute once. After working with several American colleagues from Silicon Valley, I have discovered an unexpected difference in their approach to problem-solving.

In Silicon Valley, they tend to execute first, revise, and then execute again. While I can see the

value in rapid learning cycles, at the same time, this approach creates a headache for Finns who have already settled contentedly and deliberately with their first creation.

As we work with more foreign innovators, Finnish managers should be exposed earlier to other ways of working—ultimately leading to better harmony and making iteration a welcome part of our planning process.



## WHAT TYPES OF PROBLEMS ARE ADDRESSED?

What types of problems are other companies and innovation managers addressing with the methods in this playbook?

Here's the quick answer: some groups start with a specific opportunity or problem in mind; other groups want to explore a range of future possibilities. The methods are deliberately flexible.

See what other teams have done around the world:

### **GLOBAL FORESTRY COMPANY**

"We used the methods to develop an entirely new product concept based on a recently developed wood-based material. We applied the methods to tangibly envision a profile of the product's future user in order to build a user-driven vision."

### **INTERNATIONAL PAPER PRODUCER**

"We wanted to think out of the box and find new ideas for existing assets. The tools gave us a structured approach to inventing new uses for an obsolete production capacity. In a heavily capital-intensive industry such as ours, it really paid off to be creative with alternative uses for our slack capacity and resources."

### **NATIONAL MEDIA COMPANY**

"With the methods, we redesigned our company's long-range planning approach and aligned multiple organizational processes in trend-finding. The methods let us jointly design and efficiently communicate the new processes among colleagues and external collaborators."

### **SOFTWARE DEVELOPER**

"We wanted to anticipate future technology changes, so we could prepare ourselves for these changes and craft solutions for our clients that support the new routines and ways of working in the future. We used the methods to build grounded scenarios of future work environments and practices, helping us determine the actions to take today to be ready for tomorrow."

### **TRAINING SERVICE PROVIDER**

"We believe foresight is a skill and a way of thinking that can be learned. We used the methods in our annual strategy planning process to gather input from our external network and guide the development of a five-year strategy roadmap."

### **MARKETING DEPARTMENT**

"We needed to rebrand one of our more conventional product lines, make it 'greener' to consumers. Brands are all about creating perceptions and, hence, influencing people. This required both a strong, exciting, and believable vision as well as a coherent and targeted communication strategy. The methods here helped us achieve just that."

### **FEDERAL GOVERNMENTAL AGENCY**

"One of our largest funding programs was drawing to an end. We needed to figure out how the world and national innovation challenges had changed since it started, so we could develop new program structures and content that would be relevant for future funding

needs. The methods made it easy to organize discussions with experts and test whether the new program visions were far-reaching and ambitious enough."

### **STRATEGIC R&D CONSORTIUM**

"R&D activities take place in highly networked communities of academic, corporate, and governmental actors. We used the methods to create and plan a joint research agenda that is far-reaching yet actionable. It was helpful to map and then re-position our network partners based on their fit with our future goals."

### **INTERNATIONAL STEEL COMPANY**

"We especially liked the visualizing and fast prototyping with simple mockups, which has affected our mode of operation

and opened new ways to think and communicate ideas to others."

### **NATIONAL IT COMPANY**

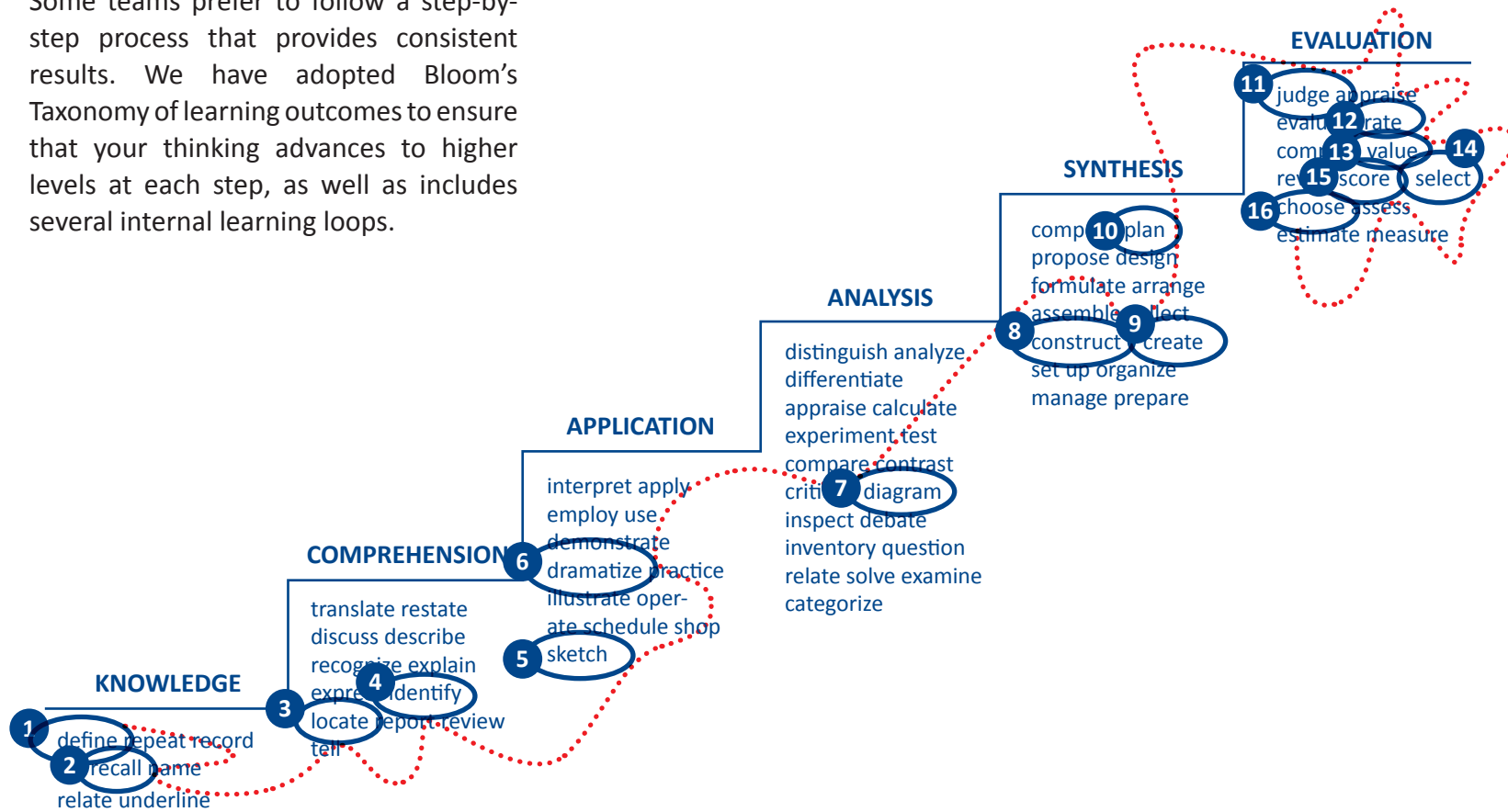
"The methods have been used in the annual planning of some of our company's areas. They have been useful when producing supporting ideas and material for business model development of new services. All in all, consider these sample situations as hints for your own planning."

The guidelines provided in this playbook will help you learn the core principles needed to use the methods correctly, and as with most plans, you then need to translate them into your context.



# WHAT IS THE LEARNING PROCESS?

Some teams prefer to follow a step-by-step process that provides consistent results. We have adopted Bloom's Taxonomy of learning outcomes to ensure that your thinking advances to higher levels at each step, as well as includes several internal learning loops.

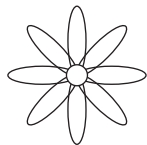


Step	Learning Objective	Method	Go to Page
1	Define the different dimensions in your innovation space	Context Map	61
2	Recall the historical patterns for the relevant dimensions	Progression Curves	70
3	Locate the patterns in time, noting other related influences	Janus Cones	81
4	Identify any opportunities in population changes	Generational Arcs	94
5	Sketch two user profiles to anticipate future customer needs	Future User	103
6	Dramatize the future customer need in a real context	Futuretelling	114
7	Diagram a range of solutions to find a gap in customer need	White Spots	127
8	Construct a quick physical prototype of your future solution	Paper Mockups	136
9	Re-create your prototype, focusing on the core benefit	Dark Horse Prototype	145
10	Plan a path of action to address the future customer need	Change Paths	149
11	Judge colleagues and friends as potential innovation partners	Buddy Checks	168
12	Rate yourself and your team for innovation leadership aptitude	VOICE Stars	178
13	Value how your innovation network can support your idea's growth	Crowd Clovers	188
14	Select a short description about your future solution	Vision Statement	203
15	Score your solution's vision statement for its visionary potential	DARPA Hard Test	213
16	Choose your idea's most efficient network path to success	Pathfinders	230



## CAN WE START WITH A SPECIFIC OBJECTIVE?

Are you focused on a particular aspect of a problem? While all the methods are designed to work as a system, you can jump to a particular method as needed based on the question facing your team now:



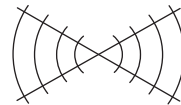
**What's the big picture?**

→ page 61



**What was done in the past?**

→ page 70



**What patterns can we anticipate?**

→ page 81



**What changes in people matter?**

→ page 94



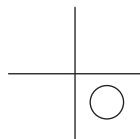
**Who are our future customers?**

→ page 103



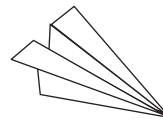
**How can we excite our audience?**

→ page 114



**Where is the untapped market?**

→ page 127



**What is our first prototype?**

→ page 136



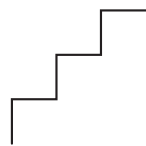
**What is essential about our idea?**

→ page 145



**What action should we do next?**

→ page 149



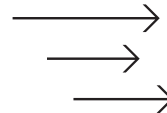
**How do we find good partners?**  
→ page 168



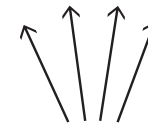
**What leadership do we need?**  
→ page 178



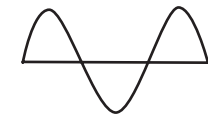
**How can we use our network?**  
→ page 188



**What is a good vision?**  
→ page 203



**How can we test our vision?**  
→ page 213



**How can our vision succeed?**  
→ page 230





# WHERE DO WE START MIDWAY IN A PROJECT?

If your team is midway through a project, you can use the quick self-assessment here to determine your next step or re-check that all gaps have been sufficiently addressed. This evaluation will let you jump to the specific method(s) you need.

## INSTRUCTIONS

Please mark one X for each row to evaluate your team's level of knowledge in addressing the specific statement.

### Scoring key:

- 1 point = missing knowledge
- 2 points = limited knowledge
- 3 points = adequate knowledge
- 4 points = good knowledge
- 5 points = excellent knowledge

Radical innovation statement		Team's level of knowledge				
		1	2	3	4	5
<i>Example: I clearly understand the instructions.</i>					X	
a.	We can identify the main issues in our topic.					
b.	We can describe the precedents of this idea that have succeeded or failed in our organization, related industries/ disciplines, and other countries.					
c.	We know which events, companies, and other ideas that have influenced today's understanding of this topic.					
d.	We know who the largest and/or most relevant population group is in our target future horizon.					
e.	We can identify the shared values and beliefs of this specific population group.					
f.	We have developed a comprehensive profile (persona) of our target future user.					
g.	We know how the unique needs of the target future user will be different from today's user. (persona) of our target future user.					
h.	We can present a clear use case that presents the user's behaviors in a realistic future context.					
i.	We know how our solution creates a radically new opportunity in the marketplace.					
j.	We can identify the top 2-3 factors that define the unique value of our innovation idea.					

## SCORING

If your team's score is less than 3 points per row in the adjacent table, consider turning to the appropriate method(s) as needed:

- a. Context Map on page 61
- b. Progression Curves on page 70
- c. Janus Cones on page 81
- d. Generational Arcs on page 94
- e. Generational Arcs on page 94
- f. Future User on page 103
- g. Future User on page 103
- h. Futuretelling on page 114
- i. White Spots on page 127
- j. White Spots on page 127
- k. Paper Mockups on page 136
- l. Dark Horse Prototype on page 145
- m. Change Paths on page 149
- n. Buddy Checks on page 168
- o. VOICE Stars on page 178
- p. Crowd Clovers on page 188
- q. Vision Statement on page 203
- r. DARPA Hard Test on page 213
- s. Pathfinders on page 230

Radical innovation statement		Team's level of knowledge				
		1	2	3	4	5
k.	We can explain several lessons gained from building and testing a rough model / prototype of our innovation system.					
l.	We can specify the fundamental innovation in our idea that brings the most value to our target users.					
m.	We can name the top 2-3 most critical decisions that are on the direct path to delivering our innovation idea.					
n.	We have a good sense on how to find co-creators.					
o.	Our team knows what is required to lead and instill a culture of radical innovation.					
p.	We know how to rely on our personal networks for action.					
q.	We can present a mini summary of our innovation vision that any potential customer would understand.					
r.	We can identify the breakthrough potential of our innovation vision in relation to other well-known innovations.					
s.	We know the formal and informal path our idea must take within the organization to succeed.					



# SHOULD WE WORK IN TEAMS OR ALONE?

The short answer is both.  
All the methods can be used independently or within groups.

## USING METHODS ALONE

Some people prefer using a particular method on their own for the following reasons:

- Before they talk with others, they use these methods to help them sort and prioritize multiple options that have been stewing quietly in their heads.
- The methods let them prepare a better presentation that is more visual and provocative than the usual report slides.
- The methods are uncommon, encouraging a user to loosen existing biases and broaden a problem space in new ways.

## USING METHODS IN TEAMS

Others take advantage of working in groups for these reasons:

- The methods offer an impartial common language, which helps prevent people from different divisions or functions falling back to alienating jargon or beloved tools as easily.
- The feedback and ensuing dialogue among group members allow ideas to sharpen faster and co-evolve with additional input.
- Another benefit is greater alignment within a team or community. By working together with the methods, people feel a shared sense of ownership in the ideas.
- As work has become more complex and specialized, working in groups overcomes the problem of narrow thinking. The methods can be used to encourage a cross-disciplinary conversation, drawing upon a wider pool of knowledge in the group.

## OPTIMAL GROUP SIZE

We are often asked, what is the right number of people in a group? The ideal group size tends to be about four people, so that enough diversity exists in terms of age, background, discipline, etc. Ultimately, everyone should feel like a contributing member. Group sizes tend to be larger in Asian cultures. Also, expert facilitation is nice, but optional.

Use the methods to rally your team to a common cause and spark in-depth discussions on ideas and visions that you want to pursue. Either used individually or in groups, the methods give structure to the unstructured process of radical innovation.



## WHERE CAN WE FIND CREDIBLE DATA?

The methods here rely on real-world data, so that the resulting solutions are fully grounded in reality. In other words, these solutions are intended to be built.

When innovation projects start, groups are often stumped about where to find appropriate data. In group meetings, it is easy and convenient to draw from personal experience to make a business case for a new idea.

At some point, however, you should ground your anecdotal evidence and hunches with real data. Below are several data sources as starting points for foresight development. These sources span newspapers, international databases, academic programs, and more. We expect you to expand this list based on the experts and resources unique to your field of work and organization.

And don't forget to observe what is around you as revealing sources of information. For example, when

attempting to understand needs today, a wonderful exercise is to pick up a set of magazines as primary research materials.

Ask yourself:


- What are the articles about?
- What is the tone?
- What is the background of the writers?
- What is the quality of the magazine itself?
- Who is the magazine's target reader; who is its perceived reader?

Your data sources for future planning are endless, including: textbooks, newspapers, wikis, industry reports, universities, government agencies, industry associations, research labs, think tanks, professional journals, and expert interviews.

Please see the appendix for a brief list of resources in emerging technologies, location and population, corporate resources, and more.

### REFLECTION

*What are your usual top sources for information?  
Why?*



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# CASE STUDY | 10 WORKSHOP LESSONS FROM AN INDUSTRY VETERAN

## PLANNING WITH FORESIGHT

Sophie Henriksen (a pseudonym), development manager at a global player in one of the world's most production-intensive industries, attended a manager program for innovation training with several colleagues.

Afterwards, she planned to apply the new tools and techniques she learned to other initiatives underway at her company. Henriksen decided to plan two additional workshops tied to specific projects.

One workshop would be a half-day session focused on exploring innovative business models for new products. The second workshop would be a full-day session dedicated to finding new end uses and applications for an existing product.

## THE ADVANTAGE OF WORKSHOPS

More than routine meetings, workshops are an effective way to bring people together and focus efforts on a topic of common interest. Few other methods of

collaboration give people the chance to interact and have a concentrated period to strategically plan and reflect.

Typically, managers may devote only a small portion of their time on deep analysis, so these kinds of sessions provide key perspectives that can be difficult to pursue during daily work hours.

How is an innovation workshop different from any other type of workshop? First, the agenda is focused on generating and evaluating new ideas. Henriksen wished to provide the right innovation tools to explore more ideas beyond the usual brainstorming tactics.

Second, the outcome is not to solve problems. While Henriksen wanted to encourage open-ended thinking about future possibilities among participants, she knew that the real goal was to identify promising business opportunities.

Third, participants often work with ideas as part of their job roles. Henriksen would first consider colleagues in business strategy, research and development, new

product development, market research, and other related areas, all of whom were responsible for innovation in some way.

From prior experience, Henriksen knew the importance of planning certain workshop details before sending out the invitations, such as framing objectives appropriately and creating a safe and supportive environment for everyone. She also consulted two workshop facilitators in advance for their recommendations.

Together they revisited their 10 most central tenets for organizing an innovation workshop:

### **LESSON 1: MAXIMIZE PARTICIPANT DIVERSITY**

People rely on techniques honed from prior experience—what scholars call heuristics—and trial-and-error for daily problem solving, learning, and discovery. Inviting people with similar backgrounds and job responsibilities means that everyone in the workshop will draw on similar mental models and biases. Inviting people from more diverse backgrounds will boost the number of mental models available, which could lead to more creative (re-)combinations. Diversity can be defined across multiple factors such as corporate function, job role, personality type, gender, age, and academic training. Diverse perspectives will also energize team discussions and bring new insights into old contexts.

### **LESSON 2: DIVIDE PEOPLE INTO SMALLER TEAMS**

Smaller teams lead to higher levels of engagement and interaction, and studies show that the optimal group size for problem solving tends to be four people.

Smaller teams also means more ideas can be pursued and shared with the other teams for feedback. Breaking up groups that collaborate in daily work and inviting external stakeholders, such as partners and customers, helps foster diversity.

### **LESSON 3: ASSIGN LIGHT PRE-WORK**

Many workshops start with a warm-up activity that sets the tone for the workshop and serves as a group icebreaker. You can achieve similar results by assigning light pre-work in advance of the workshop, which recovers precious time from the workshop itself. For example, you may ask participants to read 2-3 short relevant articles, ponder a short list of provocative questions, try applying an innovation tool, or observe/interview 1-2 representative customers. Teams can then share their initial thoughts and results at the workshop for open discussion. This lays an effective, shared foundation that everyone can directly build on from the start.

### **LESSON 4: FRAME THE OPPORTUNITIES TO BE EXPLORED**

At the early stages, innovation efforts often require making sense of very ambiguous tasks. People's natural discomfort with ambiguity may lead to tweaking product features they know by heart and gravitating toward familiar business solutions.

Every facilitator must strike a balance between ultimate creative freedom and directed group objectives. By setting a clear agenda and framing the business opportunities sought, facilitators can help everyone understand the context of the creative activities that will follow. Drawing these boundaries is like building a fence around a group playground, which helps participants see where to focus their efforts. Be prepared to reset team discussions throughout the session.

**LESSON 5:  
PREPARE SIMPLE EXAMPLES**

Many times complex issues are easier to learn when we can observe how others have approached and solved them. Before teaching a new method, consider providing an example that shows the method in action. Participants will learn faster when examples are shown from contexts they know and recognize in the daily work and home life, such as the last project launch or typical summer holiday.

**LESSON 6:  
APPLY REAL-WORLD DATA**

Teams typically draw first from personal experiences and opinions as input to anchor the tools. Solely using subjective data can lead to invalid, utopian conclusions about the future state of the world. The more real-world data teams can build on, the more grounded their innovation solutions will be. The real

truth to strategic foresight and innovation is to prepare a factual foundation of the present, not to wildly speculate about the future.

**LESSON 7:  
FOLLOW THE PROCESS**

While the types of activities vary with every innovation workshop, the goals are nearly always the same: to encourage participants to look at an opportunity in different ways. Ideally, the current workshop activity will build on insights from the previous activity. This playbook provides one tested formula for finding the next big idea and also addresses the gaps often found with the usual activity combination of brainstorming, role-playing, and group voting.

**LESSON 8: ALLOW TIME TO  
REFLECT AND RECHARGE**

The temptation is to build a workshop agenda bursting with exercises. While intense programs can translate into high productivity, creative tasks generally require time to explore alternatives and connect unrelated things. Give participants time by spreading the agenda over multiple workshops or days. Pre- and post-assignments can streamline the workshop agenda and provide ample breaks and downtime for reflection, recovery, and recharging.

### **LESSON 9: ENCOURAGE EXPERIMENTATION AND ITERATION**

The methods in this playbook are designed to help structure and advance team discussions. With that in mind, remind participants that the output from the methods is not final. Instead facilitators should encourage teams to iterate their analysis using the same methods—reworking, discarding, and revisiting drafts as needed. Each iteration will bring them closer to a stronger solution.

Moreover, discussions within and between teams may proliferate beyond the boundaries of the set objectives. Managers should note all new ideas for future reference because these ideas are the seedlings of potentially valuable new avenues for business or internal development.

### **LESSON 10: SUSTAIN THE MOMENTUM OF THE WORKSHOP**

The co-creation of ideas is one of the most powerful ways of committing people to their implementation. There is no stronger sense of ownership than to that which we have created ourselves. Workshops bind individuals together and create a sense of solidarity around new ideas. This momentum can be harnessed into action after the workshop. Instead of the usual individual who is single-handedly tasked as a project champion, you now gain an entire team that is energized to push through change. The difference in leverage is great, allowing inspiration to lead quickly to innovation execution.



*"The challenge of competing for industry foresight  
is to create hindsight in advance..."*

*The quest for industry foresight often starts with  
what could be, and then works back to what must  
happen for that future to come about."*

— **Gary Hamel and C. K. Prahalad**  
*(Competing for the Future, 1996)*





# PERSPECTIVE

## CHAPTER 3

### Shortcuts

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Phase I: Perspective 59

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Context Maps 61

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Progression Curves 70

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Case study: UbiCom 78

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Janus Cones 81

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## PHASE I: PERSPECTIVE

Have you ever spent time in a meeting and after 30 minutes, realized the group should have discussed what has happened before in your organization, let alone industry? Or wondered when the brainstorm you're in will ever converge to the main points?

While some groups like to believe their best innovations occur when they dismiss all prior knowledge, this situation is hard to repeat. The real discipline of innovation requires learning the problem space thoroughly. By being immersed in the facts, you can see new patterns emerge and make unexpected connections beyond the obvious. This is a time that scholars term “incubation”.

Phase I in the Foresight Framework takes all of these issues into account. The objective of the first phase is to develop historical perspective about an area of interest relevant to the future you want to create. You must look back first in order to look forward. By knowing what has happened in the past, you can better understand what may happen again and why—or what you can do to either exploit or prevent similar occurrences.

Call this phase blue sky research, discovery, or whatever term makes the most sense for your team: it's all about

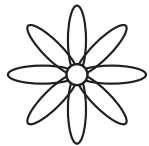
gaining a view of the big picture, so you can discern the right patterns.

Three methods can help you gain perspective quickly:

- Context Map
- Progression Curves
- Janus Cones

## PHASE I: PERSPECTIVE

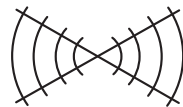
Perspective develops a broader frame of reference, holding up a mirror to the past so you may better anticipate the future.



**Context Maps**  
identify the main dimensions of your current problem or opportunity space.  
→ page 61



**Progression Curves** put event timelines, industry life-cycles, and other developments in context.  
→ page 70



**Janus Cones** let you to view multiple, overlapping, and intersecting events in a single framework.  
→ page 81

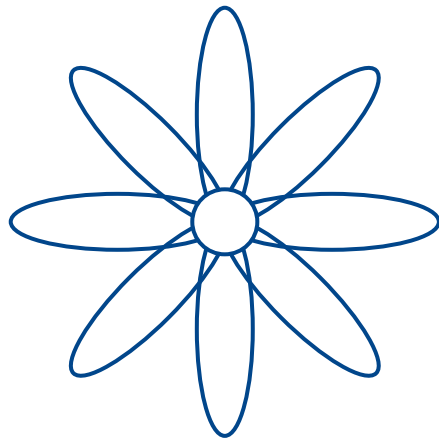
### Questions that drive this phase:

- *What is the bigger context for the topic we are interested in?*
- *What historical events, industry actions, and societal movements can be identified as drivers?*
- *When reviewing previous inventions and opportunities, what similarities in timing and adoption exist today?*



# CONTEXT MAPS

Context Maps capture the themes that emerge when discussing complex problems.



## WHEN TO USE IT

- To pursue an entirely new area of research
- To find group agreement on the important aspects of a problem
- To gain fast background for a particular topic

## WHY IT'S HELPFUL

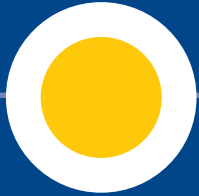
A Context Map advances the work of the usual idea generation tools, such as brainstorming and mind-mapping. The goal of brainstorming is to generate as many ideas as possible, and no focus is required. In contrast, a Context Map lets you begin converging on the top themes or dimensions of a particular topic or opportunity space.

Why eight dimensions to a Context Map? You have enough to capture the problem's complexity, yet not too few to lose sight of what is important.

## WHAT YOU GET

You will identify eight core dimensions of your current problem or opportunity space. By knowing these dimensions, you can ask the right questions that, in turn, prompt a more informed search for promising innovation opportunities.

Moreover, this method is an excellent ice-breaker for a new team to start their innovation discussions. Context Maps also provide rapid reflection at project milestones.



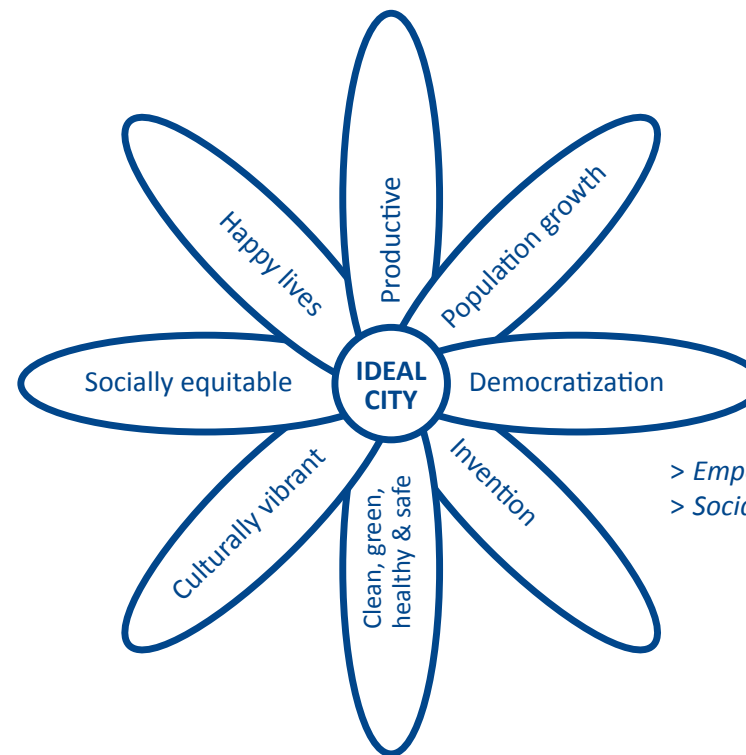
## LET'S LOOK AT AN EXAMPLE

Sir Peter Hall is an eminent British scholar who studies the history of urban planning and design. For the EXPO 2000 World Exhibition, Hall and his colleague prepared an extensive report called *Urban Future 21*, in which they outline a global agenda for 21st century cities.

A university student team used Hall's report to gain quick background for a class project. A major auto manufacturer, which sponsored the students' project, wished to understand how premium transportation would change in global megacities.

Lacking knowledge of the auto industry, the students used the Context Map as a conceptual shorthand to get started on their project and also to remember the main themes of the report.

Without reading the report yourself, you can look at the students' Context Map and also know the eight key dimensions that Hall felt are important to a future ideal city.



> Empowering citizens at local levels  
> Social capital

Source: Peter Hall and Ulrich Pfeiffer. 2000.  
*Urban Future 21: A Global Agenda for 21st Century Cities.*



## INSTRUCTIONS

1. Agree on a broad topic or opportunity area your team wants to pursue. You set the scale of topic. Very broad topics may require several iterations.
2. Draw an outline for a Context Map or use the worksheet template in the playbook.
3. Start talking with your team about your topic, noting any salient dimensions as they arise. Points of intense discussion or even disagreement are good to include in your Context Map.
4. Note side topics and connections around your Context Map. At times, you may jump to create a tangential or different Context Map. That is great association.
5. Repeat the process until your team arrives at a map (or set of maps) that captures your problem space satisfactorily.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

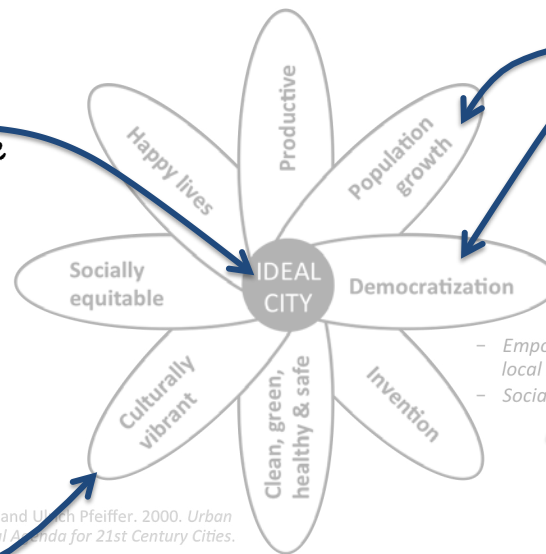
*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Which dimension did you spend the most time discussing?*
- *Which dimension generated the greatest number of questions?*
- *Which dimension generated the greatest number of questions that you can't answer today?*
- *After discussing as a group, do you want to redraw the Context Map based on what you have learned?*

1. We agree that we first want to know how experts define the city of the future

2. We then sketch the tool outline, which looks like a big flower with eight "petals"

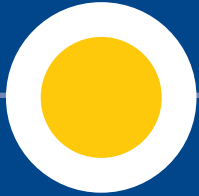


3. As we talk, we note the biggest themes in Hall's report, as one theme per dimension

4. A team member captures related points near certain themes, so we don't forget our dialogue later

Source: Peter Hall and Ulrich Pfeiffer. 2000. *Urban Future 21: A Global Agenda for 21st Century Cities*.





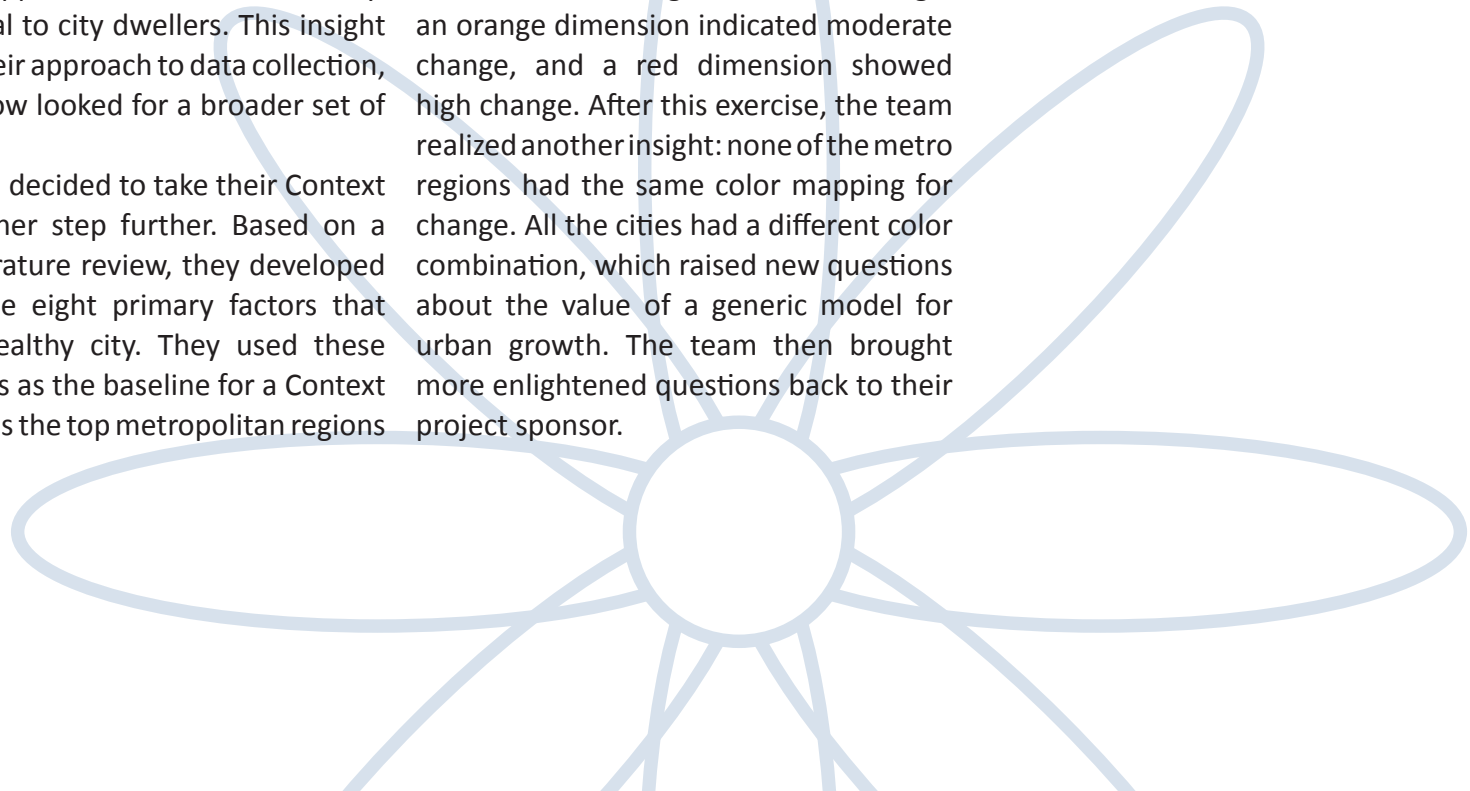
## **DRAWING INSIGHTS & IMPLICATIONS**

After developing an initial Context Map, the student team realized that population growth and productivity were only two measurements for the future development of mega-cities. Other intangible and qualitative aspects, such as personal happiness and cultural vibrancy, are essential to city dwellers. This insight changed their approach to data collection, and they now looked for a broader set of measures.

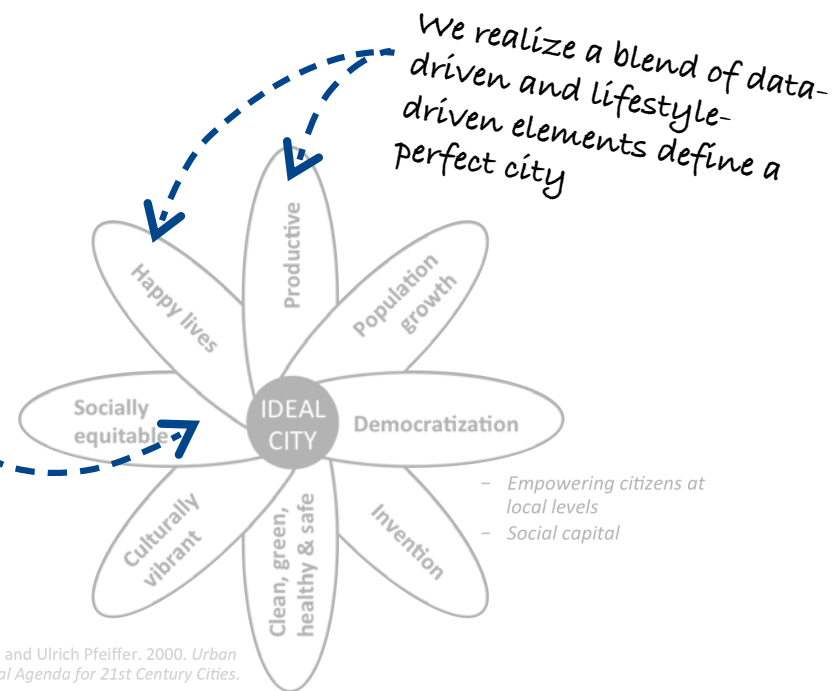
The team decided to take their Context Maps another step further. Based on a deeper literature review, they developed a list of the eight primary factors that define a healthy city. They used these eight factors as the baseline for a Context Map to assess the top metropolitan regions

around the world. They color coded each dimension (or flower petal) in the Context Map based on the potential impact of change expected in the next 20 years. In other words, the cities all shared the same dimensions but showed different color combinations.

Using subjective rankings, the students made a dimension green for low change, an orange dimension indicated moderate change, and a red dimension showed high change. After this exercise, the team realized another insight: none of the metro regions had the same color mapping for change. All the cities had a different color combination, which raised new questions about the value of a generic model for urban growth. The team then brought more enlightened questions back to their project sponsor.



As a variation of the tool, we changed the background color of each dimension, which could show varying levels of expected change



Source: Peter Hall and Ulrich Pfeiffer. 2000. *Urban Future 21: A Global Agenda for 21st Century Cities*.




### TIPS & LESSONS FROM OTHERS

- Draw big maps, preferably on a whiteboard or large flip chart so everyone can see and comment on the various dimensions easily.
- Don't worry about keeping the eight dimensions at the same level. The main objective is to capture what is important in context.
- Note any related points and questions. Sometimes the questions are the most interesting to revisit later, when your team understands more about the problem space and issues.
- Consider generating a Context Map from an outsider's view, such as a supplier or end user, to see how their top dimensions compare to an internal team or organizational perspective.
- You can always create more Context Maps. You may want to pause midway through one map to create a second map in order not to lose your group's conversation flow.
- Hang or post completed maps in public view, such as near your desk. In this way, you can generate continuous insights with others, as well as encourage additional personal reflection and incubation about the innovation topic.

### REFLECTION

*What is the proposed topic?*

*Why do you want to pursue it?*



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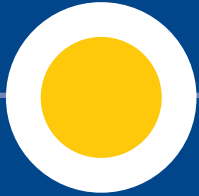
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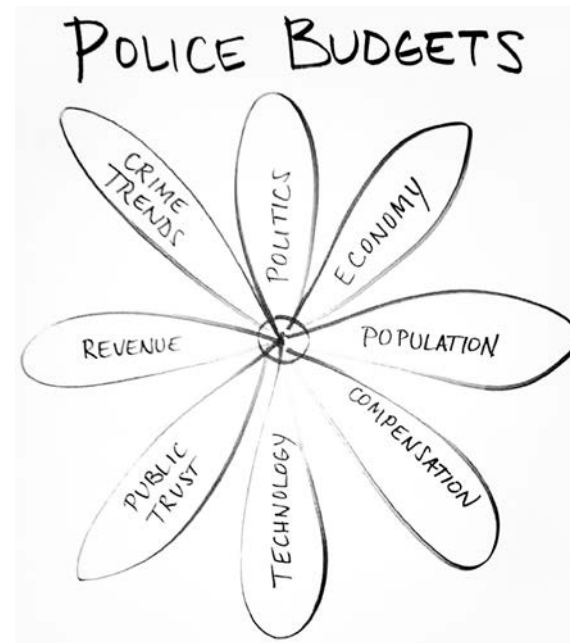
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## ADDITIONAL EXAMPLES

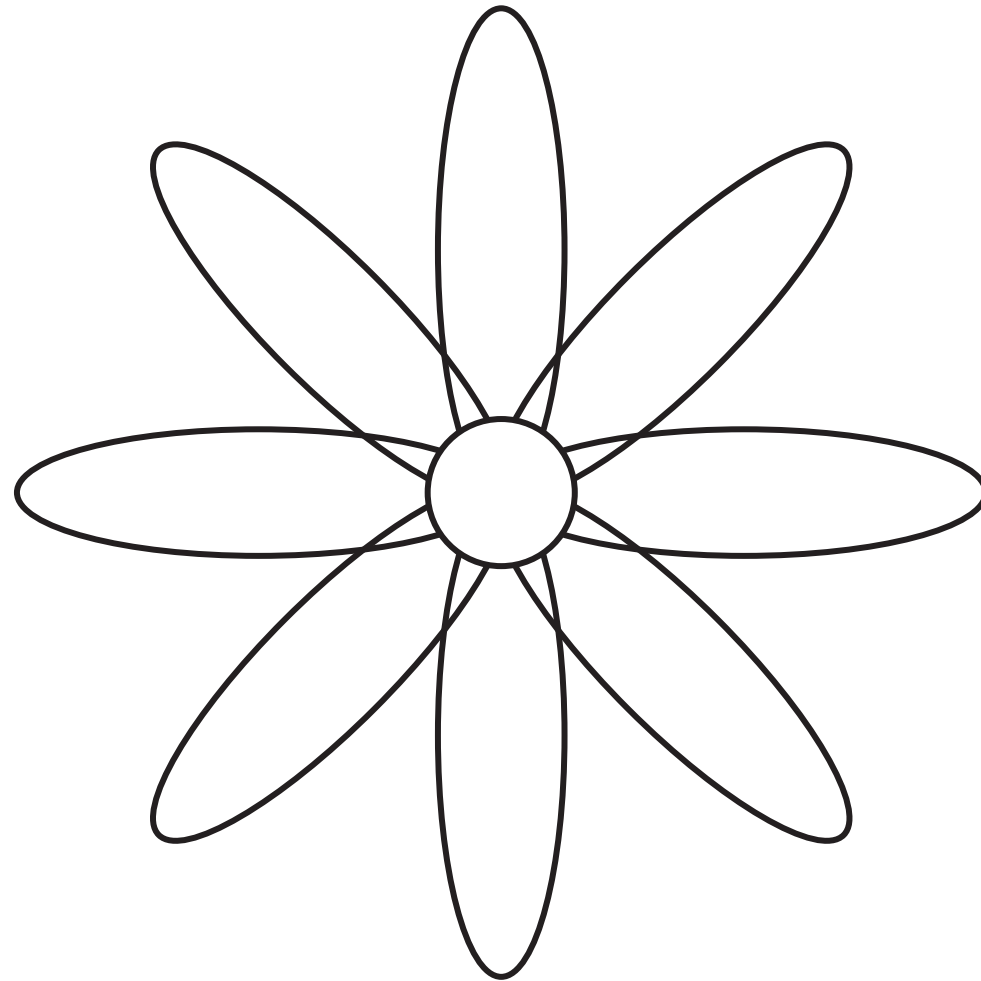


A major consumer electronics company used a Context Map to review their product portfolio, discovering some internal differences in priorities.



An American police force considered how decreasing state funds would impact a range of future planning needs.

# CONTEXT MAPS | METHOD WORKSHEET





# PROGRESSION CURVES

Progression Curves represent the evolution of changes in terms of technological, social, and other filters.



## WHEN TO USE IT

- To understand the pattern of events for a particular topic and how these events have led to its current state

## WHY IT'S HELPFUL

Progression Curves show what changes when. They are a variant of the classic technology adoption lifecycle, which outlines the common stages of user adoption over time.

As you plot multiple, even over-lapping curves, certain patterns may emerge. For example, you may discover that a minimum (or maximum) duration regularly occurs between two points, such as the typical clinical trial period for the U.S. Federal Drug Administration, allowing you to plan for similar intervals in the future.

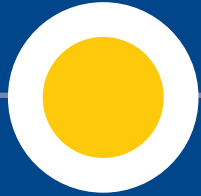
As another example, if you plotted the development of payment innovations in order to understand personal banking, you would learn that there have been only

a few major breakthroughs in history—such as, smart cards with microchips in the 1990s.

Moreover, later stages build on earlier stages. In many cases, certain steps cannot be skipped within your industry or organization, so if you expect a similar pattern of events to continue in the future, you can anticipate which step will likely happen next. This is useful knowledge when planning ahead.

## WHAT YOU GET

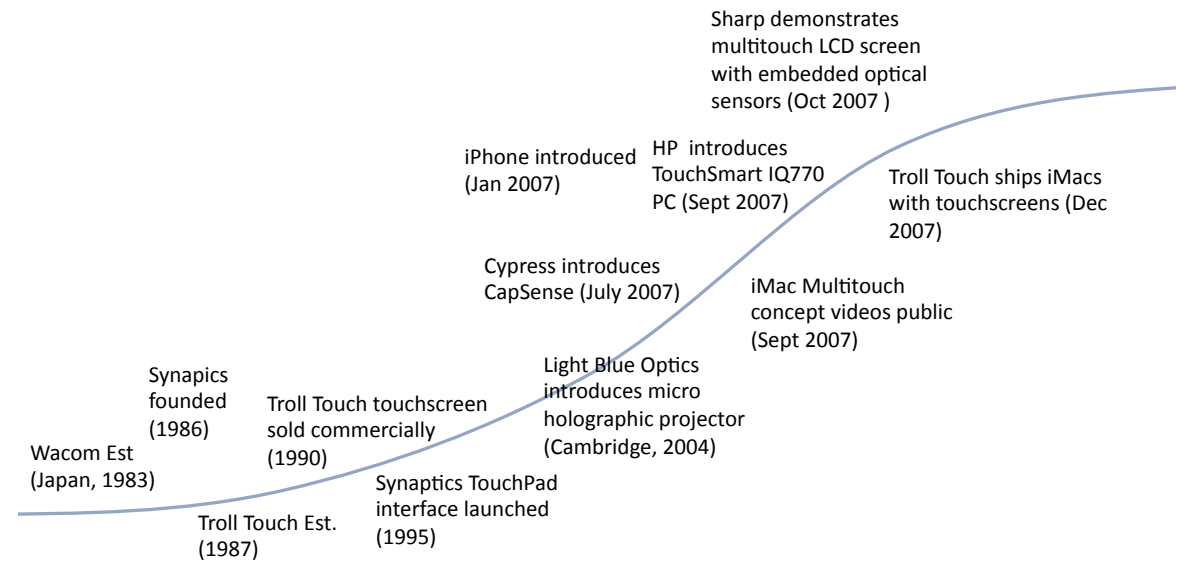
Progression Curves extends the familiar timeline. This method puts event timelines, industry lifecycles, and other developments in historical context relevant to your topic. By identifying repeated patterns, you know what to expect in the future. The use of multiple layers of data helps you identify patterns that might have escaped your attention previously.



## LET'S LOOK AT AN EXAMPLE

An engineering graduate student wanted to investigate the future of robotic surgery, especially using interactive touchscreens, in 20 years. She had hands-on experience in the research lab and also as an engineer for two medical device companies.

The student developed multiple Progression Curves to capture the emerging state of the field, as defined in 2008. Drawing from a mix of primary and secondary sources, plus her own knowledge, she looked at the evolution of projection-based displays, interactive displays, haptic interfaces, industrial robot arms, minimally invasive surgery techniques, medical robots, and medical imaging—tracing many historical developments back to the 1950s.



Source: Santhi Elayaperumal, Stanford University, ME410, 2008



## INSTRUCTIONS

1. Identify your starting topic.  
Your team could describe past developments for your idea, company, industry, society, technology area, etc. Some teams refer to their last Context Map, developing a Progression Curve per dimension.
2. Draw a long s-curve. You can always extend this curve or link other curves to it later. The height or length of the curve are largely symbolic.
3. Begin plotting key events that have influenced or changed in that space, estimating dates when necessary. The farthest left end point on the curve is set by you, going as far back in time as you wish. The farthest right end point represents today because you are not looking to project the future.

4. Add more data points along the curve. You may mix a variety of data points, such as historical dates, major events, people, company milestones, and social movements.
5. Draw more curves that intersect, extend, and even overlap with your first curve.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

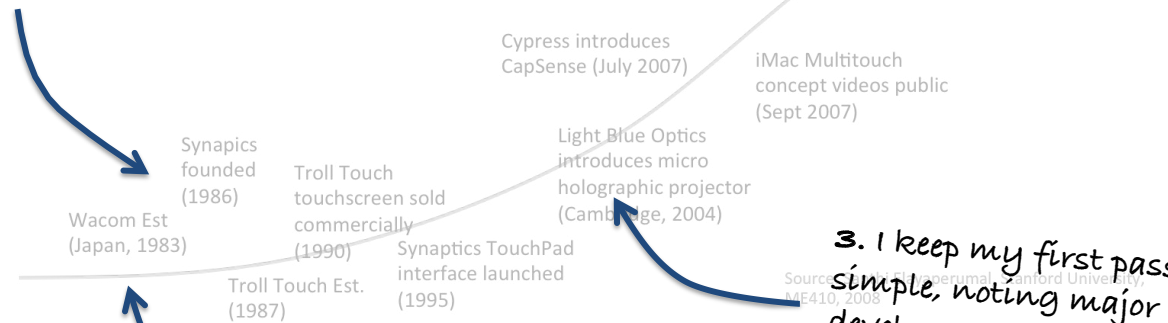
*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Which dimension did you begin with? Why?*
- *Who can you contact to verify timelines and fill in any gaps?*
- *Are you surprised by how long (or quickly) progress takes?*
- *Was it easier to add examples and activities your team was personally involved in? Why?*



1. After reviewing my Context Map, I decide to look at the evolution of interactive touchscreens for my first Progression Curve



2. I draw a wavy line quickly, knowing that I can always extend an end point or format later.

4. I add more data points from history, realizing that I will want to continue extending this curve during the course of my research program

3. I keep my first pass simple, noting major developments and dates that help me understand how the field has developed



## DRAWING INSIGHTS & IMPLICATIONS

As part of her analysis, the graduate student identified the current major players in the computer, gaming, and service industries, which gave her a short list of companies to watch as field leaders.

In addition, the exercise helped her to refine her research questions, shaping her perspective toward finding the right opportunity. For example, three questions were sharpened to: (a) How do doctors “see” and “feel” the patients anatomy during minimally invasive surgery?, (b) What are current challenges with tele-operations?, and (c) What are some current advances in medical imaging?

## TIPS & LESSONS FROM OTHERS

- News articles and company time-lines can provide helpful data, often listing important milestones and dates.
- Don’t rely entirely on team knowledge, which can sometimes serve to validate existing biases.
- Older experts may find this exercise easier to do because they typically have more stories and life experiences to draw on than younger colleagues.
- Many project teams can trace their timelines back to Greek history or Shakespearean literature. This shouldn’t be a surprise. Many aspects of humanity have their roots in these universal accounts.
- The curve height is symbolic for change; some people like to draw taller elevations related to the varying levels of adoption or growth. That is optional extra work.

## REFLECTION

*Who are some experts you can ask for their wisdom?*

\_\_\_\_\_

\_\_\_\_\_

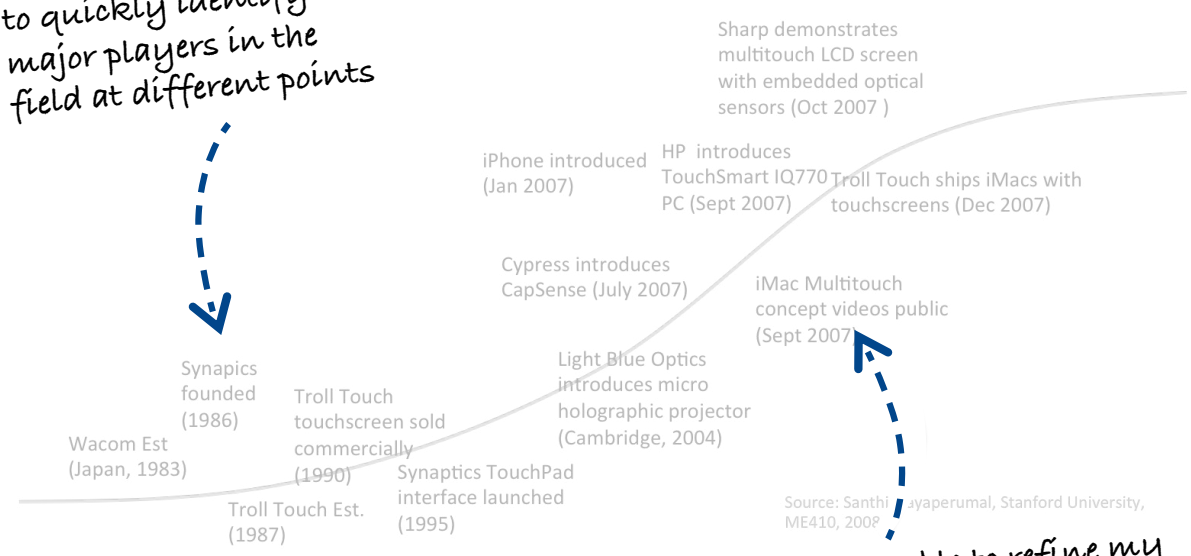
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This method helps me become a fast expert of this topic, allowing me to quickly identify the major players in the field at different points

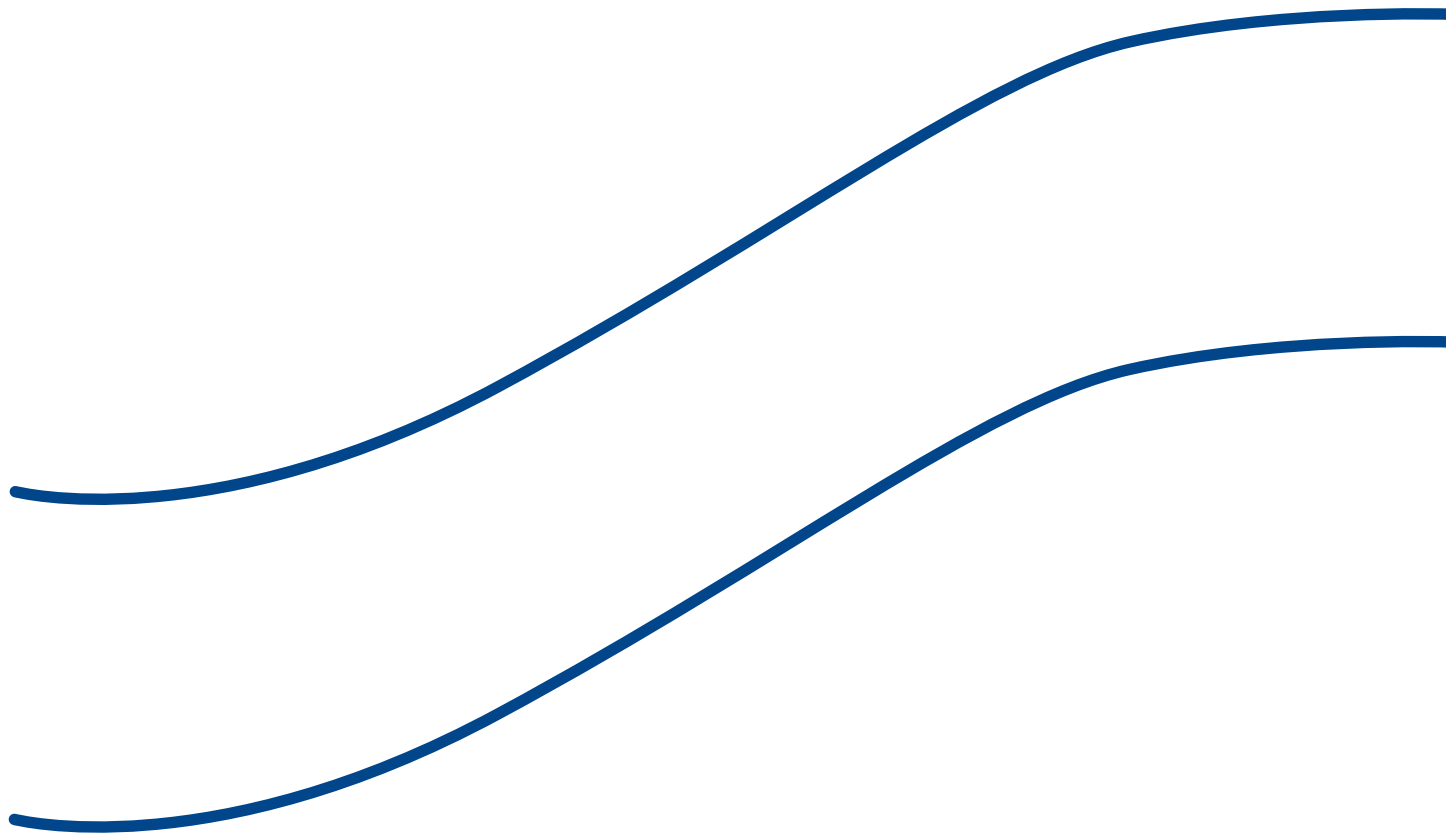


Source: Santhi Jayaperumal, Stanford University, ME410, 2008

Overall, I am able to refine my questions for finding potential future applications in robotic surgery



# PROGRESSION CURVES | METHOD WORKSHEET



## CASE STUDY | CRAFTING A NEW VISION AFTER UBICOM

As the Finnish funding agency for technology and innovation, Tekes is the most important publicly funded expert organization for financing research, development, and innovation in Finland. The agency boosts wide-ranging innovation activities in research communities, industry, and service sectors across the country. Taking a broad-based view on innovation, Tekes funds technological breakthroughs and also emphasizes the significance of service-related, design, business, and social innovations. Every year, Tekes finances some 1500 business research and development projects and almost 600 public research projects at universities, research institutes and polytechnics.

Since 2007, Tekes has focused on “renewing services and production by digital means.” One of the major existing investments under this focus area has been the Ubicom—Embedded ICT 2007-2013 program. Ubicom was built from over 300 public research and industrial research and development

(R&D) projects having over €200 million project volume. Ubicom projects focused on building research competences and demonstrating new solutions based on distributed computing and embedded information computer technology (ICT) systems. A 13-person steering group, whose members came from companies, research institutions, and Tekes, advised the overall direction and execution of the Ubicom program.

### **THE CHALLENGE: FOLLOWING THE STEPS OF A SUCCESSFUL RESEARCH PROGRAM**

A program manager and chief technology adviser at Tekes, Kimmo Ahola was responsible for managing Ubicom as one of the agency’s largest long-term technology programs. After nearly five successful years, Ahola now faced a big challenge: what was next after Ubicom? The program would conclude in 2013, leaving open many resources that could be applied to a new strategic program.

Ahola wished to redesign a new program so it could meet the challenges of tomorrow in terms of both structure and content. He knew that simply copying the previous success formula of Ubicom would not guarantee another five years of success because the world has seen many significant changes since the program was initiated.

Among many topics, Ahola wanted to know which types of organizations should be funded, what the overall scale of the program could be, how to encourage collaboration between funded organizations, how to tie in foreign stakeholders and align the program with global partners, what technologies should be at the center of the program, and how these technologies would relate systemically.

## THE APPROACH: TWO DAYS OF EXPERT PROTOTYPING

Ahola decided to apply the foresight and innovation methods in an intensive two-day workshop. It was scheduled to overlap with a previously scheduled Ubicom board meeting, so he could ensure that the program's critical stakeholders would be present. The first day involved the Ubicom board members, as well as key senior executives and Tekes program managers, who focused on exploring various research themes and potential program models for the next stage of Ubicom. Ahola set the day's agenda by briefly reviewing the program's original vision and history, and he used the methods to help frame his presentation.

Several participants returned on the second day, helping to transfer their knowledge as well as hear from a broader community. The second day included nearly two dozen research scientists and technical specialists, who delved deeper to propose promising areas of focus and prototype "seedlings" for program

content. The bulk of discussion occurred in multiple small teams, so that a greater diversity of themes could be explored and all participants would have the opportunity to contribute.

Ahola found the workshop to be helpful in many ways. He said, "It aligned participants toward a common target in very fast and engaging way." Practically, it was also easier to attract participants to commit to two days away from work, when they learned a new set of methods and also gained a fresh view for their own company use. The methods opened new unexpected ways to approach the planning task, which provided a motivating experience for everyone.

In addition, the methodology provided a flexible structure to guide group planning. Ahola added, "A clear strength of this large set of tools is that can be applied in any order or level of depth." Workshop teams used the methods to go from broad contexts to specific problem settings depending on their objectives. Creating a program structure necessitated

a wide initial perspective, and once program boundaries were lightly defined, teams used the methods to quickly find the key targets to be addressed. Moreover, the methods left freedom to fine-tune the results, allowing room for smaller item documentation at the same time. This helped Ahola take the results from the workshop and integrate them with larger planning efforts at Tekes.

## THE RESULT: A NEW VISION, A NEW PROGRAM

The workshop generated the foundation for the new program focus, currently known by its working title “All Things on Networks” (ATON). The workshop material provided the basis of new planning guidelines for ATON, which focuses on funding small networks of subcontractors (1-6 partners). In the context of ATON, these subcontractor networks will initially support the research activities of large companies and then become dedicated subcontractors in later stages. Ahola envisions that this model will truly motivate the co-development of intellectual property (IP) between different subcontractors and large corporations. It will strengthen the position of small and medium sized enterprises (SMEs) by integrating them into an IP-based cluster of other SMEs and large corporations. The program is envisioned to also fund

the development of new innovation clusters that cross national borders.

A smaller set of methods will continue to refine the ATON vision. One idea is to develop a set of grand challenges that will then inform more specific funding efforts in different industrial sectors. In particular, Ahola sees that

the DARPA Hard Test will help validate the visionary potential of ATON’s grand challenges. Lastly, Ahola intends to use the foresight and innovation methods as visual templates to communicate the new program and its outcomes within Tekes and to other stakeholders.



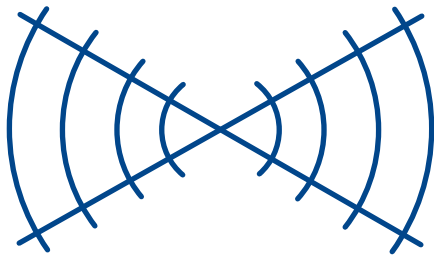
Source: Kimmo Ahola, Tekes, 2012





# JANUS CONES

Janus Cones looks backwards and forwards in time to identify the timing of historical events and how timing affects potential future events.



## WHEN TO USE IT

- To become a fast expert of your topic's background
- To discern a possible pattern of relationships among many related (and even unrelated) events

## WHY IT'S HELPFUL

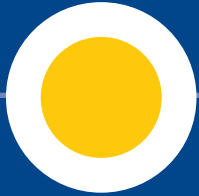
History is often told by the winners, who present one view of an event. There are always other views. The Janus Cones method overcomes the limits of a survivor's bias by helping you see multiple events that have converged to the dominant understanding in the present time.

The center of two cones marks today. The left cone faces the past. The further back in time you go, the fuzzier human memory becomes. The right cone faces forward in time, equally murky and unknowable the further out in time you go—what futurists like to call a “cone of uncertainty”.

Future patterns often reflect, but do not necessarily repeat, past patterns. However, only in hindsight do (most) patterns become clear. Many events, which may not seem related, can influence one another.

## WHAT YOU GET

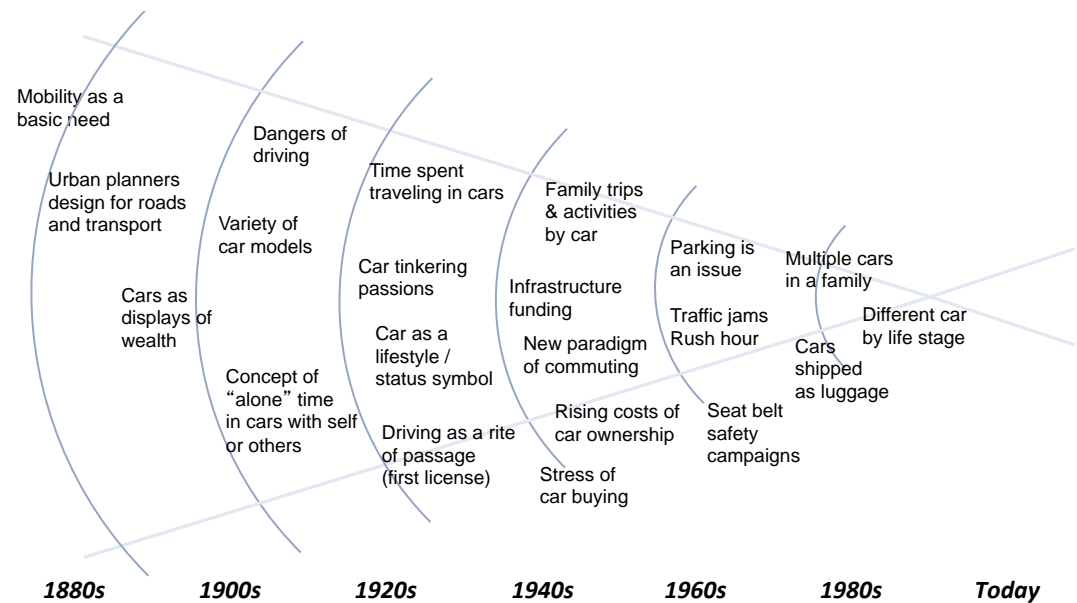
Janus Cones lets you release the strict linear assumptions of events, allowing to view multiple, overlapping, and intersecting events in a single shared framework at once. Each vertical marker denotes a specific time period, such as 5 or 10 years, going incrementally backwards or forwards.



## LET'S LOOK AT AN EXAMPLE

An international project team wanted to understand American beliefs in driving and how these beliefs had evolved in recent decades. The team had already analyzed the usual industry trends, market statistics, media reviews, and company reports. Now they needed a more holistic view, which a timeline or pie chart couldn't present as well.

The team developed a group snapshot of 100+ years of American beliefs, starting with the invention of the first modern automobile and leading up to current views of the car as an extension of lifestyle. Through this exercise, the team became fast experts in the topic and, more importantly, developed a shared language that brought them together as a group at the start of the project.



Source: Tamara Carleton, Stanford University, ME410, 2008



## INSTRUCTIONS

1. Draw an open cone facing left toward the past. The right point represents today.
2. Talk about what has happened or changed leading up to today's views and assumptions for your topic. Identify major points in time, such as a company founding (e.g., Genentech in the biotech industry). Plot these data points inside the cone, placing earlier ones further back in time than more recent points.
3. Now draw appropriate time markers under the cone, such as "1990s" or "2000," to help you cluster and organize data points by time period.
4. Draw corresponding time arcs to those dates. These arcs will be vertical.
5. Add more data points so that you complete your team's knowledge and fill in all time periods as much as possible.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *How far back in time do your Janus Cones go? Why to that point in time?*
- *If you overlaid your Progression Curves on the Janus Cones timeline, did anything surprise you?*
- *Did you try adding events that changed society's attitudes (such as the British Invasion) or had long-term effects (such as the dot-com bubble)?*
- *Who can you contact to fill in gaps in your map?*

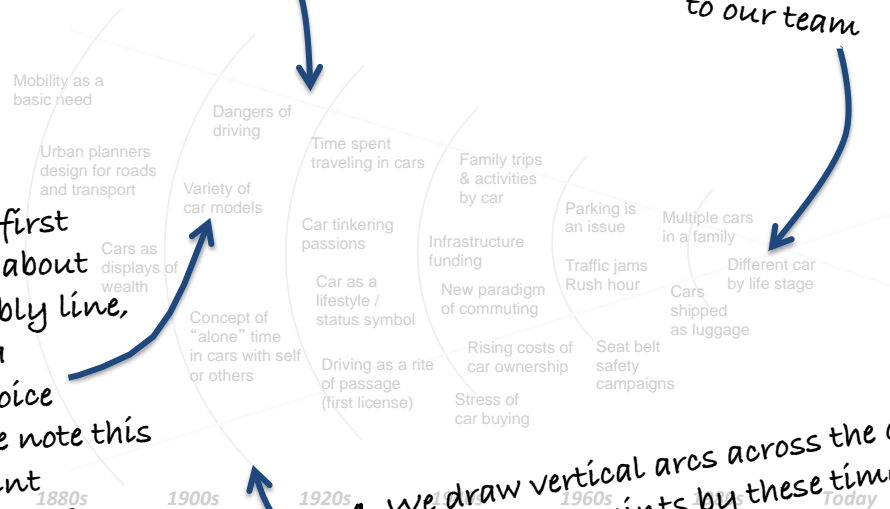
1. Our priority is to focus on the past, so we sketch a big cone on the whiteboard with its nose pointing right to today

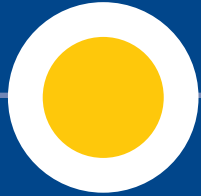
5. We add more data points so that the cone feels complete to our team

2. One of the first comments is about Ford's assembly line, which led to a consumer choice in cars, so we note this historical point somewhere far left inside the cone

4. We draw vertical arcs across the cone to help us cluster data points by these time increments

3. After a few more data points, we see the timeframe emerge, so we note the major time periods in 20-year increments under the cone





## **DRAWING INSIGHTS & IMPLICATIONS**


The team members came from various backgrounds: product and graphic design, engineering, project management, and marketing. The Janus Cones method provided a neutral common ground that allowed them to set aside their preexisting conceptions and discipline biases, so that they could focus on developing a shared view of what happened to arrive at today's state of knowledge.

As the team examined American attitudes toward driving cars, they realized that the definition of "premium" has changed over time, starting with premium as displays of wealth and lately becoming premium as an elite experience. Their understanding of premium helped them see that American drivers in the future, as well as around the world, will continue to evolve their views of what premium means in cars.

A third lesson was that the team saw how much American media, particularly mainstream movies from Hollywood, had influenced their assumptions of the American driving experience throughout different historical eras. This bias was not as apparent when they had analyzed earlier data reports.

### **REFLECTION**

*Who remembers the history in your group and organization?*



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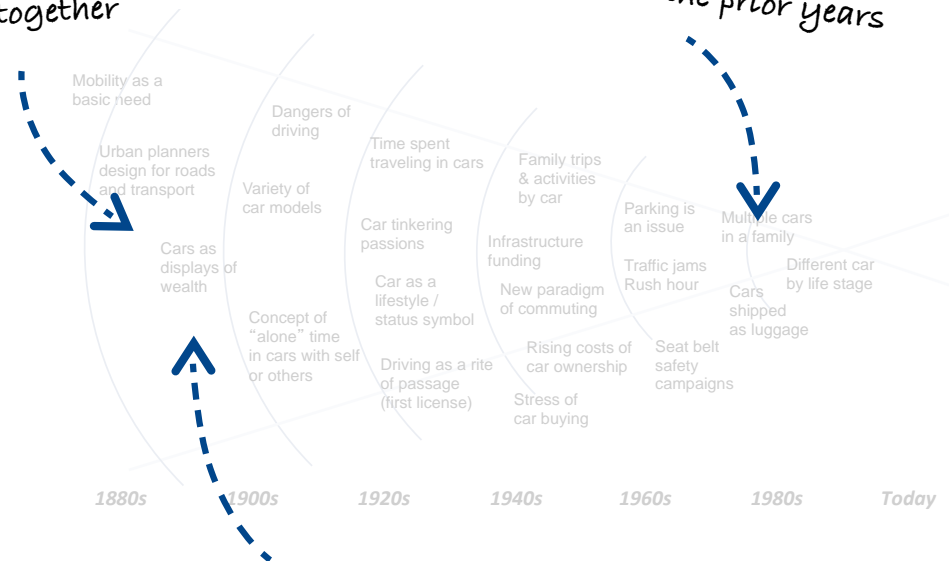
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Due to our group's varied backgrounds, the Janus Cones became a useful neutral tool to bring us quickly together

We discover the majority of our group knows the last 15 years well from personal experience and then relies on movies and grandparent anecdotes for knowledge about the prior years



We start to see a pattern about the changing definition of "premium" in cars, starting with premium as wealth displays



## TIPS & LESSONS FROM OTHERS

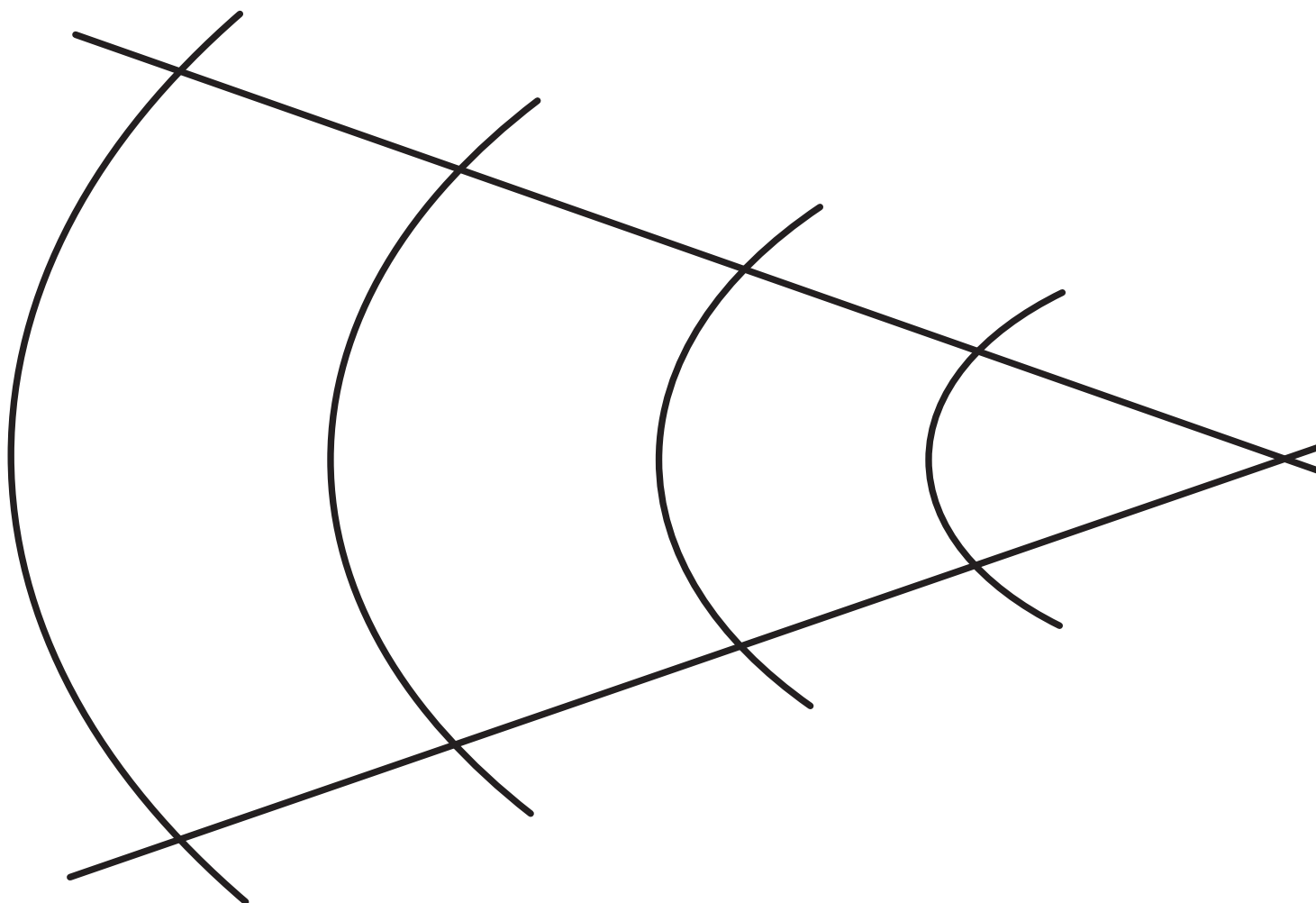
- Your touch points may include significant product launches (e.g., Tata’s Nano), historical milestones (e.g., fall of Berlin wall), media examples (e.g., E.T. movie), and personal stories (e.g., grandma’s first mobile phone)—whatever helps you to develop broader context for your particular topic. See the adjacent table for example touch points.
  - You can overlay multiple Progression Curves on top of your Janus Cones to help you see more patterns in context. Use the dates to help you align the two methods.
  - Look back twice at least twice as far as you want to look ahead. This advice is a core principle of good forecasting.
- Use real dates, such as “2005” instead of “-10,” so you have clear touch points for future reference.
  - We strongly advise all users to focus first on completing the past (left) cone because history provides the best record for future learning. Advanced users can learn to pencil in planned or scheduled future events from their company’s R&D roadmaps and other project plans on the future (right) cone. Please keep in mind that future events are simply placeholders and wishes.

Category	Example touch points
Company	<ul style="list-style-type: none"><li>&gt; Company founding</li><li>&gt; Product launch</li><li>&gt; Partnership deal</li><li>&gt; Management change</li><li>&gt; Revenue milestones</li></ul>
Nation	<ul style="list-style-type: none"><li>&gt; Government change</li><li>&gt; New treaty</li><li>&gt; Economic event</li><li>&gt; Major historic event</li><li>&gt; Sporting achievement</li></ul>
Society	<ul style="list-style-type: none"><li>&gt; Popular movie</li><li>&gt; Science fiction book</li><li>&gt; Major cultural event</li><li>&gt; Cultural attitude or belief</li></ul>
Technology	<ul style="list-style-type: none"><li>&gt; Invention</li><li>&gt; Product adoption</li></ul>
Personal	<ul style="list-style-type: none"><li>&gt; First purchase</li><li>&gt; Major life decision</li><li>&gt; Family memories</li></ul>





# JANUS CONES | METHOD WORKSHEET



*“If you don't think about the future,  
you cannot have one.”*

*—John Galsworthy, English writer  
(Swan Song, 1928)*

*“Ability is nothing without opportunity.”*

*—Anonymous  
(often attributed to Napoleon Bonaparte)*





 **OPPORTUNITY**  
CHAPTER 4

## Shortcuts

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Phase II: Opportunity 92

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Generational Arcs 94

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Future User 103

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Viewpoint: Acting out 113

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Futuretelling 114

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## PHASE II: OPPORTUNITY

Now that you have developed some perspective about your problem's space, how do you find the emerging opportunity?

The objective is to develop an ability to see growth opportunities that exist today and could extend into the future. This step is critical to selecting the right path to pursue because today's opportunities become tomorrow's innovations.

This phase makes two jumps from the prior phase. First, you will move from working in the past into the future. Second, you will move from a focus on the problem to a focus on the people.

This phase takes a user-centric approach. This phase defines "users" broadly, which may include end users, customers, suppliers, partners, and other roles as relevant to your problem or topic area. This helps you identify an unmet public need.

The methods in this phase are designed to understand the user from three levels of analysis: a macro view, a micro view, and a narrative view. A macro view considers change from a grand scale, a micro view considers change on a personal scale, and the narrative view considers change in terms of a story. By developing a better understanding of your users in the future, you increase the chances that your opportunity truly meets their needs.

Three methods can help you find promising opportunities quickly:

- Generational Arcs
- Future User
- Futuretelling

## PHASE II: OPPORTUNITY

The second phase develops an ability to see growth opportunities that exist today and extend into the future by understanding future customer changes.



**Generational Arcs** views the demographic changes and generational views of a target population.  
→ page 94



**Future User** profiles your future customer based on what will (and will not) change from today's customer.  
→ page 103



**Futuretelling** uses live theater to illustrate a particular user need as a realistic scene from the future.  
→ page 114

### Questions that drive this phase:

- Which behaviors are emerging that will shape or influence new opportunities in the future?
- Which major changes about people over time, such as population movements and generational shifts, can we identify and understand that affect future changes?
- What might we expect from future users and customers?



# GENERATIONAL ARCS

Generational Arcs identifies and tracks population changes in terms of life stages and other generational variables.



## WHEN TO USE IT

- To evaluate a new market or expected market change
- To anticipate major disruptions in demographic structures within a target market or customer population
- To analyze a different or younger user base relative to your current user base

## WHY IT'S HELPFUL

Analysts like to say that “demographics is destiny” because they believe a population’s size and makeup determine a nation’s future. Like many generalizations, there is some truth to this belief.

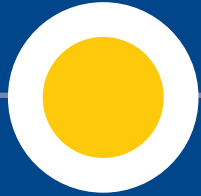
Peter Drucker, often called the father of modern management, felt that changes in demographics are unambiguous and have the most predictable consequences. You can use demographics as a way to forecast clearly from facts known today.

The Generational Arcs combines the statistical power of demographics with a

qualitative understanding of generational behavior to glean even greater insights of future users. Generational information includes social values, career needs, and technology attitudes that help you understand what motivates different groups of people. Moreover, each generation is defined by a dominant belief system, which they carry forward in their life and work habits.

## WHAT YOU GET

Basic demographic details will tell you a target population’s size and socio-economic situation. Coupled with generational characteristics, you will also learn about a group’s behaviors, values, and beliefs that define them today and in the future. You can then use this knowledge to validate your current market composition and also to prepare for any crucial changes that will occur for the future user profile. Ultimately, you will identify exactly who your future users are today and who they will become in the future.



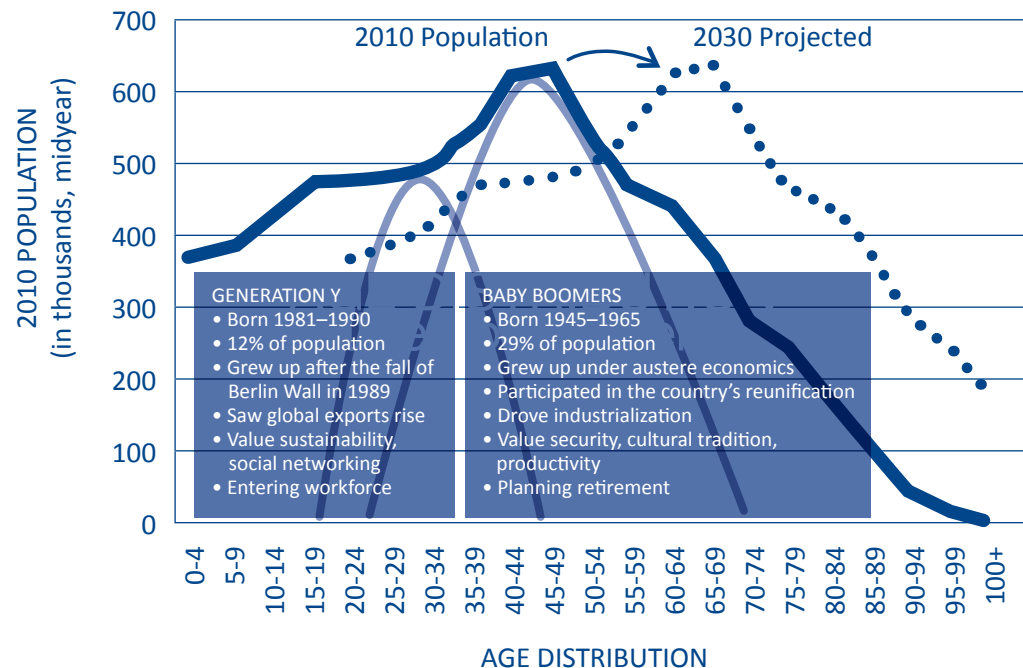
### LET'S LOOK AT AN EXAMPLE

One of the world's top banks sells many of its financial products to one target market in Europe, which has proven to be a dependent and sizable group of customers in the last decade. Members of this population are largely affluent male professionals in their mid to late 40s in age.

In the next 20 years, the bank team saw that this customer base would continue aging, as they entered their early 60s. Their needs would shift to retirement, which was backed by company research studies.

However, if the bank continued targeting the 40-year-olds, then this primary group would decrease by roughly 140,000 citizens, which equated to nearly a quarter of their current customer base. Without immigration, the country's potential labor force—those between the ages of 18 and 62—would shrink by 18.2 million, or roughly 40 percent, by 2050.

Additional data showed that members of the older generation valued tradition and state security. In contrast, under more financial pressure than previous generations, the rising generation was seen as agile multi-taskers with little loyalty to employers or the government.





## INSTRUCTIONS

1. Select a country, region, or particular group as your population of study.
2. Find a credible source for your group's population records, such as the World Bank, U.S. Census Bureau, or Eurostat. See the appendix for a list of data sources.
3. Plot the number of people living at each age (or age range) from birth to 100 years old. Population numbers will be on the y-axis, and age ranges will be along the x-axis.
4. Note the dominant generational groups living under the population curve.
5. Describe each generation's dominant beliefs, values, and attitudes.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

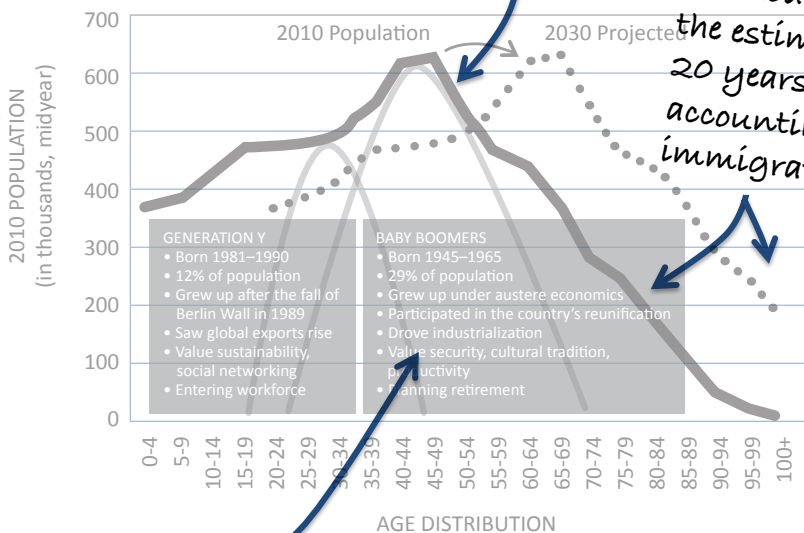
- *Looking at your potential market, is the overall trend growing, shrinking, or spiky?*
- *If your chosen market has a demographic dividend, what are the implications?*
- *If your chosen market is becoming a gerontocracy, what are the implications?*
- *Looking at the generational changes, which one factor or aspect would you target in each generation in 10 years? 20 years? 30 years?*



1. We decide to focus on our country as the primary target population

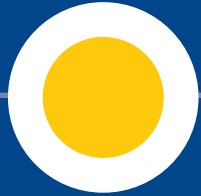
2. We rely on World Bank reports, plus company records, as our primary data sources

3. We decide to present both today's data and the estimated shift in 20 years (without accounting for any immigration changes)



4. We then write down some characteristics of the different generations

Source: World Bank Research, Johnson Controls "Oxygenz Country Report: Germany", 2010



## **DRAWING INSIGHTS & IMPLICATIONS**

Through the Generational Arcs method, the team discovered several implications for business planning. As the bank's core customer base continued to age in the next 5-10 years, they would stay loyal senior customers, and the company could ride this wave easily.

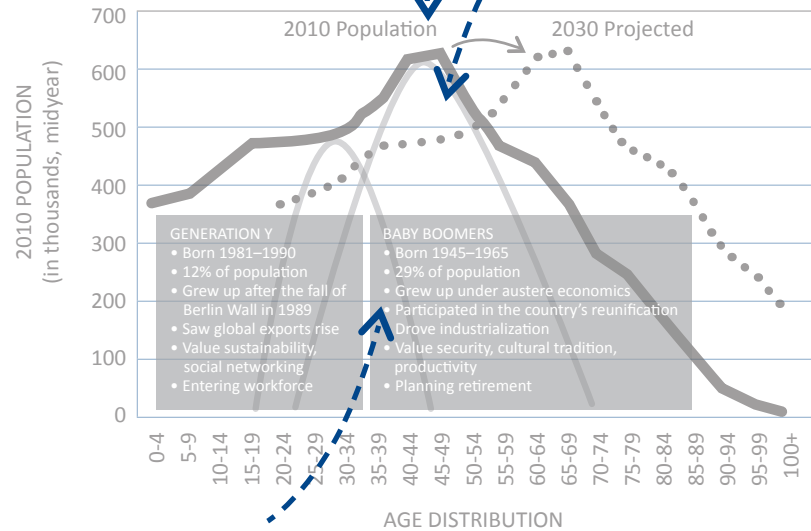
However, the rising generation of workers, who would be the next logical set of customers in the bank's target age range, were a significantly smaller population. Without doing anything, the bank's core market (and resulting revenue) would drop tremendously after 15 years because there was literally fewer people alive.

The team discovered that asking these types of demographic questions enabled them to understand how differences in people affect their behaviors. This method generated intense discussion, and the team pondered:

- How well did our company know the next set of customers?
- Which generational differences would affect the future customer's willingness to use the bank's financial products and services?
- How could they sell more to each future customer in order to ensure the same revenue?
- Where could they find more customers, and should they look abroad?

We see our sweet spot in recent customer growth is tied closely with our country's biggest population

In 20 years, this same age group would drop by nearly a quarter, raising some concerns about available markets in the future



Part of our group's discussion focuses on how our company could better address changing generational needs

Source: World Bank data, Deutsche Bank Research, Johnson Controls "Oxygenz Country Report: Germany", 2010



### TIPS & LESSONS FROM OTHERS

- You are not limited to a region's population. You can describe population changes over time within an organization, industry, or other unit.
- Refer to published population records to plot the number of people living in a particular country or region at each age. Nearly all countries and municipalities maintain their own population records. For example, the U.S. Census Bureau tracks all U.S. states and cities, plus maintains an international data base for countries and areas of the world with a population of 5,000 or more.
- Describe generational preferences as richly as possible because they will impact the value of your insights.
- Typically, three generations will dominate in a country at any given time. Data about generations can

be found from market research firms and government agencies. Often these sources can provide estimates of future demographic structures, too.

- You can combine expected future demographic curves (and the related generational data) on the Janus Cones method to see how population growth will impact timing.

### REFLECTION

*What are the generational labels in your primary market?*

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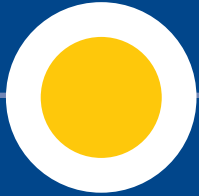
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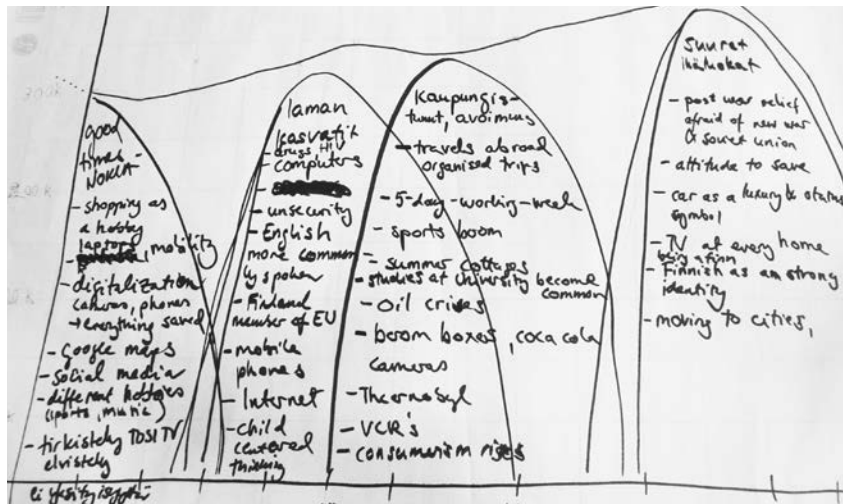
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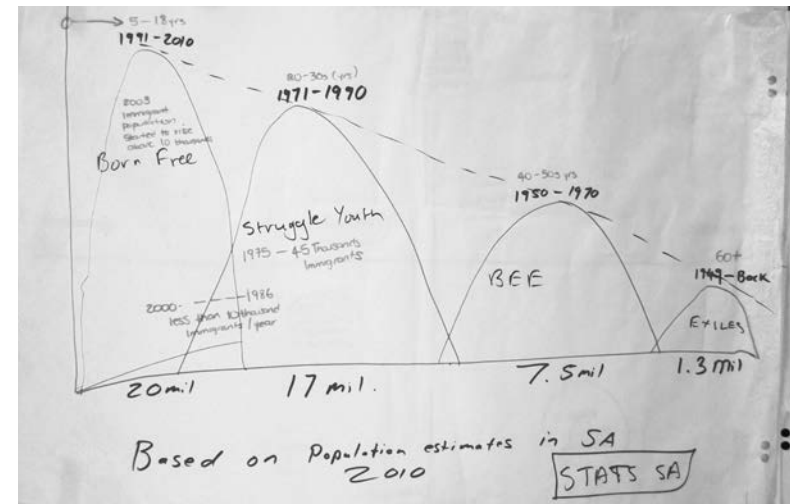
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## ADDITIONAL EXAMPLES

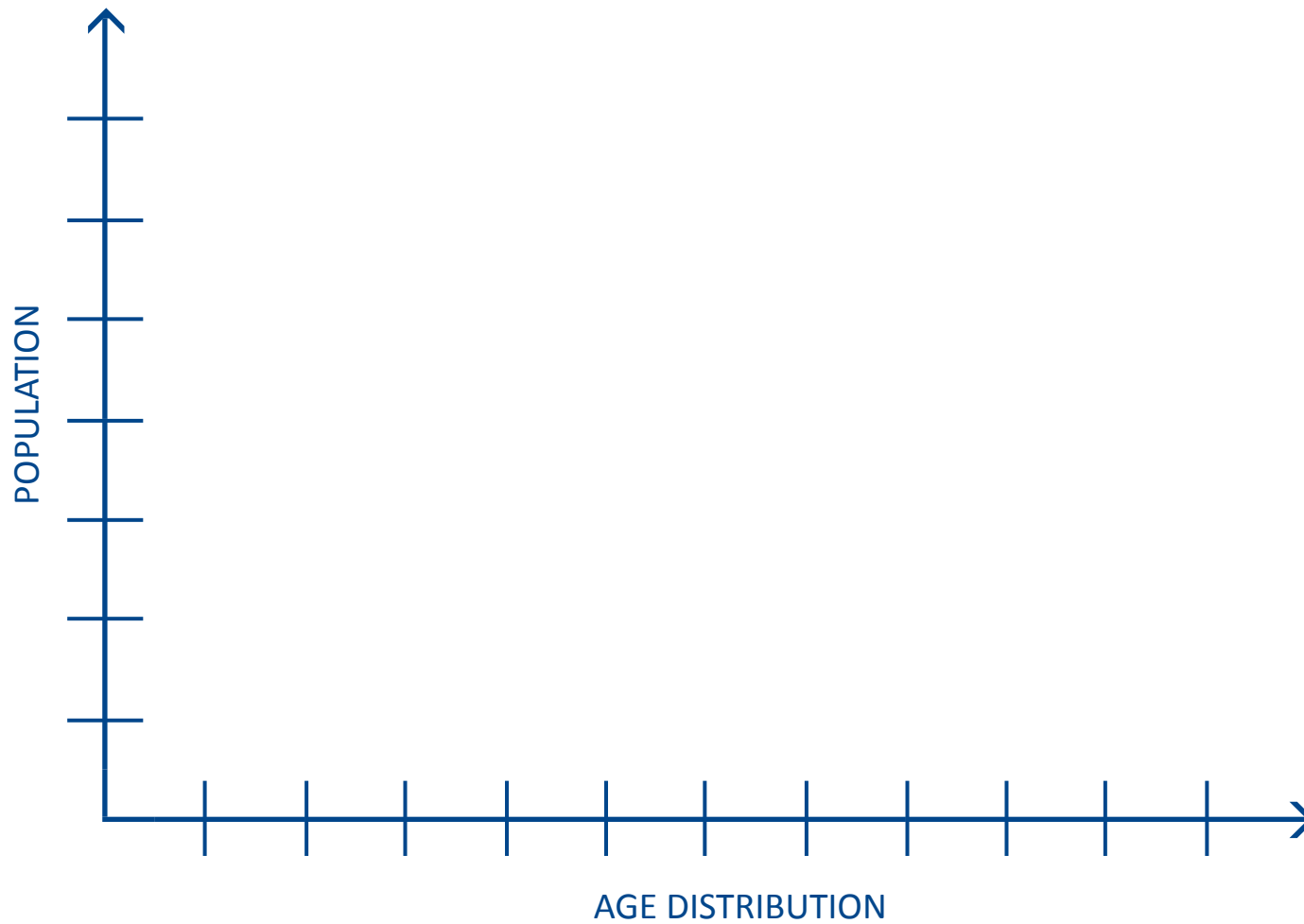


One Finnish project team discovered that their nation's population has been rather flat in recent decades. They also saw how each Finnish generation had a common set of cultural experiences and values that they should consider for their business planning needs.



After mapping their country's population, a South African team saw that their nation's average life expectancy was 49 years, that immigration played an important role for the younger generations, and the interplay of ethnic subgroups within generations.

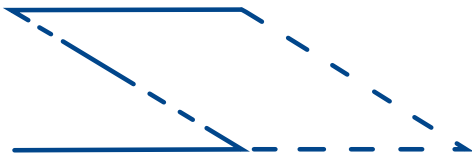
# GENERATIONAL ARCS | METHOD WORKSHEET





# FUTURE USER

Future User creates a future profile of a user within a targeted demographic by comparing similar groups over time.



## WHEN TO USE IT

- To expand the work of existing customer personas
- To identify the user needs of a specific market segment in the future
- To identify similarities and differences in values, attitudes, and behaviors between two customer generations

## WHY IT'S HELPFUL

Every user persona tells a story. The common practice is to develop personas for your market segments as you know them today. But what if you are designing for customers in the future, who may not be the same group or whose needs may change from today's situation? How do you see into the future to capture the right customer attributes?

The Future User method extends the classic persona used in design, marketing, and sales. This method lets you develop smart profiles of your future users. By

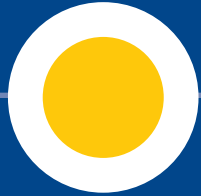
relying on current evidence and historical facts, you will develop a composite profile of your target user that is deeply grounded in reality.

By putting the persona of your future user or customer in context, you will gain a clearer view of that user's buying habits, beliefs, motivations, lifestyle, and more at a future point. Often what changes in one generation will be taken for granted in the next generation.

## WHAT YOU GET

Future User can be used to analyze consumers, business buyers, or any other user role. Some groups have adopted this method to even compare different products, business models, and international markets.

Ultimately, you will develop multiple profiles over time for two different customer segments or users, looking at how they compare at similar points, as well as how they have changed over time.



### LET'S LOOK AT AN EXAMPLE

Based on the demographics of Mumbai, India, a senior researcher decided that he wanted to focus on a specific user group called “Strivers.” Considered part of the rising middle class, Strivers earn an income of 500,000–1,000,000 rupees, live mainly in cities, and are motivated to achieve. This demographic data gave the researcher a basis from which to start developing his future user.

He interviewed several people who were representative of Strivers. He also reviewed industry reports about the behaviors, values, attitudes, and beliefs of this group, especially looking at social mobility and transportation usage.

Drawing from this data, he created two fictional characters named Nikhil and Siddhartha (Sid), and he chose the names from a list of popular names from each generation. Detailed profiles were created at four points in time: Nikhil at age 22, Nikhil at age 34, Sid at age 22, and Sid at age 34. Each profile described

the person’s education and career aspirations, family background, personal beliefs, consumption habits, and mobility habits.

The researcher then compared the profiles with one another in two ways: in terms of life changes occurring for the same individual over time (called “life changes” in the example diagram) and also between the two individuals at the same age (noted as “similarities” and “differences”).

As the last step, the future user profile for Sid was developed. He carried similarities over from Nikhil and also from a generational analysis, assuming that both users shared the dominant beliefs and behaviors with their respective generations. The researcher made the character differences more evident, knowing that earlier beliefs held by Sid would continue to shape his personal decisions in the future. Overall, the target customer in 2020 was a very different type of person than the customer known today.



Nikhil age 22



Nikhil age 34



**Life Changes for Nikhil**

- Married at age 28
- Got an MBA degree
- Two daughters born
- Spent 2 years in London (first time outside India)
- Purchased an apartment in Mumbai
- Purchased mobile phone (uses Blackberry Pearl)
- Purchased computer with internet access
- Purchased a car (Maruti)
- Purchased a club membership

1996

2008

**Similarities at age 22**

- Use personal transport
- Aspire to an MBA degree
- Live with parents
- Watch Bollywood and cricket
- Both wear foreign brand apparel

**Differences at age 22**

- Sid has broadband access to internet
- Sid is into social networking, an unknown phenomenon to Nikhil
- Sid uses a mobile phone, Nikhil uses landline
- Sid is already working at his fathers' company, Nikhil is still not in the job market

2020

Siddharta (Sid) age 22



Siddharta (Sid) age 34

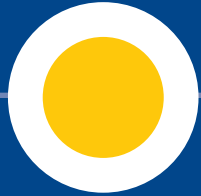




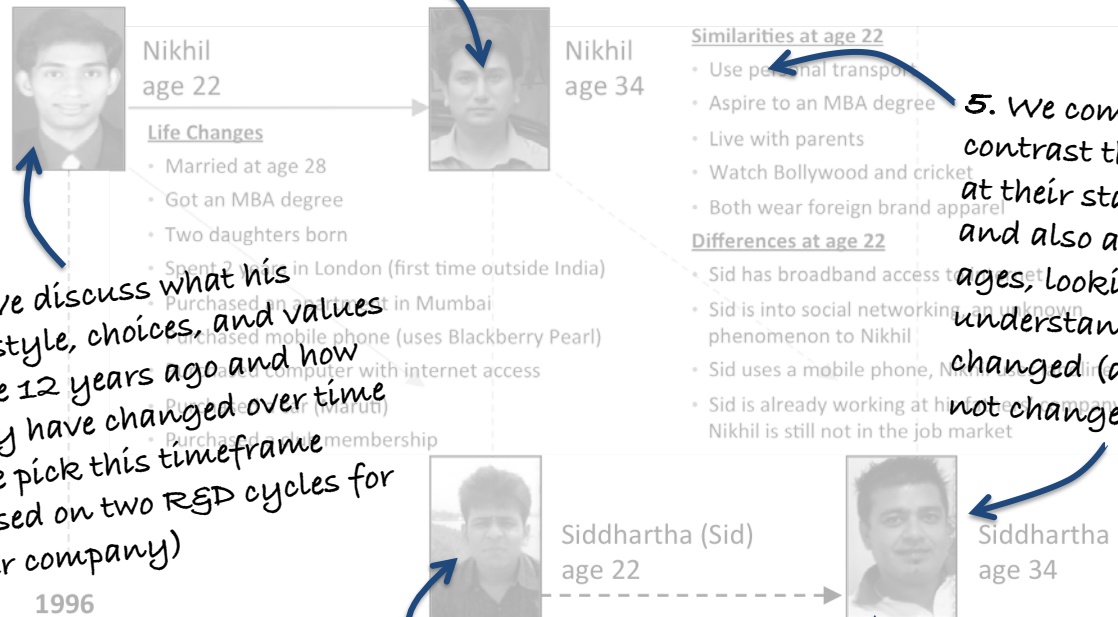
## INSTRUCTIONS

1. Draw a box that represents your primary customer today. Name your customer and note his/her age today. You may find it helpful to develop a detailed profile (persona) using data from interviews, generational studies, surveys, market reports, etc.
2. Draw a second box to show this person back in time and use an arrow to connect the two boxes. Note the customer's starting age. (How far you look back will depend on your group's R&D lifecycle, launch plans, and related strategy—if you don't know a good timeframe, use 10 years.) Discuss this person's views, behaviors, and choices in the past and how they have changed over time.
3. Under the first box, draw a third box that represents your future customer as he/she exists today. Name this future user, and his/her age will be the same starting age as your first customer. You may find it helpful to develop a detailed profile (persona) using data from interviews, generational studies, surveys, market reports, etc.
4. Draw an arrow forward from the third box that connects to a fourth box for your future user. This box represents the target future user. His/her age will be the same as today's customer.
5. Compare the two people at their starting ages and also at their target ages. You may find it helpful to develop a profile of the future user, which will include a mix of dominant generational values, similarities with today's customer, and new differences extending from the young future user today.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.



1. We describe our primary customer today and note his age



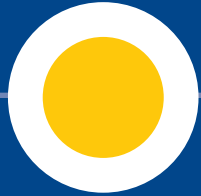
2. We discuss what his lifestyle, choices, and values were 12 years ago and how they have changed over time (we pick this timeframe based on two R&D cycles for our company)

3. Drawing from our earlier generational research, we describe our young future customer as he exists today

5. We compare and contrast the two people at their starting ages and also at their target ages, looking to understand what has changed (and what has not changed) over time

4. The target age of our future user is the same as as today's customer

Source: Neeraj Sonalkar, Stanford University, 2009



## **DRAWING INSIGHTS & IMPLICATIONS**

The researcher learned that the future user is similar and different to today's customer in some important ways. Although both Nikhil and Sid are 34-year-old middle managers who shop foreign brands and watch cricket, they grew up under different economic and political environments in India.

For example, Sid doesn't care much about politics and believes business principles should be used in the government. Unlike Nikhil, he spends more time abroad and likes combining business and family activities on trips. He also expects ubiquitous internet access in all future products and services.

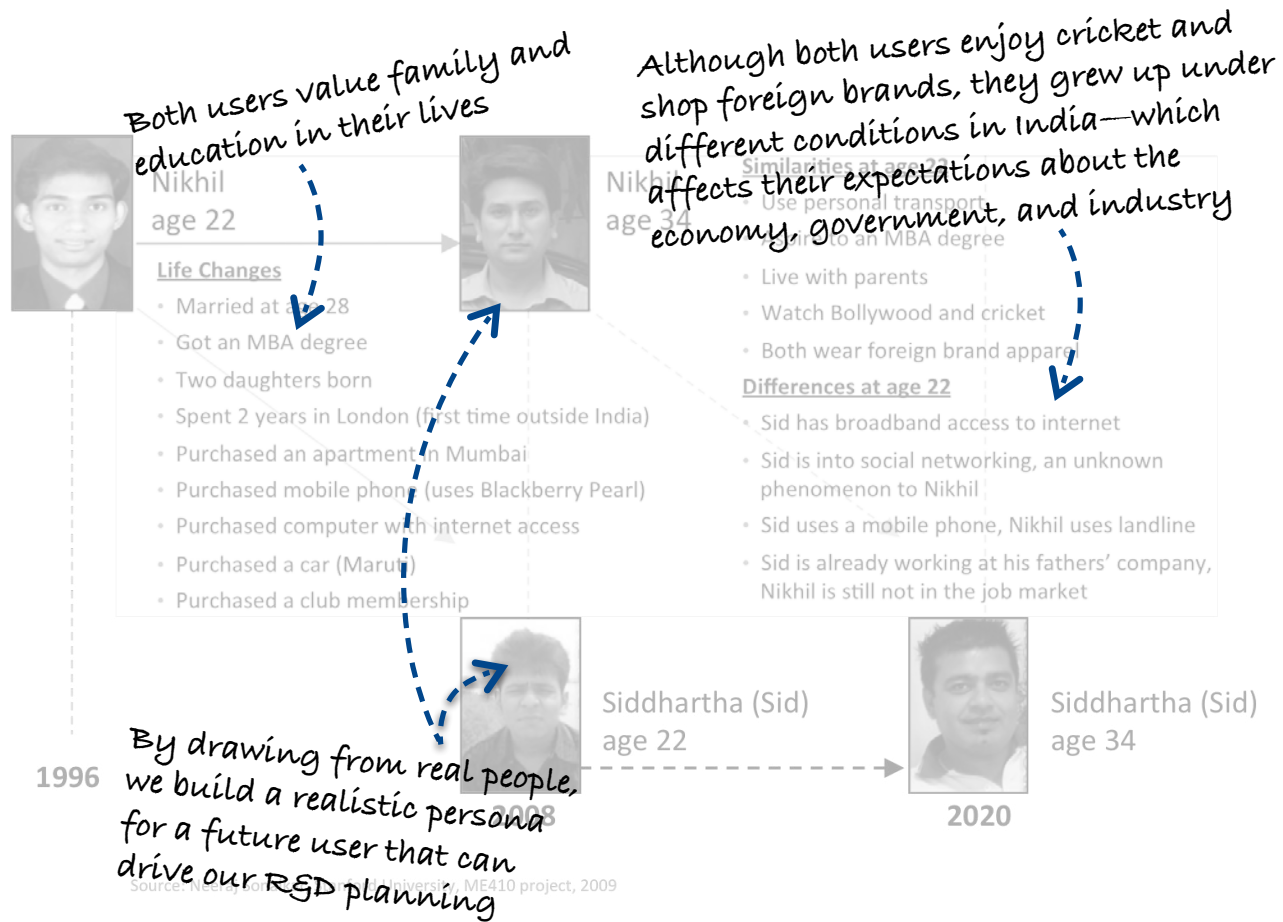
The researcher also learned that some aspects of human belief and behavior do not change that quickly. For instance, both characters believe strongly in marriage and education. Both eat well, live in city apartments, and commute to work.

Also importantly, Sid does not have unrealistic expectations about his future in 12 years. He does not plan on lunar condos, flying cars, or brain implants for communication, based on what he grew up with and is experiencing in 2008. Instead of wild science fiction, the Future User method presents a plausible persona with real-life needs set in a future context.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Where can you find additional data about how people live today? How they lived in the past?*
- *Do you want to grow the same market or pursue a new market for your future user?*
- *How representative is your future user of his or her generation?*
- *How many additional future users should you develop to better capture a coming change in the generation's makeup?*






## TIPS & LESSONS FROM OTHERS

- The method is quite simple at its core, simply comparing four different profiles in time for two people.
- Start with the profile of today's customer in order to reconfirm any existing biases and facts before extending into the future profile.
- Gather profile data from all the usual market research sources, including personal interviews, online surveys, focus groups, and ethnographic observation.
- Select both the names and faces carefully for your character profiles because they will convey many implicit messages about identity to your audience. One trick is to select a popular baby name from that time.
- Use real evidence to develop your character profiles because stereotypical attributes will weaken the usefulness of this method for your planning.
- Each character profile may include basic demographic data, family background, values and beliefs, personal and career goals, lifestyle activities, purchase/product habits, generational values, and technology/media usage.
- Draft the final blended profile for the future user as your last step, by drawing from the three user profiles already developed.
- Include personal details to add life to your personas, such as: top influences on purchasing decisions, favorite TV shows, books reading now, car model driven, biggest fears, etc.
- Consider adapting the method to compare your group to another organization to see how your group might need to mature or evolve.

## REFLECTION

*Which user attributes should stay constant over time?*



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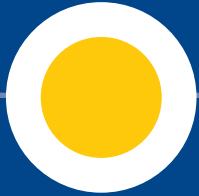
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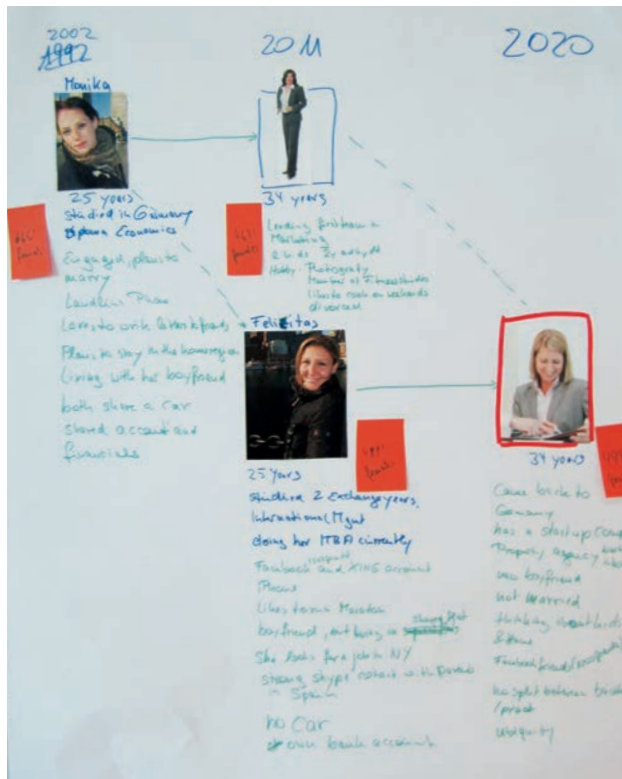
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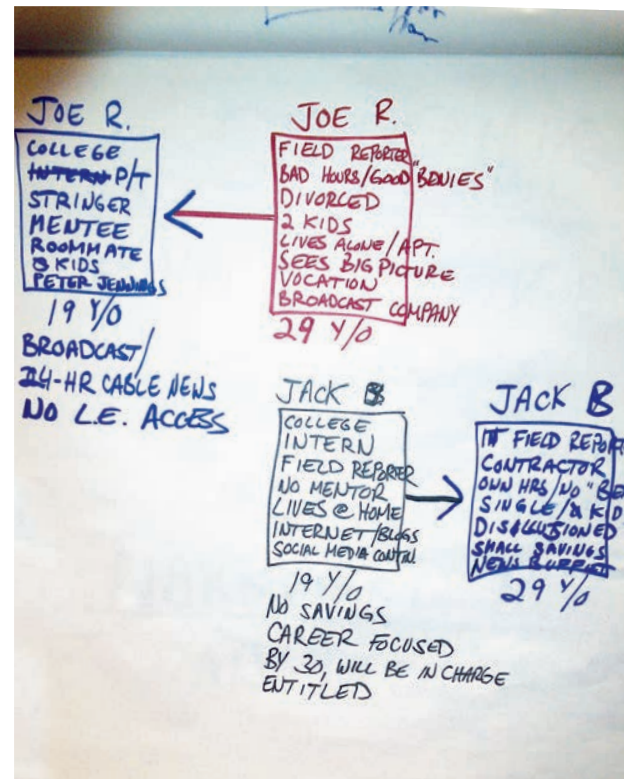
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## ADDITIONAL EXAMPLES



A European financial services group wished to sell its current services to a new market, namely affluent female professionals.



An American educational provider used the Future User method as a quick gap analysis to see what they did not know about the future customer.



# FUTURE USER | METHOD WORKSHEET

USER NAME: \_\_\_\_\_

START AGE: \_\_\_\_\_

TODAY'S AGE: \_\_\_\_\_

(PASTE  
FACE  
HERE)

(PASTE  
FACE  
HERE)

*Similarities & differences in our  
two users at their target age:*

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*Similarities & differences in our  
two users at their starting age:*

---

---

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USER NAME: \_\_\_\_\_

START AGE: \_\_\_\_\_

TARGET AGE: \_\_\_\_\_

(PASTE  
FACE  
HERE)

(PASTE  
FACE  
HERE)

YEAR: \_\_\_\_\_

**TODAY**

TARGET YEAR: \_\_\_\_\_



## VIEWPOINT | ACTING OUT FOR THE FINNS

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There is an old saying “as talkative as a Finn.” The classic Finnish stereotype is someone who is taciturn and solemn, and the national characteristic is of polite reserve. Generally speaking, we take business seriously and expect to be judged by our expertise, not the way we present ourselves.

Certain innovation methods may challenge that comfort zone. In particular, the FutureTelling method requires elements of theater and group role-playing. Like most Finns, I prefer to tell my team’s ideas calmly, not act them out.

Truth is, we might miss out on many insights that acting out in front of others might bring us. Role-playing is not just a technique to communicate an idea to another person; it is ultimately a method of

self-reflection. While acting out, we have to consider the role we are playing. We have to identify with that role and imagine ourselves in that character’s situation. In addition, a live act provides more stimuli to react to than a narrative could, so the feedback we receive from others becomes much richer and more specific.

Fortunately, performing is a skill that can be learned. While I probably can’t remove the nervousness that naturally comes with trying something new, I can make it more acceptable by practice. The FutureTelling method can be enacted in many situations in our work to tell colleagues about our new ideas—that may help all of us to challenge our own stereotypes about what is right and what is true.



# FUTURETELLING

Futuretelling are short and dramatic performances that illustrate a particular user need as a scene from the future. This is active storytelling at its best.



## WHEN TO USE IT

- To excite your audience about a future possibility that may be difficult to express in words
- To change the energy dynamic in a stale planning conversation
- To complement written explanations of your idea

## WHY IT'S HELPFUL

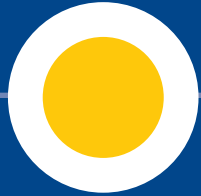
Psychology studies and everyday experience verify the importance to show, not tell. People like to see, not just hear, results. When an idea is visually presented, it conveys a richer set of meanings and engages the audience more fully than an idea documented in plain text. When the ideas are about things that do not yet exist, such as a future business solution, it can often be easier to act out the relationships than to explain the complexities through mere words.

Futuretelling is a version of storytelling, which shows your user(s) in a future context. Some participants consider Futuretelling to be role-playing or live theater, or even a TV sitcom scene; in all cases, the power is in providing another format to inform and persuade your audience about a new idea.

The value is twofold: the audience witnesses a live demonstration of a use case and the performing team completes an important exercise in sense-making. The team must think of a real-world situation to present the idea and all its components. This method presents the first occasion to think outside the solution and position it in a bigger context.

## WHAT YOU GET

You gain a short dramatic performance or theatrical sketch about your user(s) in a future context. Acts can be performed to support group communication or can be pre-recorded as part of a broader effort to build knowledge and alignment.



### LET'S LOOK AT AN EXAMPLE

A team of Nordic researchers felt that growing energy demand and coming advances in energy technologies presented a compelling business opportunity. The team discussed issues in scale, accessibility, and distribution, among other topics in the energy industry.

One of their assumptions was that the national military would serve as a lead adopter. The future user was a specialized military medical doctor in northern Europe, who valued sustainable solutions.

When team members pictured this doctor working on critical surgeries on the battlefield and other remote locations 15 years in the future, they believed he would bring a small power generator using algae to help provide local power.

In order to present this complex picture, the team developed a short

comedic performance, or skit, to show the doctor performing the surgery. Team members played the doctor, patient, medical assistant, and fellow soldier. They used some simple theater props, such as an American football as a tumor and a company event sign as a scalpel. By adding some light humor to their role-playing, the team entertained the audience and made the future situation feel more memorable.



Source: William Cockayne, 2008



## INSTRUCTIONS

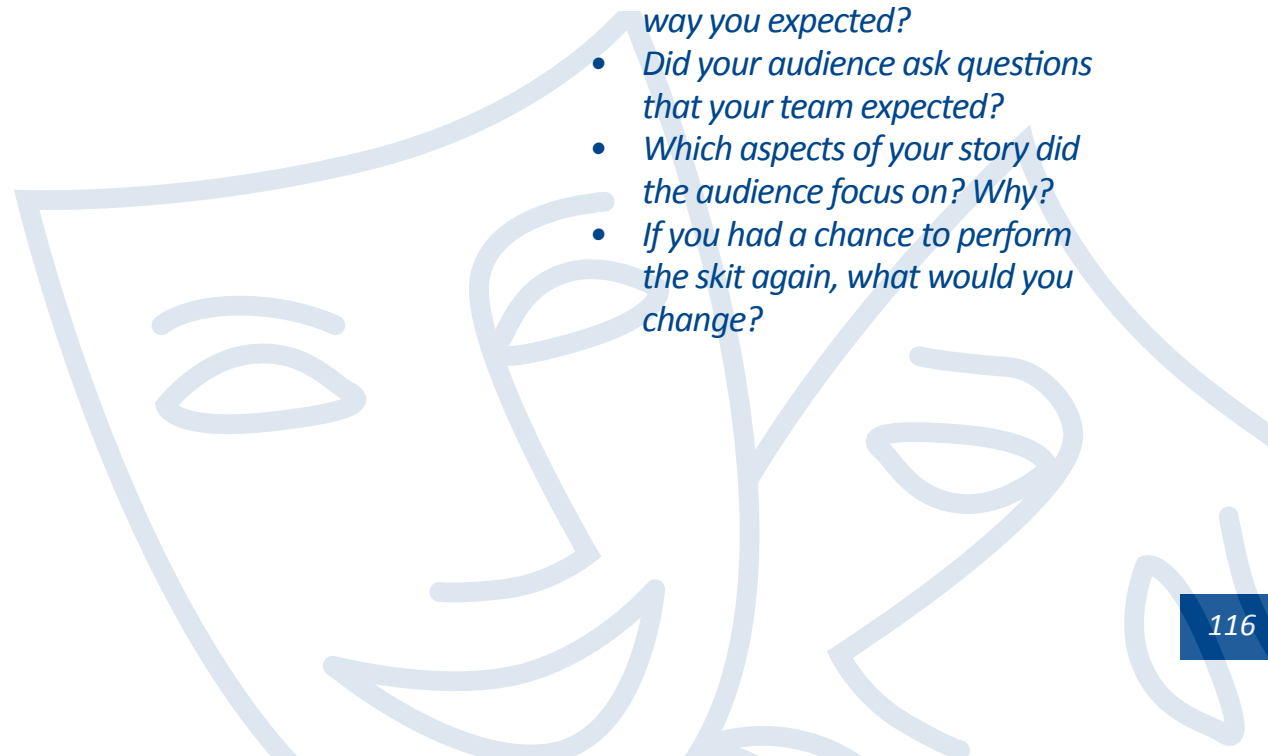
1. Determine the primary need or situation that you think helps show your future user best in a realistic situation.
2. Create a story about this user's situation. What are the circumstances, and what are the people involved trying to accomplish?
3. Develop a simple script that outlines each person's dialogue and interactions in this story.
4. Identify acting roles for all the team members.
5. Find any supporting props that may help convey the story.
6. Present your performance to a live audience.
7. Listen to the reactions and questions from the audience, which may show well- or under-performed areas in your presentation.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Did your audience react in the way you expected?*
- *Did your audience ask questions that your team expected?*
- *Which aspects of your story did the audience focus on? Why?*
- *If you had a chance to perform the skit again, what would you change?*



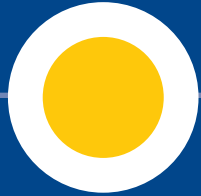
1. We decide to show the doctor performing a critical surgery on the battlefield.

5-6. We used simple props, such as giant paper scalpel, to help add some humor to our storytelling.

2. Our story had four roles: a doctor, medical assistant, patient, and fellow soldier.



3-4. Everyone, including the patient, had some lines to say that conveyed the importance of using a portable energy generator.



## **DRAWING INSIGHTS & IMPLICATIONS**

Through this simple exercise, the research team discovered several new insights that they had not expected. First, they learned how important it was that they show their user behaving and interacting in a realistic future context. The user need became much more palpable to the audience, who had been slightly skeptical before hearing only the verbal description. Now the audience could literally see the future scene and related complexities, and the team was reminded of the old adage “a picture is worth a 1,000 words.”

Second, by developing the skit, the team learned more about their user

more than any other analysis previously. They also developed a deeper empathy for their user. In order to develop this character for live presentation, it became necessary to understand what it would feel like to be someone else.

Third, the method brought the entire team together in creative collaboration. Like theater, the team had to work together to create a successful production.

Lastly, the audience feedback and reaction helped the team improve their communication. They realized that they didn't need an ending to their user's situation at this point; instead, the method gave them a chance to learn and practice the greater story about why energy was an important issue to address.

Everyone had a role to play  
in the production, and it  
united us more as a team

Once our audience saw—instead of  
hearing us describe—the user's need  
in context, they began to understand  
the critical value of our opportunity



We gained more  
empathy for the  
user's situation, and  
good design begins  
by understanding  
basic human needs



## TIPS & LESSONS FROM OTHERS

- A story becomes particularly memorable when you engage members of the audience in safe roles.
  - It helps when each character in your story has a specific agenda that drives his/her actions.
  - Sometimes it helps to use stereotypes for supporting characters to keep the story simple.
  - Good storytelling and acting are all about action and dialogue. Make sure your characters speak realistically, and try not to mix styles of speech and vocabulary too much unless you are going for a certain effect.
  - Use the Futuretelling performance as a chance to test and gather feedback about your innovation idea.
- Consider using a narrator as one of the acting roles, if you need to provide transitions between specific scenes or to explain what your future user is thinking.
  - Don't worry about getting the lines right. Many performances are best improvised under deadline.
  - Some ways to design a future scene include having your future user meet its older version at a bar, or having your future user turn to its older version for generational advice.

### REFLECTION

*When do you see live storytelling used in your organization or industry?  
What makes it work?*

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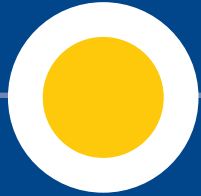
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## ADDITIONAL EXAMPLES



Several Koreans presented a mock commercial on how kimchee, a traditional fermented Korean dish, could be the next health tonic for the world.



In a provocative scenario, an R&D team in India showed how a typical urban middle class family used water before and after their new system.

# FUTURETELLING | METHOD WORKSHEET

Planning point	Your story framework
<i>Describe your future user in one sentence or less. What does your user care about most?</i>	
<i>What do you want your audience to understand about your user's essential need(s)?</i>	
<i>What is the situation in the future? Keep it to a simple scene or two, if possible.</i>	
<i>What other people (or objects) will your user interact with in this situation?</i>	
<i>How do you want the audience to respond at the end of the situation?</i>	

*“The sketches and plans you will see today are simply a starting point: our first overall thinking. Everything in this room may change time and time again as we move ahead, but the basic philosophy of what we’re planning is going to remain very much as it is right now.”*

—**Walt Disney**, entertainment visionary  
(“EPCOT” television special, 1966)





 **SOLUTION**  
CHAPTER 5

## Shortcuts

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Paper Mockups 136

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Dark Horse Prototype 145

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Change Paths 149

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Case study: Yle 158

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## PHASE III: SOLUTION

The third phase in the Foresight Framework brings you to a solution. Innovative solutions are specific to your industry, users, organization, and individual skills.

The first two phases gave you grounding. The third phase seeks to define the questions that exist along different paths to innovation. The reason you ask questions is to help uncover any lingering assumptions and critical areas that still need to be addressed by your team before committing any resources—financial, human, or other.

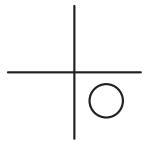
This phase is focused on connecting your view of the future to present action. All of the Phase III methods are deliberately designed to converge from multiple promising market opportunities to the select 1–2 proposals that you will take forward as innovation solutions.

You will learn three methods in this phase:

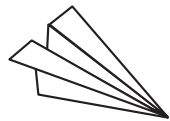
- White Spots
- Paper Mockups
- Change Path

### PHASE III: SOLUTION

The third phase seeks to define the questions that exist along different paths to innovation, which are specific to your industry, customers, organization, and team skills.



**White Spots** finds hidden markets and provides a broad look at the competitor landscape.  
→ page 127



**Paper Mockups** create tangible models of your ideas that you can test at low cost for high learning value.  
→ page 136



**Change Paths** plot the major milestones that you will need to achieve on your path to action.  
→ page 149



A specific iteration is the **Dark Horse Prototype**.  
→ page 145

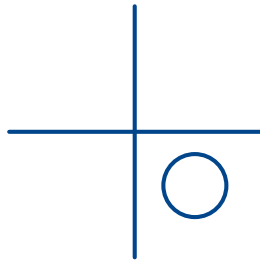
### Questions that drive this phase:

- *How can we determine the multiple paths possible to get from today to tomorrow's future innovation?*
- *Looking at what we've learned, how long does each step take along the various paths?*
- *What are the critical points for change, and which ones are in our control?*



# WHITE SPOTS

White Spots is a strategic method for studying the opportunity space defined by two salient issues.



## WHY IT'S HELPFUL

- To systematically find new solution areas or potential markets that are unknown or ignored by competition
- To identify relevant dimensions for the fundamental value of your innovation idea

## WHEN TO USE IT

The White Spots method provides a quick way to organize competing solutions and similar examples against two dimensions in order to help you assess areas of promising opportunity.

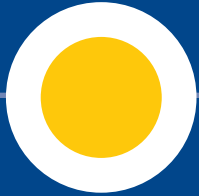
White Spots assists the search for high growth markets, and the method grew from similar tools, such as the cross-impact matrix initially established in the 1950s, the growth-share matrix developed by Boston Consulting Group back in the 1970s (which includes the

popular quadrant for “cash cows”), and the “blue oceans” approach in the 2005 business book Blue Ocean Strategy.

The method is structured as a 2x2 matrix, in which each axis defines your decision criteria. More than a competitive analysis, the White Spots method helps you iterate your idea’s positioning. Changing the dimensions will change your competition.

## WHAT YOU GET

Usually a favored tool of consultants and business strategists, the White Spots method helps you structure your approach to find hidden markets, as well as provides a broad look at the existing landscape of competition. The unfilled or “white” spots in the matrix will point you to unexplored or new open areas in the market. Finding “dark” spots will show areas of high market saturation, which may also be what you seek.

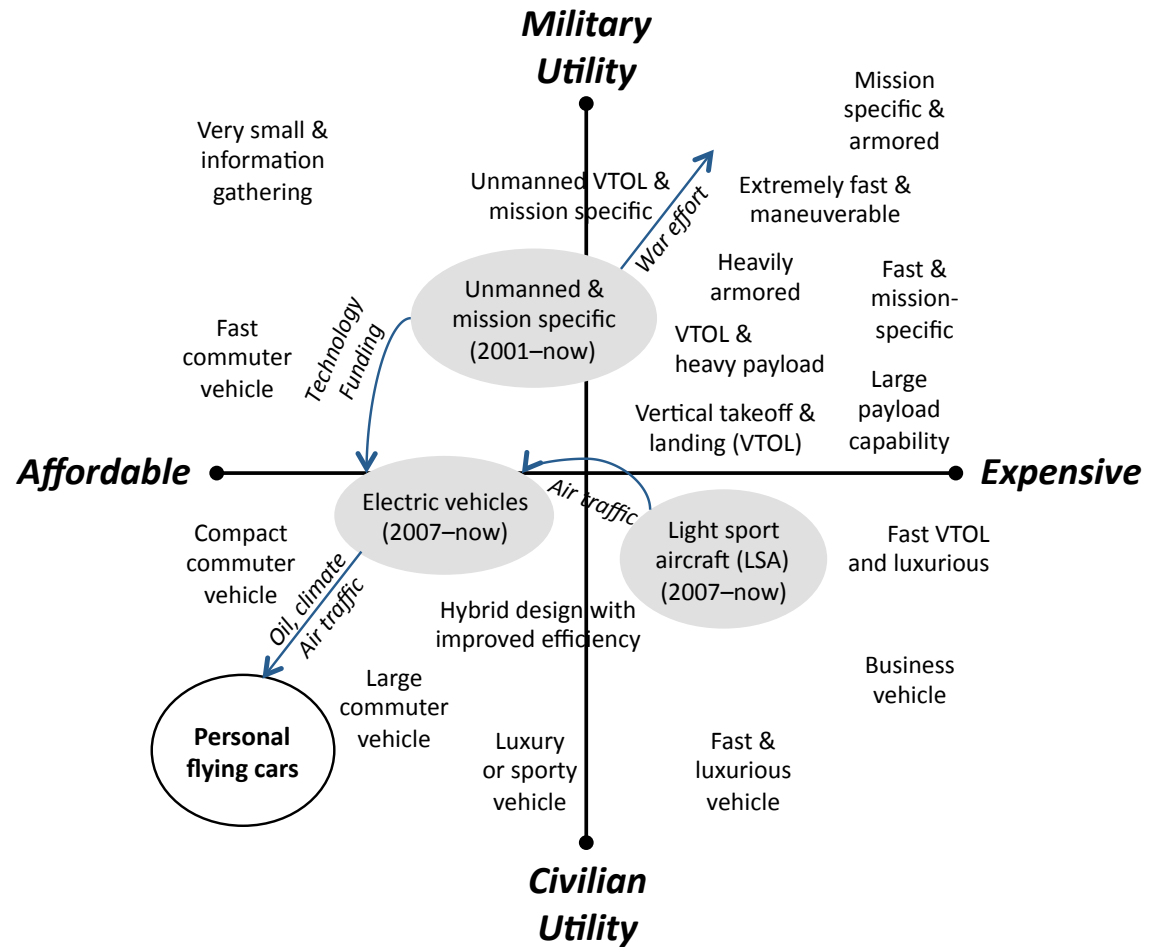


### LET'S LOOK AT AN EXAMPLE

A young aeronautics engineer had always enjoyed stories of flying cars, and he was now in a position to propose the concept for real funding.

The engineer went back to his Context Maps. He had developed five maps, so he could better understand the relationships among elements. After reviewing all his maps, he selected cost and utility as two critical dimensions as the basis for his White Spots analysis. Each dimension became an axis, and he defined opposing endpoints as evaluation filters for cost and utility.

He recalled his work at Boeing and NASA and also spoke with several industry experts to identify and map multiple examples on the matrix. He found an open space on his matrix—a potential market opportunity for personal flying cars.



Source: Kevin Reynolds, Stanford University, ME410, 2009

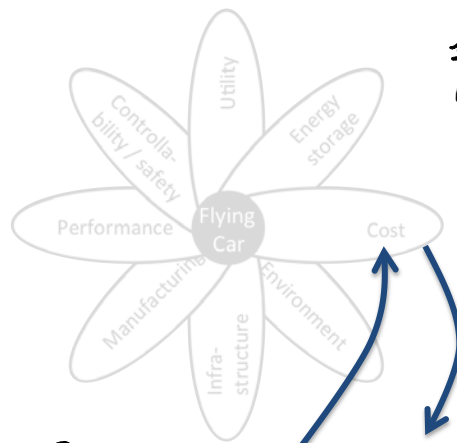




## INSTRUCTIONS

1. Draw two intersecting lines to create a 2x2 matrix.
2. Revisit your team's last Context Map. Identify two dimensions that struck you as being the most interesting or important to your team's overall learning. Advanced teams may select their top two dimensions without the aid of a Context Map.
3. Write one dimension on the matrix's x-axis and the other on the y-axis.
4. Define opposite endpoints for each dimension. This task may require several iterations to find a thoughtful pair of endpoints. The labels will direct analysis.
5. Then place an extreme example in each matrix's corner based on your axes. The corner examples will help anchor your analysis. If you can't identify any examples, go back to step 3 to try a different set of endpoints. If all endpoints prove fruitless, then go back to step 2 and pick another combination of dimensions.
6. After you have plotted at least one example in each quadrant, place other examples at various points in the matrix. Your goal is to complete as much of the matrix as possible. Dark spots, which have many examples or example clusters, represent areas of high competition and market saturation.
7. Find areas in the matrix that lack examples. These areas will appear as empty white spots in your matrix, and they represent possible market opportunities.
8. Circle one white area that most strikes your team. Different teams will apply different evaluation filters based on their respective company priorities, group goals, and other needs.
9. Describe a future vision that could exist in this space. What would the world look like? What types of solutions fit best here?

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

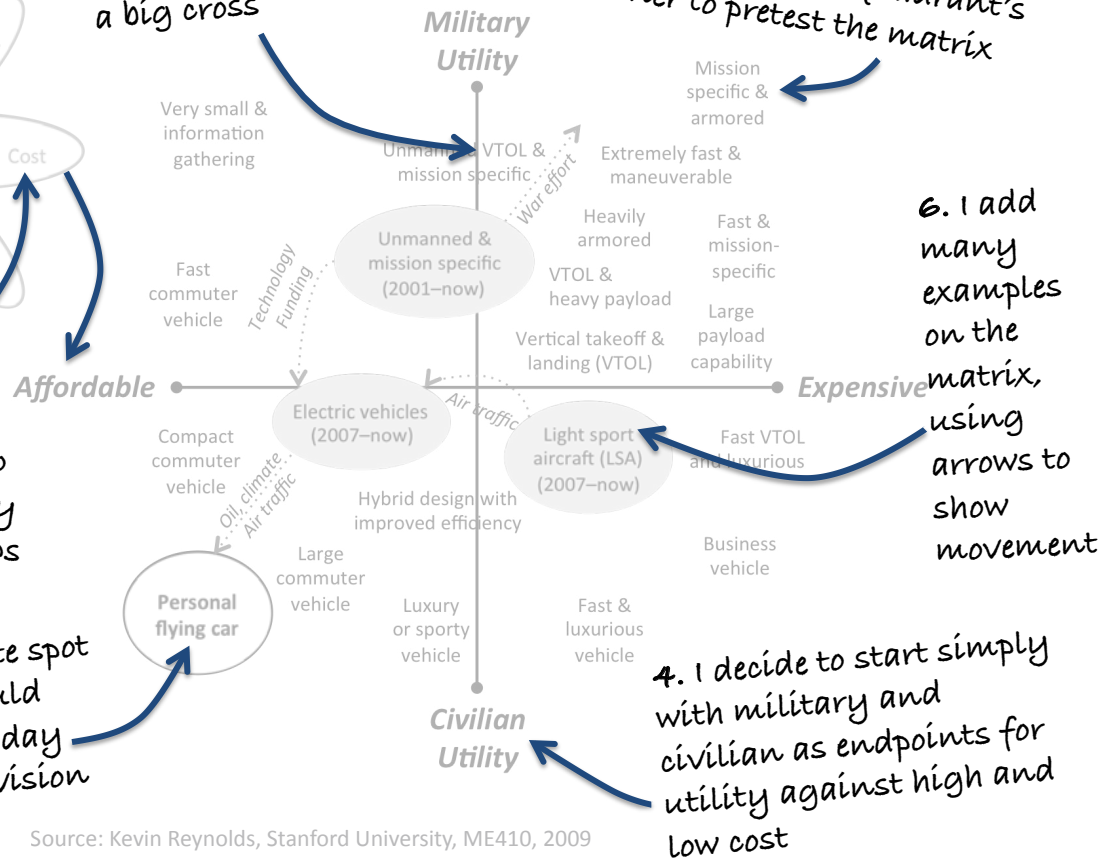


1. I start by drawing a big cross

5. I identify an extreme example for each quadrant's corner to pretest the matrix

2-3. I pick cost and utility as the top two dimensions from my previous Context Maps to create my two axes

7-9. I mark one white spot and ponder what could realistically exist today as a new industry vision



Source: Kevin Reynolds, Stanford University, ME410, 2009

## **DRAWING INSIGHTS & IMPLICATIONS**

The engineer wished to be taken seriously by potential investors and partners, so he decided to omit popular examples from the movies and science fiction stories in his matrix. By focusing on solutions available in the market, he confirmed that civilian transport aircraft tended to be less expensive than military solutions, largely since wartime demand makes cost less a priority.

In addition, he used the White Spots matrix as a communication aid. It helped him to explain the market need and timing of his vision to several research colleagues, who were unfamiliar with the aerospace and automotive industries. The engineer was able to present a complex picture easily, especially showing the important role of the American military in both leading and funding new technologies for dual-use aircraft.

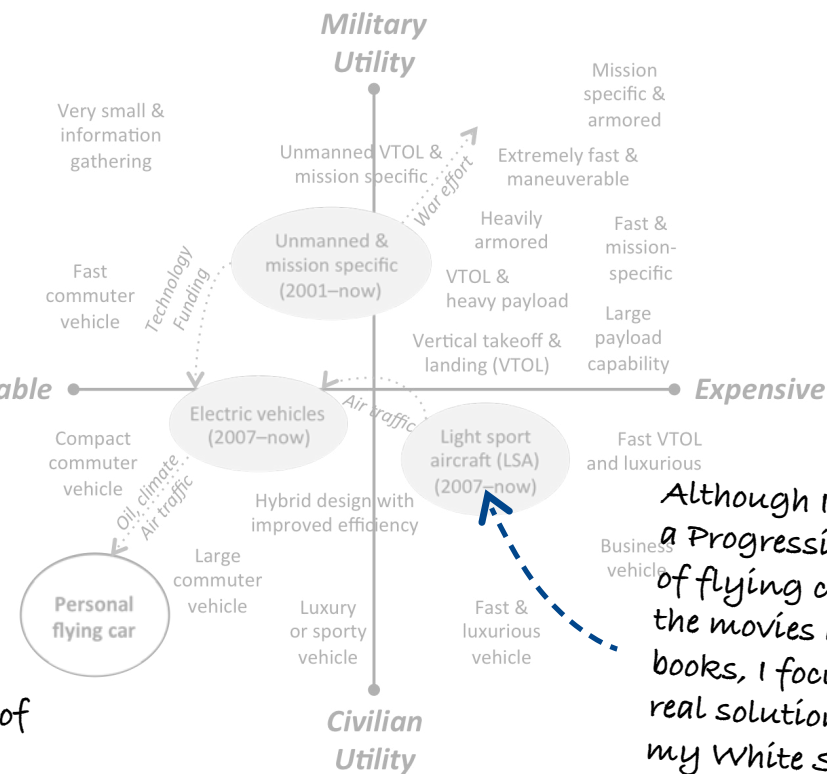
With the help of the White Spots mapping, the engineer could justify more clearly why the two dimensions of utility and cost were appropriate filters to evaluate this market opportunity. The group discussion raised other drivers and issues, such as safety requirements, that would be critical to the successful adoption and use of personal flying cars in the mid- to far future.

Armed with this knowledge, as well as practice presenting his concept, the engineer soon excited several organizations that were exploring the market space. In the end, he received two unexpected job offers and the chance to apply for funding in a government program.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Which dimensions (axes) and endpoints did your team struggle with? Why?*
- *Could you add more examples from other countries, movies, science fiction, and your personal lives? How do these examples change the types of solutions being introduced to the market?*
- *Does your team know any experts who could complete or check your analysis?*
- *Do certain types of solutions dominate the landscape? How might your team characterize or categorize those solution clusters?*



This 2x2 visual helped me tell a complex story about the market opportunity and competition in terms of the two biggest criteria of cost and use

Although I developed a Progression Curve of flying cars from the movies and books, I focus on real solutions in my White Spots analysis

Source: Kevin Reynolds, Stanford University, ME410, 2009



## TIPS & LESSONS FROM OTHERS

- Identify endpoints that are unusual contrasts or provocative, such as “factual / perceived”, which may generate unexpected insights.
- Labeling the axes is the most important part of White Spaces. Try to avoid value-driven judgments for the endpoints, such as “negative” or “better”, which can unfairly influence how your team evaluates examples.
- Don’t stress if your end points or dimensions are not leading to a fruitful group discussion. Instead, drop them and start over with a different set.
- Use arrows for any examples that fit across multiple points in the matrix to help you show change.
- Do you have a gut sense of what an opportunity could be already? Try to “reverse engineer” the White Spots analysis to support your hypothesis and see if any new gaps are uncovered.

**REFLECTION**  
*Before your team picks, which two dimensions would you start your analysis with? Why?*

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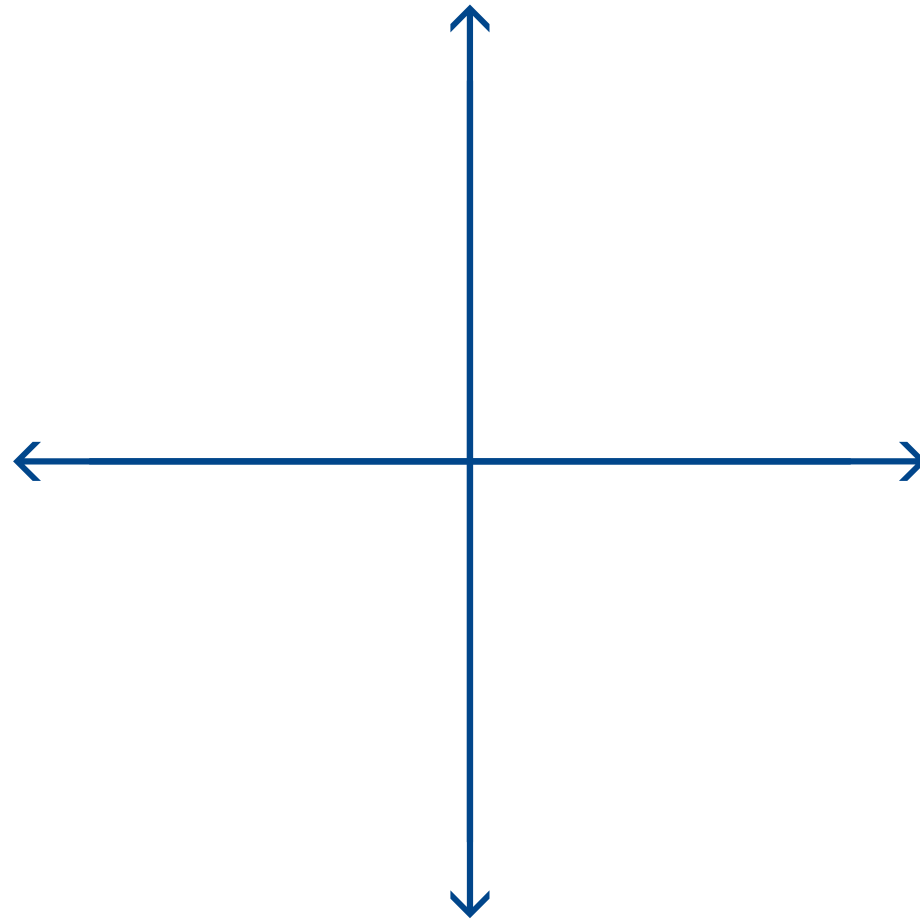
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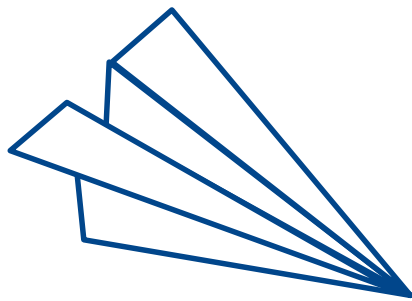
# WHITE SPOTS | METHOD WORKSHEET





# PAPER MOCKUPS

Paper Mockups asks participants to physically model a future system.



## WHEN TO USE IT

- To better understand an ambiguous innovation concept
- To visually communicate a new innovation proposal to others
- To ensure rapid cycles of feedback and learning
- To rally support for a new idea with those around you

## WHY IT'S HELPFUL

First, the Paper Mockups method helps you to literally see what you are doing. You connect your mind to your hands by taking advantage of physical form. Beyond a mental picture of your idea, you will have physically materialized the idea's complex interactions and relationships that underlie the user experience. Prototyping makes an abstract idea more real and accessible to others.

Second, you gain a tangible prop. Users are good at suspending their disbelief when seeing a rough model made from paper and other simple objects. Before

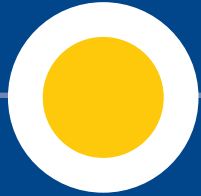
you have a chance to verbalize your idea, a good mockup will generate reactions and questions from others. A great mockup will cause people to ask, why doesn't this future already exist today?

Third, you save money. By using paper and other office supplies, you gain a cheap way to pre-test an idea before it becomes too formalized or resource-intensive. Today's innovation costs usually lie in building and verifying what has economic value. A simple paper design is often the best way to start a dialogue with potential users and test your idea's value early with little commitment. As Thomas Edison once joked, "We now know a thousand ways not to build a light bulb."

## WHAT YOU GET

The proverbial mock-up is the paper airplane. With Paper Mockups, you get a tangible 3D representation of your idea that you can annotate, share, and rebuild at low cost for high learning value.





### LET'S LOOK AT AN EXAMPLE

A corporate R&D team developed a Paper Mockup for a new innovation idea, which would be very different than their company's usual technology products. They imagined a new real estate service based on social networks that would be built on a consumer technology platform. The prototype was simply made from colored construction paper, string, children's modeling dough, stickers, and craft pipe cleaners. The team created a selection of houses in a neighborhood, some of which were marked "for sale".

Based on U.S. demographic data, they knew networks of young friends share their recommendations about good neighborhoods. In their prototype, the team modeled a group of people linked together through a combination of professional and personal connections. This group would receive regular status updates about the local properties.

Before planning a more formal proposal, the team used their Paper Mockup to help test the idea with friendly colleagues in their research division. This gave them more feedback about what to improve.



Source: Ming-Li Chai, 2008



## INSTRUCTIONS

1. Decide what you want to build or test as a mockup. For example, your mockup could be the entire system of components or a model of all the interactions in your idea.
2. Find some cheap prototyping materials nearby, such as discarded paper and plastic cups.
3. Next bring your concept to life by building it as a three-dimensional object or artifact.
4. Share your mockup with someone for feedback.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *Which aspects of your prototype did the audience focus on? Why?*
- *Which elements of your idea did your team leave out of your prototype? Why?*
- *Which parts of the prototype exist today, and which parts need to be built? Which pieces cannot exist today?*
- *How should you document and capture the lessons from building and presenting this prototype?*

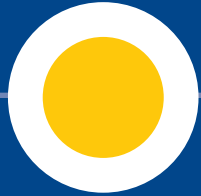
1. We choose to build the entire system because we want to understand how the various parts interact

2-3. We use materials nearby to build quickly, including string and colored paper



Image source: Ming-Li Chai

4. One of our team members sits down to explain our idea to a group of colleagues



## **DRAWING INSIGHTS & IMPLICATIONS**

An immediate lesson was that building an idea makes it more real somehow. The R&D team worked so often on digital devices and in their heads that they forgot how important (and frankly, satisfying) tactile craftsmanship can be.

By making their idea take physical shape, they also understood more about the different relationships existing among the various components. For example, while building the paper houses, they realized that the network of people did not have to live nearby to the houses, nor did all the people have to be local property owners or potential buyers. Some people might be close relatives from the broader area, who like to stay generally informed about changes affecting the family. Others

were community leaders, who lived in a different neighborhood nearby, yet had vested interests in these properties.

The team also discovered the power of an object during the first feedback session. When they set their mockup on the table, several of their colleagues became engaged immediately. Before the presentation began, their colleagues already began to ask questions, curious about the possible innovation. Prototypes can bring an imaginative or emotional reaction to a conversation that might otherwise have been limited to a conceptual or rational level.

Lastly, the major lesson was that if the prototype could exist today, then it is not far enough out in time. In other words, the team should stop planning and build the solution now!

Just having a physical mockup in hand generated intense curiosity among colleagues—normally, we have to fight for their attention during the usual slideshows



Image source: Ming-Li Chai

While sketching is helpful, building our idea into a 3D object gave us more insights into our own innovation idea

The act of building also helped us understand more about our target users and how they might react to different parts



## TIPS & LESSONS FROM OTHERS

- Depending on your organization and culture, you may call a paper mockup a feasibility study, maquette, small scale model, or dollhouse. Choose the term that makes the most sense to your team and users.
- See how another colleague explains your prototype to someone, which will help you understand what someone else sees as important to the idea.
- The best materials are cheap and readily available, such as discarded paper (e.g., recycled sheets), unused cardboard (e.g., empty printer cartridge boxes), office supplies (e.g., paper clips), kitchen supplies (e.g., plastic cups), fasteners (e.g., string, staples), and whatever else is handy.
- Deliberately keep your design rough, so that it looks incomplete and thus invites constructive feedback from others.
- Often prototyping is most useful when a sequence of mockups can be done in rapid succession. Each mockup builds on the learning and discoveries from the previous iteration.
- If you take the mockup to customers, remember that they test the prototype; you don't test them. In other words, focus on hearing how your sample users react to the idea and why.

## REFLECTION

*How might you embed paper mockups into your early market research or user testing process?*

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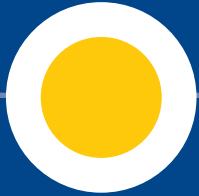
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## ADDITIONAL EXAMPLES



Several American policemen prototyped an idea that let community members send real-time texts and alerts to help the local police deputy respond more efficiently to neighborhood crime.



Based on recent changes in inexpensive building materials, prefab dwellings, and eco-friendly designs, a Korean team built a rough model of urban modular housing units.

*Feel free to use  
this piece of paper  
in your mockup.*





## DARK HORSE PROTOTYPE

A variation of the Paper Mockup, Dark Horse prototypes are three-dimensional physical prototypes that are built to explore a previous intuition or rejected idea.



### WHEN TO USE IT

- To give your team permission to think bigger and out of the box again
- To explore a fast alternate view to an existing idea

### WHY IT'S HELPFUL

In the world of horse racing, a dark horse is a bet that has the least likely odds to win, but which ultimately may have the greatest chance of reward. Likewise, your team may have rejected certain ideas too early because these ideas were perceived as being too risky, radical, impossible, unacceptable, or such at the time of consideration. People often dismiss their earlier intuition and gut sense, and in practice, the early ideas, rather than

the subsequent iterations, often become more predictive of the final success of a project deliverable.

The Dark Horse helps you uncover an earlier truth or insight that you might have lost in the overall innovation process. After being immersed in foresight planning, you have gained a greater understanding about your given problem or opportunity space. By rebuilding an earlier prototype in under a minute, you focus in on what really matters—the fundamental core of your innovation that becomes your team's "Dark Horse."

### WHAT YOU GET

You gain a tangible representation of your innovation idea, distilled to its essential value.



## INSTRUCTIONS

1. Rebuild your team's paper mockup in 2 minutes or less.
2. Explain the essence of your idea to someone using the mockup.

## DRAWING INSIGHTS & IMPLICATIONS

Building the Dark Horse gave the corporate R&D team a challenge. At first, they protested because they already knew what was important to their idea. Why build it again? What would they learn differently?

Then, someone in the team started to fiddle with the mockup, moving the string connecting the people to the houses themselves. This one decision

was symbolic because moving the string changed the social network from the people to the objects.

The houses and rental properties had their own social knowledge independent of the residents, and this knowledge could then better support the decision-making of the people in the network. In other words, the network of houses could mirror the same sensitivities, grudges, and emotional qualities that affect human friendships.

This simplification changed the entire nature of the group's discussion, helping them realize what was valuable—and potentially a unique value proposition—to their innovation idea.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### Questions for team discussion

- *What became the essential element of your idea?*
- *Looking back at your team's analysis, has the essential element of your idea been there all along? How did you miss it?*
- *With the Dark Horse prototype in hand, how would you quickly re-tell the entire analysis you did, beginning with the Context Map?*
- *Now that you know the essential element that needs to be communicated, what is the next version of your prototype?*



Image source: Ming-Li Chai

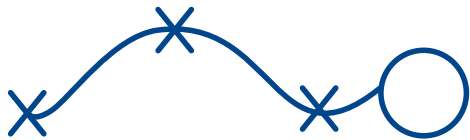
*We made one dramatic yet important change: by moving the string from the people to the houses, we emphasized the social network (and transfer of knowledge) among the houses*

*Tear your previous  
Paper Mockup in half.  
Discuss.*



# CHANGE PATHS

Change Paths are data-driven narratives exploring different paths and key decision points toward possible future innovations.



## WHEN TO USE IT

- To address the gap between vision and action
- To outline some tangible steps to achieve your innovation idea

## WHY IT'S HELPFUL

One strategy is simply to wait for the future to arrive. You see what your competitors do, and you react accordingly.

Another strategy is to anticipate the future you want and determine how best to make that view of the future happen. While this strategy requires planning ahead, the results are often more rewarding and personally satisfying.

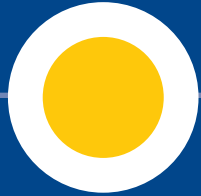
The Change Paths method puts the control in your hands. It helps you define the big steps or choices your team must take to get you to the future vision you want. By marking the top 2-3 steps on the path, you provide critical rally points for the broader team.

All Change Paths are drawn symbolically as a wiggly line because innovation does not occur as a linear process. Even if investors like to see a straight timeline, in reality the path to execution is a series of smart and lucky choices, ideally linked by a compelling vision.

## WHAT YOU GET

The Change Paths method gives you a simple strategic outline that then becomes the backbone for a detailed project roadmap and/or product plan. It helps you lay out the critical milestones that you will need to achieve on a particular innovation path, so you simply know what to do tomorrow.

You also show that innovation does not happen as a direct path, but instead as a series of smart choices linked together in a cohesive vision.



### LET'S LOOK AT AN EXAMPLE

Boeing and Airbus are two rival companies that build commercial airplanes and other aerospace products. When these companies invest in new technologies, they must bet big for the future. A small R&D team reflected on each company's original visions for the 787 and A380 airplanes with the help of analyst reports, news articles, and industry experts.

In the late 1990s, both companies envisioned a world of increasing air travel. Their research drew from similar

market studies, customer surveys, and more; however, they each took a vastly different path forward.

Boeing's solution addressed point-to-point travel. They wanted a comfortable airplane truly designed for their customers, which they called the Dreamliner, that relied on new technologies within an existing industry infrastructure. Their first step was to review the state of emerging technologies. Later big decisions included hiring a psychologist who addressed basic human needs and

outsourcing many IT and manufacturing operations.

In contrast, Airbus' solution addressed hub-to-hub travel. They wanted a luxury airliner, known as the "Super Jumbo", that could carry more people between large airports that would have increasingly fewer landing slots. By relying on known technologies, they would create an entirely new travel class that entailed a new market and business model. Their first step was to review feasible airports. Later steps would be to partner with airports and expand operations globally.





## INSTRUCTIONS

1. Draw a circle on the far right, which represents your future vision or opportunity. Discuss what a plausible and desired future looks like with your team. Write the tagline or summary inside the circle. You can also place a date or time period by the circle.
2. Draw a squiggly timeline out from the left side of the circle. What can you do tomorrow to get started? Mark an X at the far left endpoint and write your team's action here.
3. Discuss what your team has to do next to achieve your vision, identifying the top two decisions on your path to action. In all cases, these decisions should be

in your team's control and ability to affect. Mark these decisions with an X on the timeline and summarize them nearby.

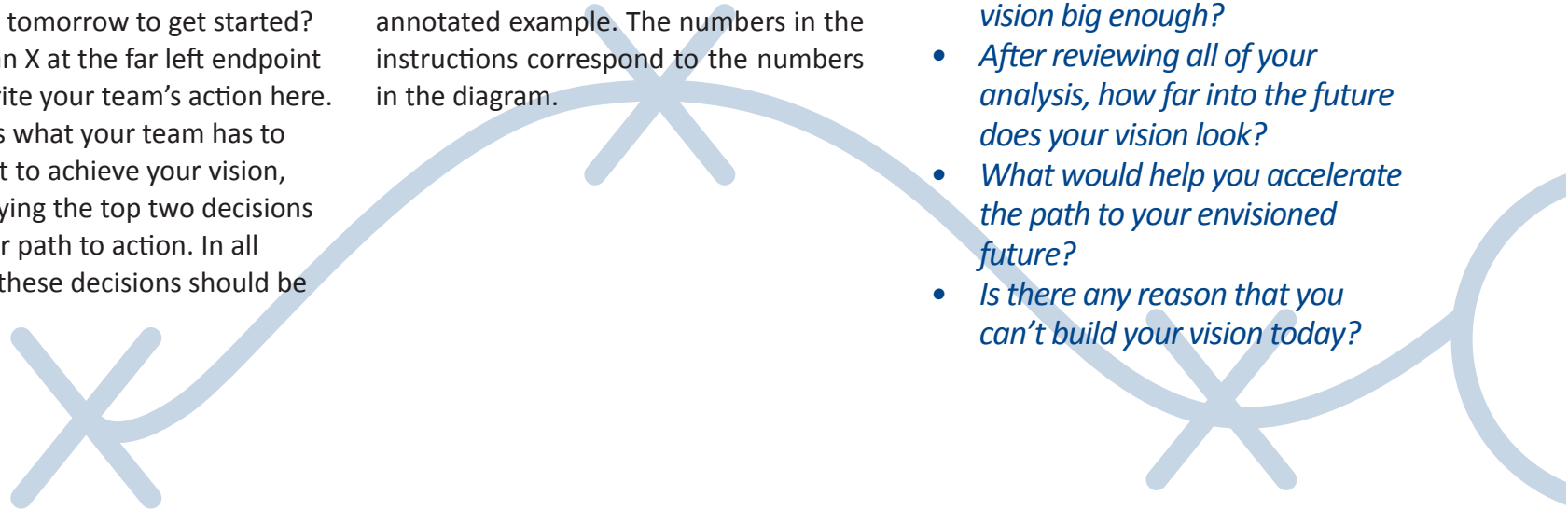
4. Place any additional indicators outside your control off the path, if they help you confirm progress toward your vision. This is an optional step.

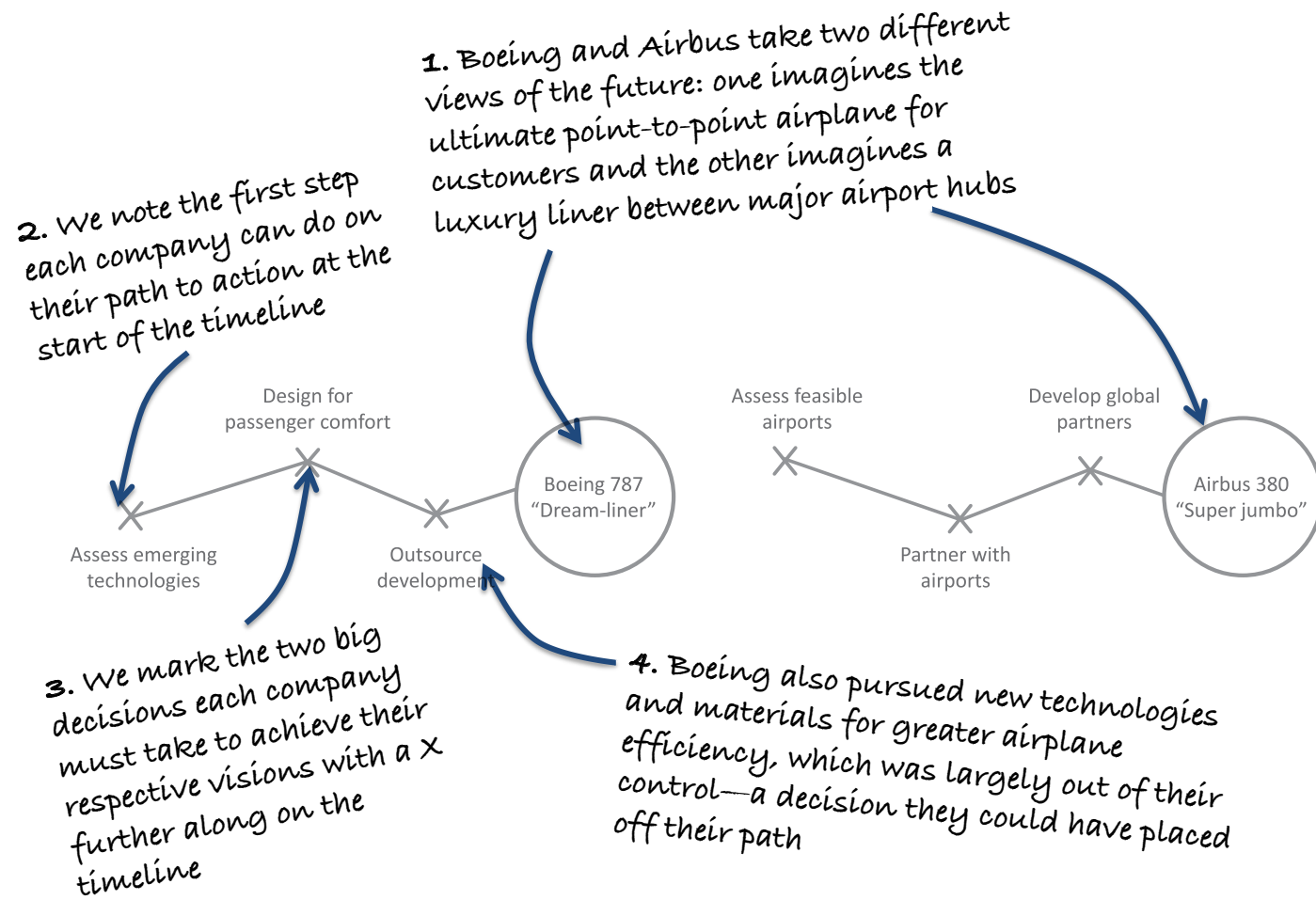
→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

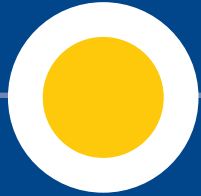
### Questions for team discussion

- *Looking at the first few steps your team needs to take, is your vision big enough?*
- *After reviewing all of your analysis, how far into the future does your vision look?*
- *What would help you accelerate the path to your envisioned future?*
- *Is there any reason that you can't build your vision today?*









## DRAWING INSIGHTS & IMPLICATIONS

The R&D team realized that both Boeing and Airbus planned future visions simultaneously. Both management teams expected current industry trends to continue, including increased airport hub traffic, declining average airplane sizes, and more point-to-point flights. Both visions were competitive, yet created two large and complementary markets. It was a good reminder that the same future can support multiple visions.

In addition, the team learned that visions can (and in many cases, should) evolve. Paths could change, as more information is gained about the vision's feasibility or as market conditions shift.

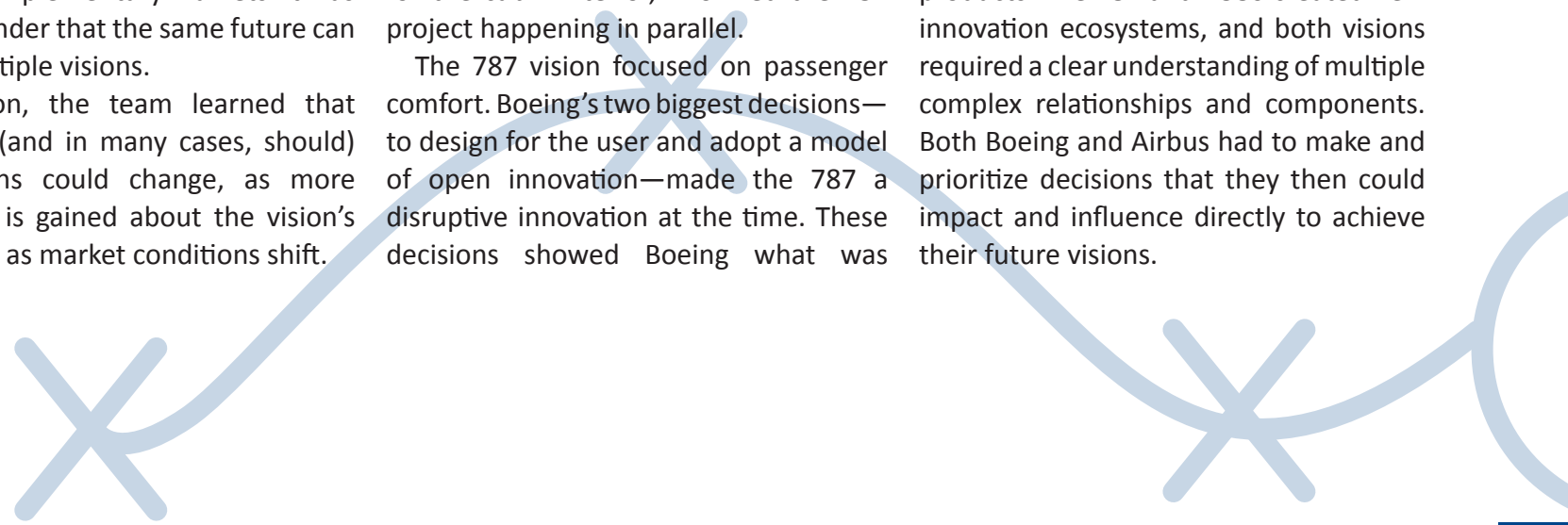
In Boeing's case, management first envisioned a speedy airplane that could travel without intermediate stops. Boeing initially developed a new concept called the Sonic Cruiser that would fly nearly 20 percent faster than most commercial jets. Ultimately, they abandoned the idea after the 9/11 terrorist attacks and concerns of rising jet fuel costs. Many insights from this project, especially for the cabin interior, informed the 787 project happening in parallel.

The 787 vision focused on passenger comfort. Boeing's two biggest decisions—to design for the user and adopt a model of open innovation—made the 787 a disruptive innovation at the time. These decisions showed Boeing what was

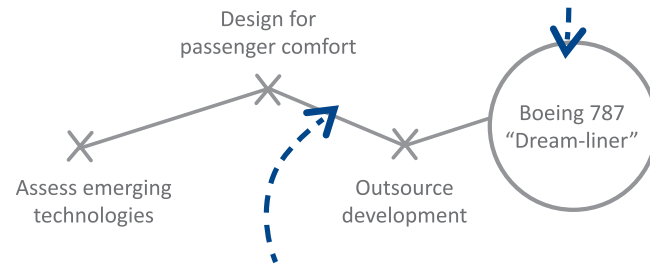
essential to achieve their vision.

Of course, other decisions mattered too. For example, Boeing worked to provide better fuel economy through new fuel-efficient twin engines, lightweight composite materials, and more electric power systems—all of which helped set the 787 apart in the market.

Another lesson to the R&D team was that both visions were more than products. The 787 and A380 created new innovation ecosystems, and both visions required a clear understanding of multiple complex relationships and components. Both Boeing and Airbus had to make and prioritize decisions that they then could impact and influence directly to achieve their future visions.

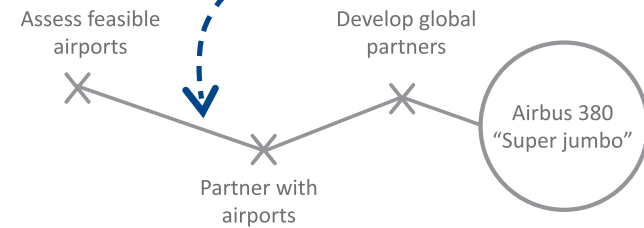


*We realized that the same future can support multiple, even competing, visions*



*Boeing actually started with a different vision that crystallized into the 787. Only in hindsight does the future look like a clear and straight path!*

*Both companies achieved the future they wanted by doing things that they could affect directly*





### TIPS & LESSONS FROM OTHERS

- Simply knowing what to do tomorrow helps break inertia. Ask yourself, what am I going to do on Monday? Who am I going to call?
  - Talk with other experts to help you validate the most critical steps to take on your innovation path.
  - Consider adding dates to your future vision and path milestones so you can plan ahead.
  - Be clear about the sequence and timing of all your steps. Remember most people must learn to walk before they run, so don't assume that your team can easily skip a process typical for the industry.
  - You can overlay the Change Path on top of your right Janus Cones to help you put your actions in context of other company and industry events.
  - Try to limit yourself to the 2-3 biggest decisions on your Change Path, so you truly know your top priorities.
- You can also link multiple Change Path together, as your goals build on each other.
  - Remember that your path to your future vision won't be a straight line. Similar to sailing, a person learns to maneuver a sailboat forward by tacking back and forth regularly—yet always into the wind.

### REFLECTION

*What action can you literally take tomorrow to set you on this future path?*

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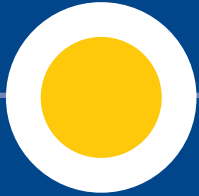
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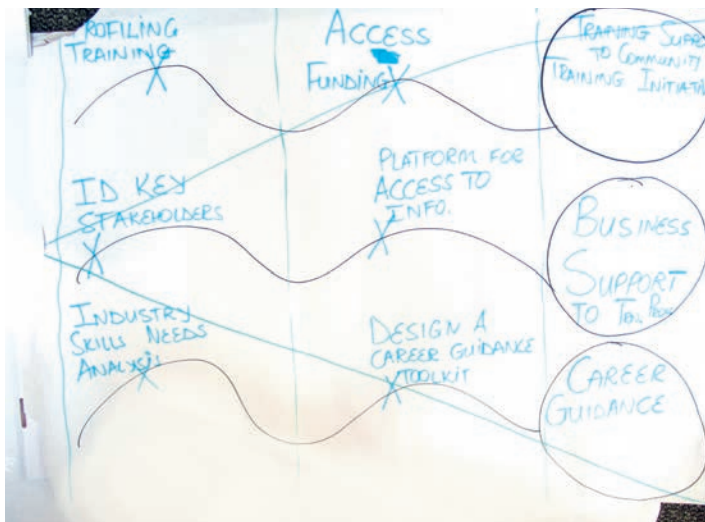
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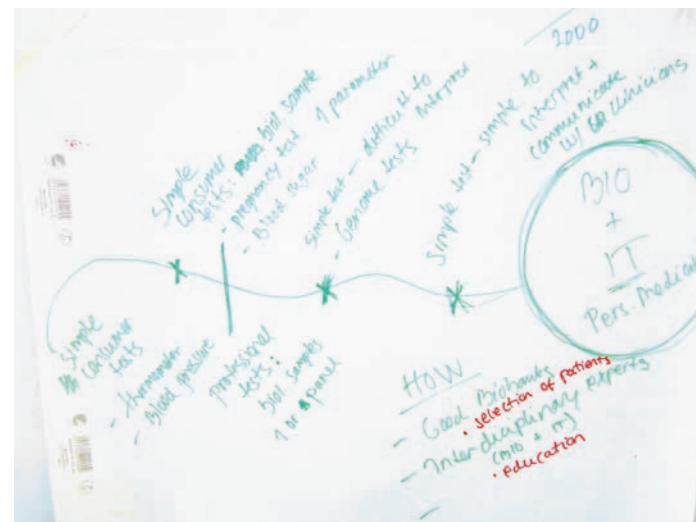
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## ADDITIONAL EXAMPLES

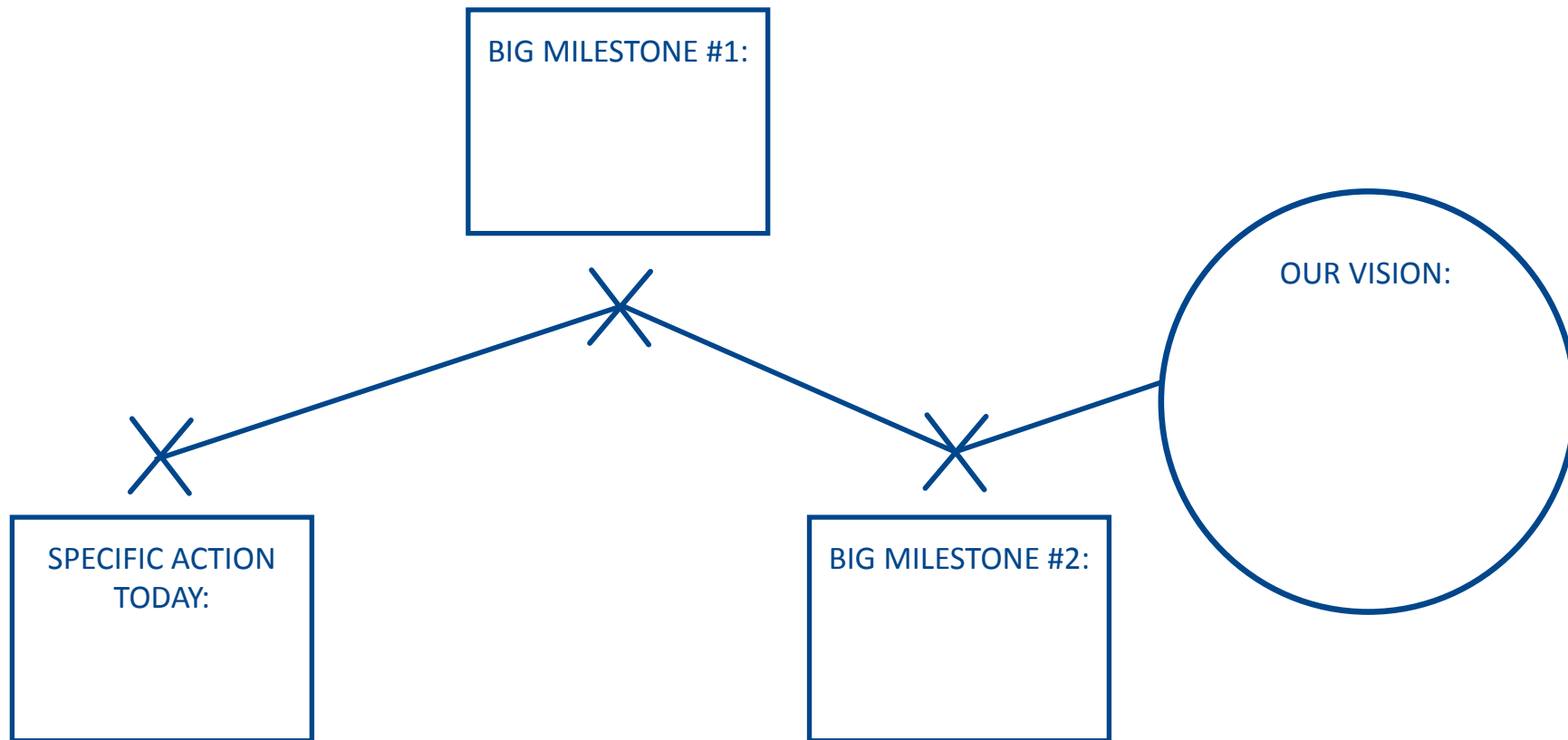


A service team in South Africa developed three related visions, each marked by different decisions, which together would help achieve a bigger goal of trained professionals in their field.



A European research team envisioned a world of personalized consumer medicine, and their Change Path featured a series of simple tests.

# CHANGE PATHS | METHOD WORKSHEET



## CASE STUDY | HOW YLE DEFINED A NEW FORESIGHT CAPABILITY

Petri Home, head of development at the Finnish broadcasting company Yle, smiled as his gaze swept over a set of prototypes on the large desk in front of his team. The fruits of a year's work sat there on the table, so tangible that Petri himself had difficulties believing it when recalling the ambiguous premises they had begun with over a year ago.

### MARKETPLACE CHALLENGES

Yle needed to change in symphony with the megatrends in the media industry. Broadcasting technology was rapidly becoming obsolete, television had lost its central role in bringing together families and friends, and on-demand services were redefining the classic model of content distribution. The same was true for radio.

To add to the challenges, the funding regime of Finnish public media services was soon to be restructured into a compulsory, device ownership independent tax. All these trends and

changes called for better customization of services to connect with individual viewers and listeners, giving them better value for their time and money.

In the spring of 2012, Yle had bold objectives. The company envisioned several innovative changes in strategy, communication, and organization to connect and interact in a more direct, interactive, and personalized manner with its audience. Beyond mere broadcasting, Yle would become a national network of connections between community and content. Home described Yle's vision that "every citizen of the country should personally know at least one of Yle's employees and take advantage of him or her as a personal helpdesk." Feedback and data gathered from the audience would then be used to develop and customize Yle's services for better strategic decision-making and service. Interaction, openness, and direct feedback were all keys to the success of Yle's new vision.

### TOWARDS PARTICIPATORY RENEWAL

The changes necessary to implement the vision were company-wide, requiring the coordination and alignment of previously fragmented efforts in innovation, planning, and foresight across numerous departments, units, and levels of the company. The objective was to create a unified, repeatable process for foresight planning.

Charged with designing Yle's new approach, Home knew that re-aligning old models and procedures would be insufficient. Yle needed to adopt entirely new capabilities to interact with their audience and transform the captured signals into viable services. Home reduced the challenge to a single question: "How can we create an engaging, organization-wide foresight process that inspires everyone to join in?"

## HERALDS OF CHANGE

Petri's first move was to establish a core team dedicated to the design and implementation of a new foresight process. His team consisted of four managers, who were given the mandate and power to access the entire organization. Their first task was to learn the foresight and innovation methods presented in this playbook. They participated in an immersive training workshop and also practiced applying the methods on their own to other internal initiatives underway within Yle.

Their second task was to engage and teach a small group of executives, recently appointed as the Future Advisory Board. This Board would consist of managers and directors with significant influence at Yle. Once the new foresight process was designed, the Future Advisory Board would be responsible for promoting the foresight methods and new practices within their respective departments, which was key to the scalability of the new process.

## A MAP OF CURRENT PRACTICES

*"What is past is prologue."*

—W. Shakespeare

Home's team started first on the process design, which required establishing a clear and coherent picture of the current muddy state of practices prevalent across Yle. They knew that past activities placed the elements of what would follow, so they needed to know how each division currently defined and approached foresight.

To gather this input, the team decided to host a series of mini-workshops, each roughly 45 minutes long during lunchtime. They felt this approach would resonate better with and motivate their colleagues than more elaborate and strenuous arrangements such as full-blown retreats. The mini-workshops' objectives were to (a) map currently used foresight practices in the company, (b) collect initial new ideas on future foresight work, and (c) familiarize multiple colleagues with the foresight methods.

Two members from the core team

hosted each workshop. Participants included colleagues and constituents from all departments and levels of Yle, including members of the Future Advisory Board. As an advance assignment, participants were asked to prepare a brief summary of the foresight methods currently used in their respective work. During the mini-workshops, these summaries were debriefed and shared within the group as a first exercise. Building on its output, participants then applied the Context Map method to synthesize existing and future aspects of the foresight process.

## A SENSE OF SHARED OWNERSHIP

*"The difficulty lies not so much in developing new ideas as in escaping from old ones."* —J. M. Keynes

When organizing the workshops, the core team met two key challenges that affected their effectiveness in planning and potentially endangered a successful outcome. On a practical level, they had difficulties getting others involved.

Few colleagues had time to spare from their designated day jobs and did not fully appreciate the long-term value in developing a corporate foresight capability. If they were unwilling to engage in the endeavor at this early stage, there was little hope for them to support efforts for an open and participatory foresight model at later stages.

The second challenge was structural. There was little co-creation of ideas, tacit knowledge, or shared understanding between the core team and the Future Advisory Board. There was a risk that the Board did not perceive any ownership of the generated ideas, which could lead to low commitment over time.

With hindsight, Home believed the conventional taskforce approach to the project caused these two challenges. Responsibility for driving the change had been delegated to a small autonomous group, yet what was needed was the authority that only top management commands. In other words, the core team had the mandate to involve the

entire organization in the process but lacked the leverage and authority to do so. Ultimately, change would have to be driven by the explicit commitment of and clear communication by Yle's top management.

Despite these initial challenges, the core team was able to push ahead with its planned agenda.

### USING STORIES TO COMMUNICATE CONTEXT

*"The error of the past is the wisdom of the future." —D. E. Turner*

After the mini-workshops, the core team began the analysis of data and information. They shared their insights through storytelling, a powerful technique that puts seemingly unrelated pieces of information into a logical and causal context. While a team member told a story, other team members captured notes and observations on colored sticky notes.

These sticky notes were then grouped thematically. Combining the Progression

Curves method with process flow charts, the core team structured the story themes and tracked their evolution, relationships, and interdependencies over time. The aim was to identify key insights regarding the causes and developments that had led to the present state of foresight activities at Yle.

In the past, the team realized that Yle had almost exclusively relied on external knowledge and consultants to identify and facilitate measures for developing foresight and innovation practices. Any insights gained had been limited to a very exclusive circle of individuals within Yle. This model was directly at odds with the new strategy that relied on an open, participatory approach to foresight.

The core team drew three major conclusions from this insight: The company needed to (a) lead the facilitation of foresight practices in order to control the creation of knowledge across the broader organization, (b) establish a foresight network within and outside Yle, and (c) create an internal system for gathering



“weak signals” and market feedback that would lessen the reliance on outside expertise.

In terms of leadership, this approach would shift away from conventionally hierarchical practices towards an emphasis on human-centered coaching and networks.

Recent developments in crowd-sourcing and cloud technologies, as well as the core team’s efforts to establish a unified foresight methodology, were deemed important enablers in implementing the new strategy.

In effect, the core team had now established an in-depth picture of Yle’s current state in foresight and innovation activities. They knew what would need to change. To establish a widely shared understanding, the results were presented at a large, company-wide seminar. The core team was now positioned to turn from the past to Yle’s future: the design of the company’s new aligned approach to foresight and innovation.

## **PROFILES OF THE FUTURE AUDIENCE**

As a next step, the team relied on the Generational Arcs and Future User methods to build detailed profiles of Yle’s future audience and employees. The Generational Arcs method analyzed the audience into various sub-populations according to age. When the generational map was overlaid with age-related data for the use of media and communication technologies, it was evident that the use of interactive digital media both at home and work had become fairly widespread in Finland. The finding validated the opportunity to integrate more digital solutions in a new Yle foresight network.

Encouraged by the results, the team more deeply investigated an important target group using the Future User method, generating a user persona for 2027 based on customer interviews. As a snapshot 15 years into the future, the persona offered a good reference point for their strategic planning that could be updated over time.

By reviewing dominant generational behaviors and expected trends in media usage, among other factors, the team felt the future persona of Yle’s audience would be highly receptive to their overall mission to design a participatory foresight process. In particular, the growing willingness of younger Finns to interact with various media channels offered a way for Yle to attract more feedback on its development and service ideas and, more importantly, to capture entirely new ideas generated by their audience. Moreover, the power of mobile devices would continue to transform content delivery.

## **THE IMPORTANCE OF REAL-WORLD EVIDENCE**

Effective analysis requires good data, and collecting good data is often a time-consuming task. Working around stringent deadlines, the core team faced many questions about the relevant scope and scale of data, and they were concerned that they might overly rely on

their own pre-existing assumptions about Yle's audience. As a solution, they turned to existing interview data that had been collected earlier for other purposes at Yle. This data contained detailed information about their target population, allowing them to complement it quickly with several short interviews that filled in the remaining data gaps.

Due to tight schedules, they also had had to choose whether to profile their external audience or internal stakeholders. Since they felt they had a better understanding of their colleagues at Yle, the team decided to focus first on the audience.

### **THE FOUR ROOMS CONCEPT**

Confident in their findings, the team proceeded to the solution phase of their planning process. Drawing from their early analysis about Yle's current practices, they explored suitable concepts that (a) exhibited great potential for scalability, (b) was flexible enough to be improved and adapted on a continuous basis, and

(c) could be facilitated and communicated through digital network technologies.

They soon converged on a concept that had only been piloted in Yle's production department. One team member had been involved in the pilot and brought the idea to the group. Known inside Yle as the "Four Rooms," the concept was rough and lacked a clear and well-defined user. It was further unclear how to make the proposed process interactive. Regardless, the concept met the team's initial criteria and offered ample room for customization. The deciding factor was that Four Rooms was built around the existing strategic decision-making infrastructure of the company, involving Yle's top management. The team decided it was more sensible to design the new foresight network around Yle's existing decision-making infrastructure than to redesign both.

As the name implies, the concept is a four-phased process, which converts "weak signals" outside Yle into tangible representations of future solutions. Room

1 is a data collection and storage phase. To date, the production department had manually collected sample feedback from users, partners, and other stakeholders. In Room 2, the gathered data is filtered, structured, and analyzed to identify issues that could impact the department's work and development efforts. Room 3 developed concrete implications based on the issues. Room 4 is a showroom in which the production department presents promising solutions in tangible form to company insiders, which might include videos, posters, prototypes, and stories.

### **BUILDING THE PROTOTYPE**

The core team agreed to design the new company-wide foresight network around the Four Rooms premise. Instead of implementing it through isolated, department-specific teams, it was clear that the overall objective to create a holistic, participatory foresight process called for multidisciplinary, cross-departmental teams.

The team was very conscious about the importance of Room 1 to the entire process because it represented the interface between Yle and its key stakeholders, including the audience. In particular, they felt it was important to provide additional stimuli for audiences to react to. It was decided that micro-blogs, such as Twitter, and social networks, such as LinkedIn and Facebook, would motivate stakeholders to provide opinions, ideas, and criticism. Creating such stimuli and posting them through various channels was to be a part of every employee's job description at Yle.

Room 2 and 3 were then designed to be the territory and responsibility of the Future Advisory Board, and several appointed Innovation Coaches would coordinate and integrate data gathered across Yle. These Coaches would analyze and interpret the input from the perspective of Yle and design appropriate visions, strategies, and actions. They would also disseminate these newly formed visions to internal and external stakeholders via discussions and public

blogs to generate additional feedback on ideas and visions under construction.

Room 4, as the Showroom, played the most important part in the team's final design. Not only would it be a physical space inside Yle where internal stakeholders could interact with tangible prototypes and other representations, it would be made public and broadly accessible as a virtual version on the web. The Showroom would be another key element of the interactive interface between Yle and all its stakeholders. The Future Advisory Board was to publicly take ownership and responsibility of the Showroom and its contents, humanizing the virtual content with their names and faces.

The core team modeled the extended Four Rooms concept using the prototyping methodology and toy building bricks from Lego Serious Play ([seriousplay.com](http://seriousplay.com)). Each team member first built a personal prototype, which then was presented and discussed within the entire team. This approach helped to infuse the joint vision with diversity and to integrate

loose, individual ideas into a coherent final prototype, which was built as a last exercise by combining key elements of each member's individual model.

## FROM PROTOTYPE TO VISION TO ACTION

Home and the team were thrilled. The virtualization of the Four Rooms concept would open up Yle's foresight process for real-time commentary and mobilize participation across all stakeholder groups from within and outside the company. It would enable a user-driven, practice-based, iterative design process for Yle's portfolio of media solutions and constitute the core of the company's foresight capability.

With the tangible incarnation of the team's vision on the table, Home turned to discuss the implementation of their new foresight process. The first item on the agenda was to create the Future Advisory Board and commit its members to the cause.

"Let's do this," Home cheerfully told his team. "We have a future to create ahead of us."

*“Hire for attitude. Train for skill.”*

— **Bill Taylor**, co-founder of *Fast Company* magazine  
(*Practically Radical*, 2011)

*“You see things; and you say, ‘Why?’  
But I dream things that never were;  
and I say, ‘Why not?’”*

— **George Bernard Shaw**, playwright and  
co-founder of the London School of Economics  
(*Back to Methuselah*, 1921)





 **TEAM**  
CHAPTER 6

## Shortcuts

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## PHASE IV: TEAM

You have the start of a great idea. Now you want to know: how do I take this idea back to my group? How can I take it inside my organization, so the idea may flourish into meaningful action? Or what if I don't have a team yet? What should I do next?

Ultimately, innovation is driven as much by the ideas as by the people. This phase is focused on finding and developing the talent who can effectively support an environment of radical innovation and carry new ideas forward. It is important to focus on finding the right people because they will be responsible for imagining, communicating, and building the big ideas.

We recognize that many large companies assign innovation teams to find breakthrough growth. Some innovation leaders have the privilege to recruit new team members, while other group leaders inherit a mix of talent who may have worked previously on new R&D initiatives, are student interns or graduates with an enthusiasm for entrepreneurship, or are simply available as resources. These workers may not necessarily be natural innovators, so they will require additional coaching to learn new skills in innovation or may be better suited for other roles.

Three methods will help you build an innovation team:

- Buddy Checks
- VOICE Stars
- Crowd Clovers

## PHASE IV: TEAM

The fourth phase focuses on finding the talent and leadership your team needs to take an idea forward as a new innovation.



### **Buddy Checks**

helps you find good potential matches for more partners and teammates.

→ page 168



### **VOICE Stars**

identifies your team's aptitude for radical innovation leadership.

→ page 178



### **Crowd Clovers**

helps you map your team's innovation network to bring your idea to life.

→ page 188

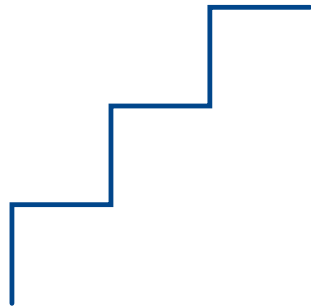
## **Questions that drive this phase:**

- *How do we engage the right kind of people?*
- *Who are good partners and co-founders in a new innovation?*
- *What are the abilities necessary to lead radical innovation?*
- *How do we grow and leverage our innovation networks?*



# BUDDY CHECKS

Buddy Checks evaluates potential new co-founders, partners, and teammates by showing their reaction level to new ideas.



## WHEN TO USE IT

- To deliberately recruit like-minded innovators
- To practice real-life situations for public reactions to your idea

## WHY IT'S HELPFUL

Finding the right person to work with often takes multiple cycles of trial and error. Experience shows us that radical innovation requires different personalities and different skill sets, so if you're serious about innovation, then you want to find and keep the people who will help you most achieve your goals.

Often seasoned entrepreneurs run through their own versions of a talent

checklist in their head, intuitively gauging which people are good matches for them based on what they have experienced before.

The Buddy Checks method borrows from the art of role-playing as a way to speed up the process of trial and error. This method will help your team test a range of possible reactions from those you would like to work with—which will help reveal the base personalities.

## WHAT YOU GET

By measuring candid reactions to innovation ideas, you gain a quick way to identify promising people to work with at multiple levels.

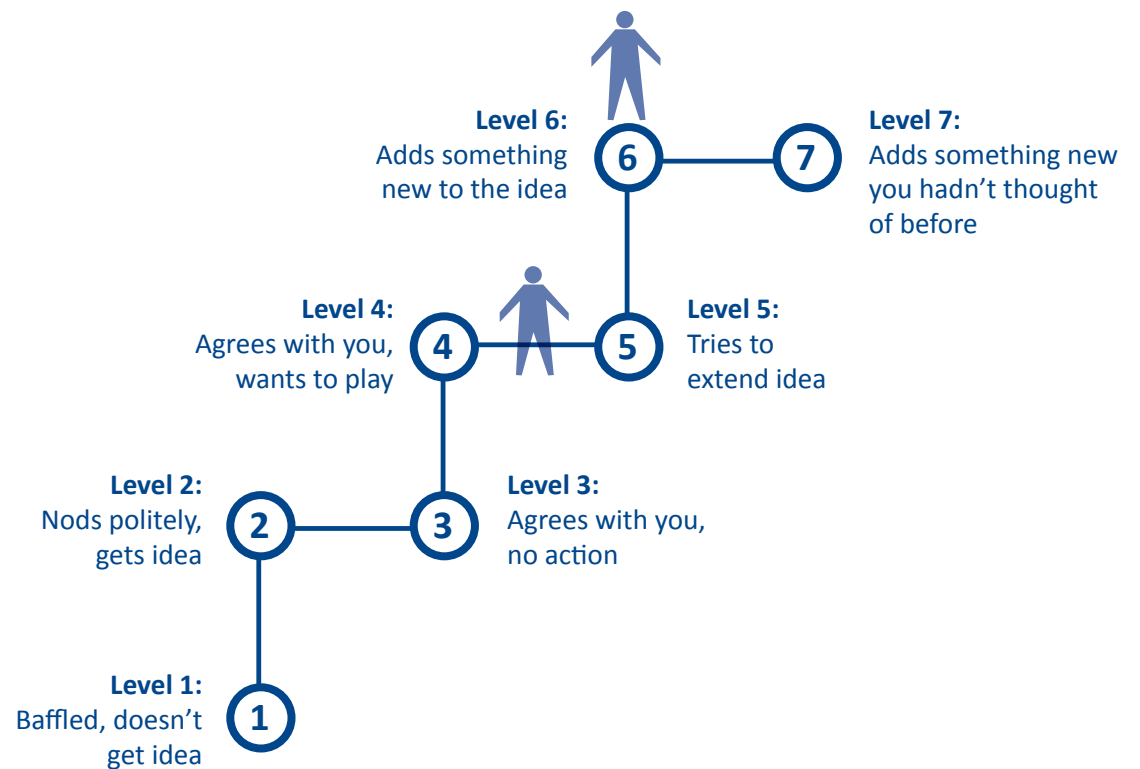


## LET'S LOOK AT AN EXAMPLE

A temporary team was hand-picked for a new business initiative at a large consulting firm. After they prototyped the first set of solutions, the team needed to recruit a full-time staff to continually develop and maintain the new initiative as a regular part of their client portfolio.

They needed a group leader and three junior members for the new initiative. They first wanted to recruit candidates internally. Part of their challenge was that the firm's culture was generally conservative and focused on execution, so they knew the type of people they wanted would not necessarily be found through the usual firm channels.

Using the Buddy Checks method, they practiced the kinds of conversations they wanted to have with two colleagues in particular—one person who would make an outstanding team leader willing to champion a bold new idea and another person who would set a role model at the team level. It was crucial to start each interview right.





## INSTRUCTIONS

1. Select roles to play. At least one person should describe the new idea and another person should hear the idea, ideally as someone whom you would like to join your team or support your idea.
2. Present the idea and evaluate reactions using the 7-level scale, judging first reactions the most.
3. Then try different ways to present the idea that prompt the reaction you hope to hear.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

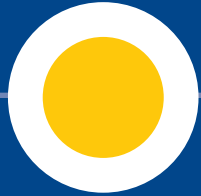
- *Did the people in the various roles experience any pressure or stress during the mock interactions, and how did that pressure change reactions?*
- *During the course of a reaction, how did the presenter adjust his/her communication about the idea, either verbally or nonverbally?*
- *What types of personality attributes were demonstrated at different reaction levels?*

1. I volunteer to present our rough idea, and Anna and Jesse pretend to be two colleagues we know whom we hope join our efforts



2. We agree our first colleague sits between levels 4 and 5 because his first reaction is to volunteer for the team and his later reactions are to suggest minor improvements to refine our raw idea

3. After some more rehearsal with Anna, we find two scenarios that we expect will prompt the reaction we want from our second colleague, who we'd like to join as a group leader



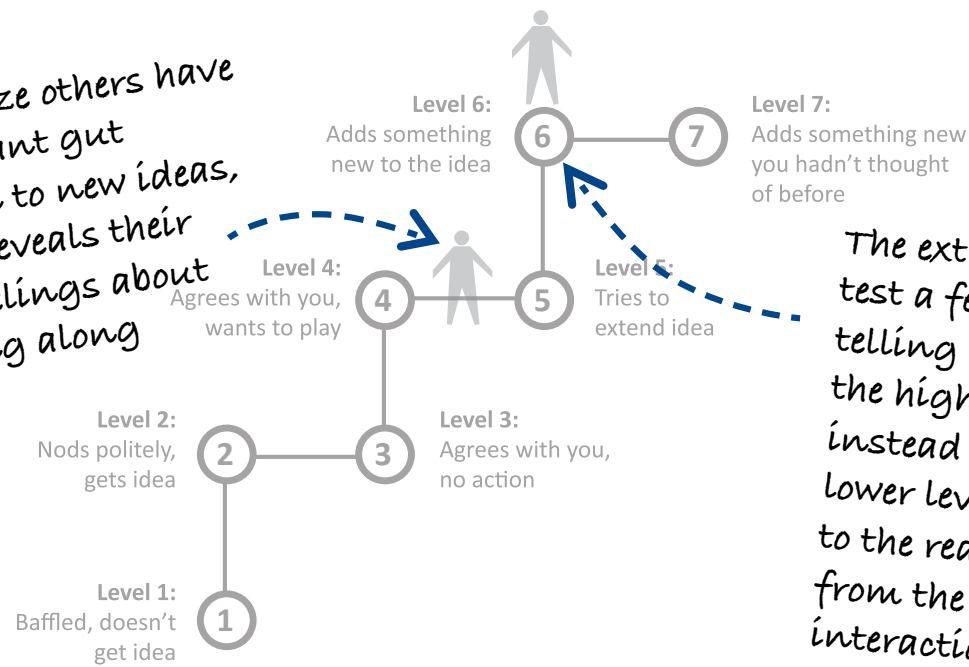
## DRAWING INSIGHTS & IMPLICATIONS

During roleplaying, the team quickly discovered that first reactions are most telling about people's beliefs about an idea's potential. This led them to refine their story's angle.

Another lesson came from the rehearsal. The team realized that they did not have much time to make a good impression with the person they wanted to accept the role of group leader. It was worth practicing different conversation openings in order to provoke a higher level reaction because it was much harder to start at a low level and work up the reaction chain than to start at the level they preferred. As a result, they developed a short list of the toughest objections they expected to hear, so that later they could steer actual talks in the directions they needed.

Level	Reaction	Example comments from others
1	Baffled, doesn't get idea	> "Why are you doing this?" > "I don't understand how it will change anything."
2	Nods politely, gets idea	> This sounds interesting." > "Who else have you showed this to?"
3	Agrees with you, no action	> "I like what you've proposed." > "What will you do next?"
4	Agrees with you, wants to play	> "I have some extra time in the evenings to help." > "I'd like to join your group."
5	Tries to extend idea	> "I know somebody you should talk to." > "My old company could really use this."
6	Adds something new to the idea	> "We could adapt this solution for my contacts in China." > "I can add a service model to this product idea that will help drive adoption."
7	Adds something new you haven't thought of before	> "I can help you take this to the gaming industry." > "What if we do this for the military?"

We realize others have an instant gut reaction to new ideas, which reveals their true feelings about playing along

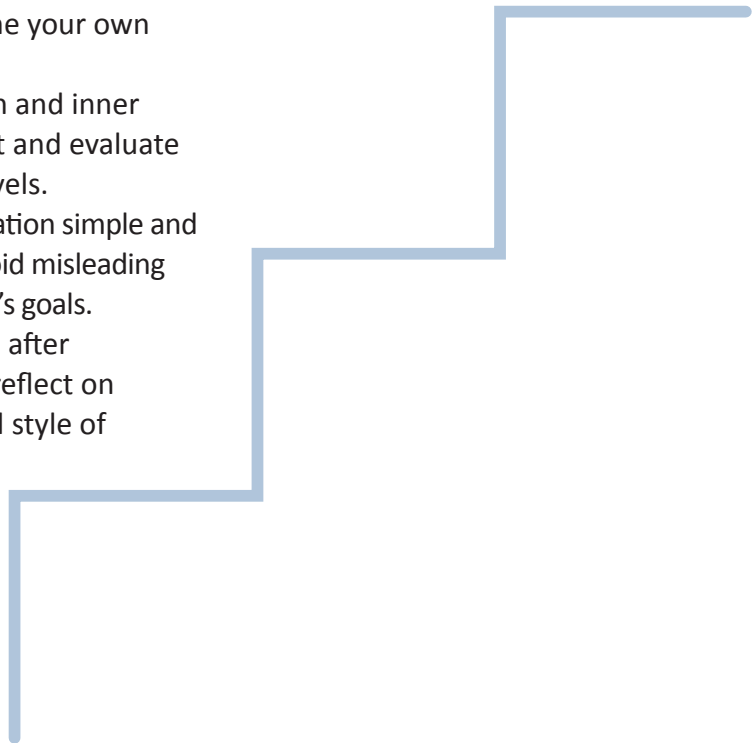


The extra rehearsals lets us test a few different ways of telling our idea to generate the higher level reaction— instead of starting at a lower level and working up to the reaction we wanted from the start of the interaction



### TIPS & LESSONS FROM OTHERS

- Other team members can act as observers or coaches during the role-playing exercise.
- If you don't have a team yet, you can practice presenting your initial idea with friends and family because their candid reactions will help you fine-tune your own phrasing of the idea.
- Rely on your intuition and inner feelings as you adjust and evaluate potential reaction levels.
- Keep your communication simple and honest in order to avoid misleading or inflating your team's goals.
- Take time during and after your role-playing to reflect on both the content and style of communication.



### REFLECTION

*Which reaction level do you think you sit at most commonly?*

\_\_\_\_\_

\_\_\_\_\_

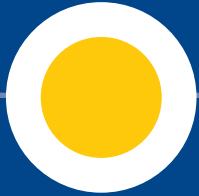
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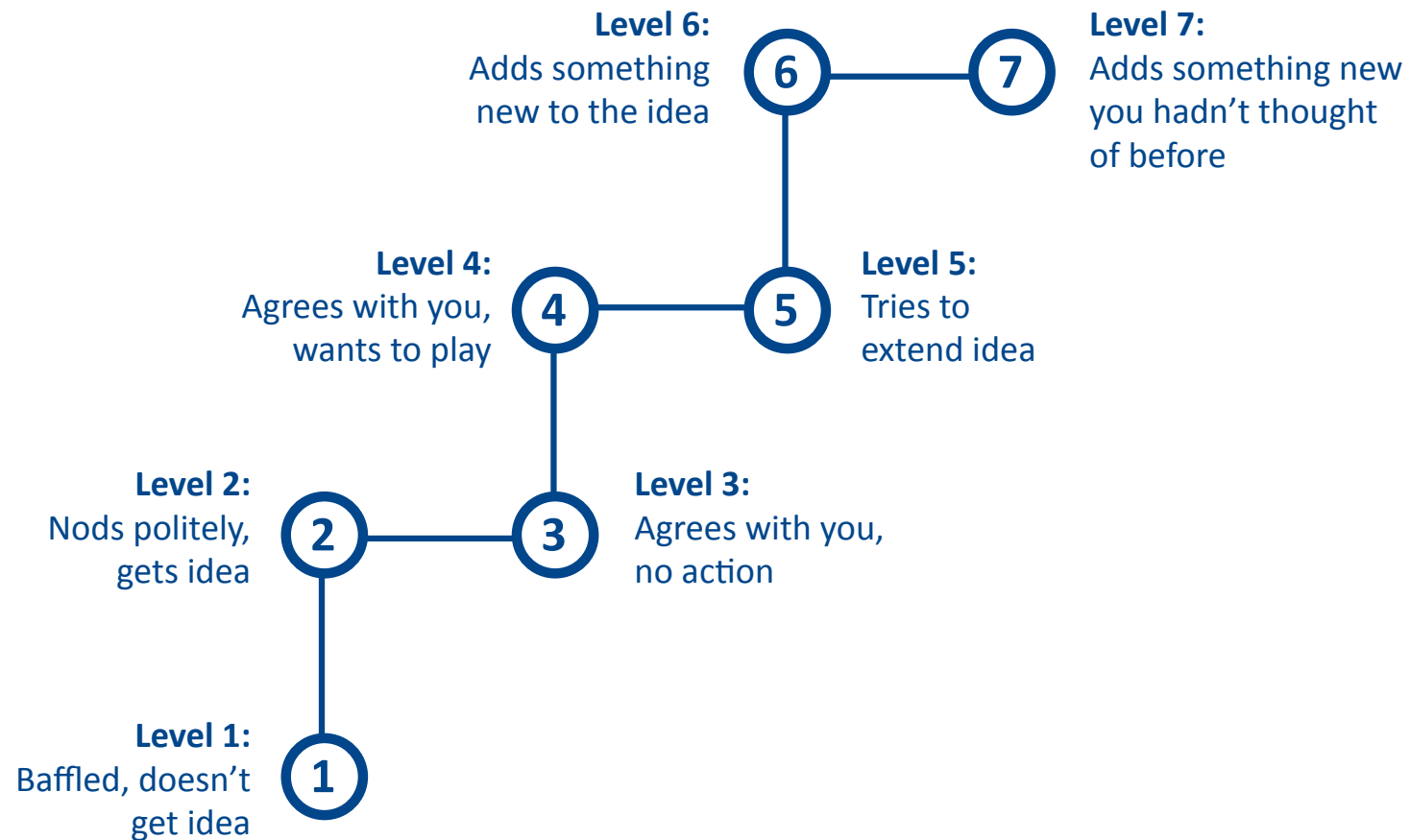


## ADDITIONAL EXAMPLES



**A team of Finnish managers adopted the method to explore different organizational reactions from member companies (instead of individuals) to help them gauge support for the future strategy of their R&D consortium.**

# BUDDY CHECKS | METHOD WORKSHEET





## CASE STUDY | A JOB POSTING FOR DARPA

Since 1958, the U.S. Defense Advanced Research Projects Agency—known as DARPA for short—has pursued radical innovation, relying on strong personalities to drive and define high risk, high reward programs in research and development.

DARPA knows it needs to attract a certain type of person for this kind of work. While much recruiting occurs through internal referrals among staff, the agency uses its public job postings as a broad provocative advertisement. The

focus is on promoting DARPA's mission and inspiring the right people to respond.

In a way, the DARPA job posting functions as the agency's Buddy Check. Good job descriptions provide accurate summaries of a job opening. Great job descriptions cause people to act. Great job descriptions are viral. The sign of an effective profile is that when someone reads it, they either want to apply themselves, or they immediately and enthusiastically recommend it to a colleague or friend.

**Are you a scientist or engineer with a radical idea (or ideas) that you believe could provide meaningful change of lasting benefit for the U.S. military? Would you like to lead the country's most capable academic and industrial experts to make that idea become reality in a period of just a few years?**

If so, you should consider joining the Defense Advanced Research Projects Agency (DARPA) as a program manager.

**What is a DARPA PM?**

A DARPA program manager is...

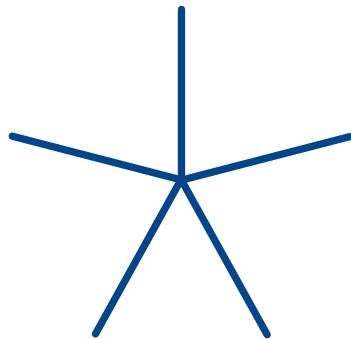
- > An idea generator
- > A technical expert
- > An entrepreneur
- > A visionary
- > A patriot dedicated to national service

Source: *The Economist* magazine, 2008



# VOICE STARS

VOICE Stars is a talent diagnostic that measures the leadership aptitude for radical innovation of an individual or team.



## WHEN TO USE IT

- To conduct a self-assessment for personal skills development
- To measure an individual's aptitude for innovation leadership
- To evaluate a team's ability to develop an environment that supports innovation leadership

## WHY IT'S HELPFUL

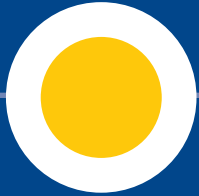
Genuine innovators are a unique breed of people. Beyond the usual job pedigrees and performance metrics, they seem to have a certain distinguishing mix of characteristics that define their ability to lead others in new ventures. The VOICE

Stars method provides a simple way for you to assess these leadership qualities.

Beyond individual leaders, teams must demonstrate collective leadership, in which team members rely on each other's different strengths in order to operate as a cohesive unit. This method allows you to view your group's overall scoring, assessing which areas dominate and which areas require additional attention.

## WHAT YOU GET

You now have a simple gauge for identifying "star-shaped people", the kind of innovators needed to lead and carry new ideas forward.

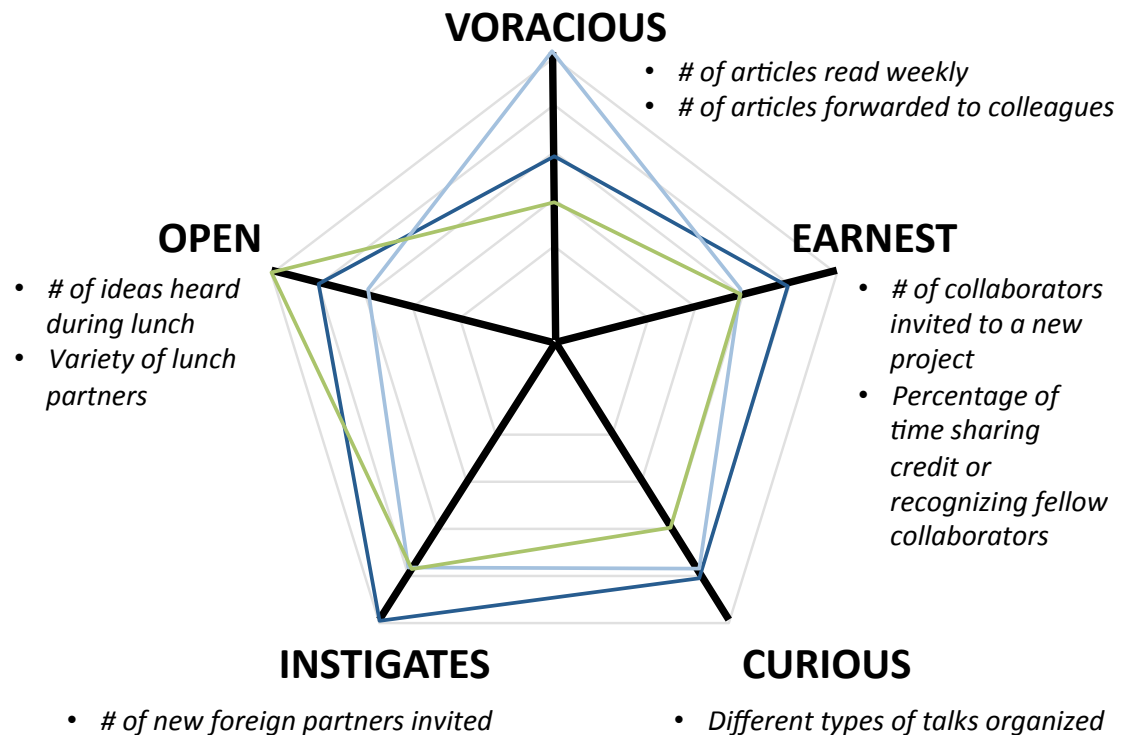


### LET'S LOOK AT AN EXAMPLE

Three senior managers started a new initiative at a national services company. Each person brought different strengths, and they wanted to assess their collective abilities to foster a group climate for innovative behavior.

Using the VOICE Stars method, they ranked their personal aptitude along five attributes for innovation leadership: Voracious, Open, Instigates, Curious, and Earnest—the basis for the acronym VOICE. Each person's set of attributes was connected by a different line color.

They then noted various activities and metrics at each point that they currently followed, which supported or demonstrated that particular leadership attribute.



Source: Tamara Carleton, 2012



## INSTRUCTIONS

1. Draw five lines linked together at the center, so that they resemble a big asterisk or star.
2. At each line's endpoint, write one attribute from the VOICE list: Voracious, Open, Instigates, Curious, and Earnest.
3. Draw five tick marks evenly spaced on each line. These marks represent the scoring levels for each attribute.
4. Score each team member's aptitude for all the attributes. Each attribute will have one score per person. The scores are subjective to your group.
5. Draw a line connecting all five attributes for each person. These lines represent the VOICE profile for each person.
6. Identify example activities and metrics next to each VOICE attribute that your team and/or organization does.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- Which attribute dominates your team? Why?
- Which attribute scores the lowest across the team?
- Which attribute has the fewest number of activities associated with it, and what can your team do to build more of a climate for this attribute?

1. Our first step is to draw the underlying star shape

2-3. We write a VOICE attribute at the end of each line and mark five tick marks for scoring per line

**VORACIOUS**

- # of articles read weekly
- # of articles forwarded to colleagues

**OPEN**

- # of ideas heard during lunch
- Variety of lunch partners

**EARNEST**

- # of collaborators invited to a new project
- Percentage of time sharing credit or recognizing fellow collaborators

**INSTIGATES**

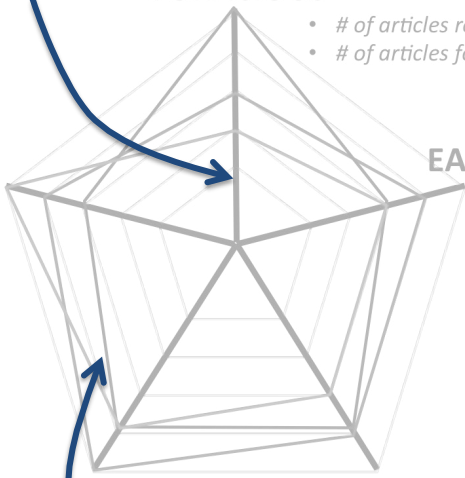
- # of new foreign partners invited

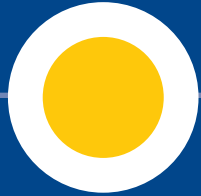
**CURIOUS**

- Different types of talks organized

4-5. We take turns scoring ourselves across all the attributes, drawing a connecting line between individual scores

6. We discuss different activities our group does that helps foster a climate for each attribute





## DRAWING INSIGHTS & IMPLICATIONS

The VOICE Stars assessment reinforced much of what the team knew, but had not discussed openly before. For example, they relied heavily on one team member as the external radar, who provided ongoing market scanning and updates.

One leadership attribute dominated their team's scores. They saw that they all ranked highly on being curious, which reflected their shared interest in working together on another new initiative.

They also considered elements that built a good group culture of innovation. One area they felt needed improvement was “Instigate”, which had few activities listed by it. Their insight was they jointly spent more time reacting to new opportunities that they stumbled upon, instead of taking more strategic action to prompt and explore new possibilities within the organization—and then drive those possibilities to fruition past the R&D proposal stage. They decided to be more deliberate in this area in the coming year. They knew innovators get ideas done.

Attribute	Description
<b>Voracious</b>	Always finding and capturing widely to add to a personal collection of ideas, knowledge, experiences, and people
<b>Open</b>	Receptive to new ideas, perspectives, or arguments
<b>Instigates</b>	Starts the action; compelled to try, stimulate, encourage, or provoke new dialogues, partnerships, and more
<b>Curious</b>	Eager to learn and know more, willing to ask “what if?”
<b>Earnest</b>	Sincerely zealous, wholeheartedly serious in purpose, radiates personal principles

Only one of our team is regularly voracious, and we discuss how we rely on him to hear the latest news updates and scan the market for us

**VORACIOUS**

- # of articles read weekly
- # of articles forwarded to colleagues

**OPEN**

- # of ideas heard during lunch
- Variety of lunch partners

We find it tough to think of examples we do to provoke or start new actions, which leads to a good discussion about what other activities and even people we should get to help us grow in this area

**EARNEST**

- # of collaborators invited to a new project
- Percentage of time sharing credit or recognizing fellow collaborators

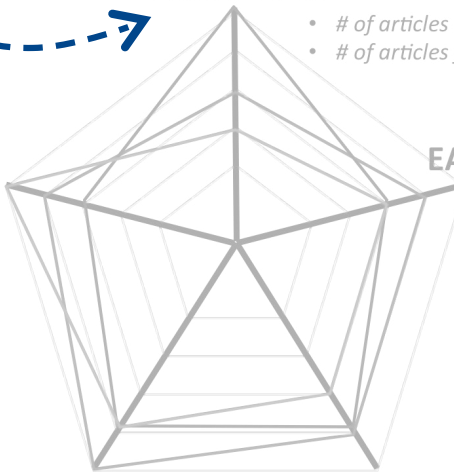
**INSTIGATES**

- # of foreign partners invited

**CURIIOUS**

- Different types of talks organized

We realize our team scores most high on being curious, which helps explain why we all appreciate exploring new topics and possibilities together






## TIPS & LESSONS FROM OTHERS

- Certain VOICE terms may not translate directly into other languages, so take time to read the expanded descriptions to find better synonyms.
- Don't perfect standardizing scales within the team and instead focus more on the dialogue that results from an honest assessment of personal and/or group aptitude.
- Consider adapting this method to complement existing hiring procedures as an informal assessment tool.

### REFLECTION

*Who do you know that best exhibits all four VOICE attributes?*



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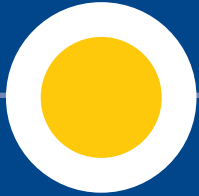
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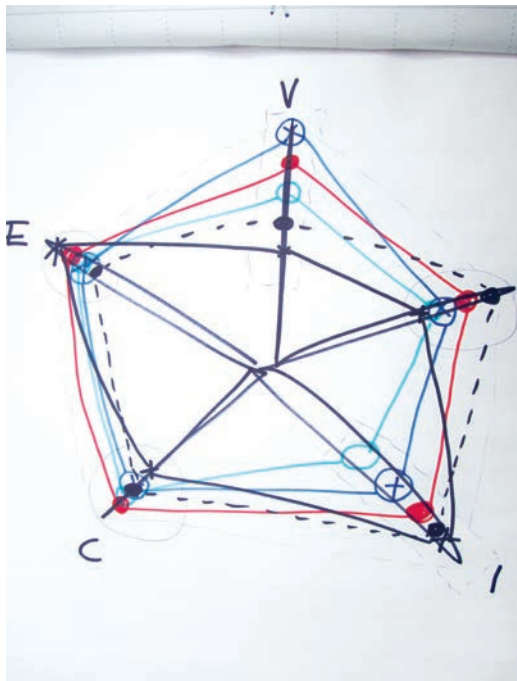
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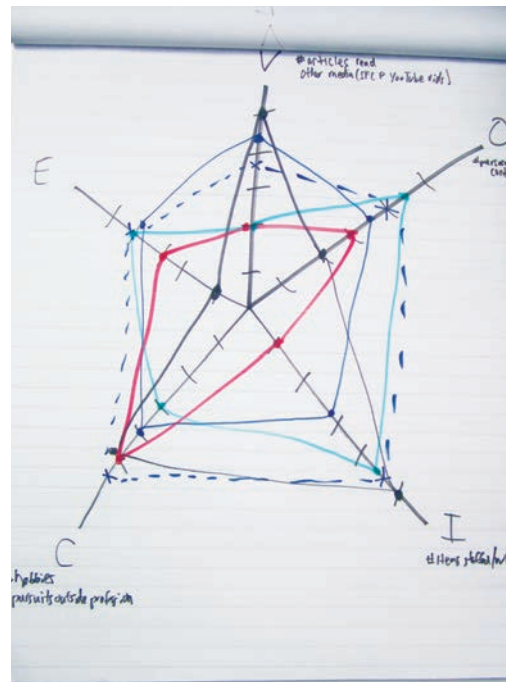




## ADDITIONAL EXAMPLES



One team in an European R&D consortium found that it was easy to score the full team, but much harder to identify related activities for each area.



An American military team discovered that certain attributes generated a broad scoring range, prompting a candid discussion about self versus group perceptions of each person's aptitude.

# VOICE STARS | METHOD WORKSHEET

**VORACIOUS**  
*Related activities / metrics:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**OPEN**  
*Related activities / metrics:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**EARNEST**  
*Related activities / metrics:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**INSTIGATES**  
*Related activities / metrics:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CURIOUS**  
*Related activities / metrics:*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## CASE STUDY | PROGRAM MANAGERS AT DARPA

Since 1958, the U.S. Defense Advanced Research Projects Agency—known as DARPA for short—has pursued radical innovation, which has been driven heavily by their program managers (PMs).

### THE DARPA ETHOS

PMs are hired on a short-term basis—typically 3-4 years—to find, fund, and foster new innovation ideas based on technology visions that each one of them is expected to develop. While the PMs develop the overarching visions, they do not bring the visions to life themselves. Instead, the PMs fund multiple teams at universities, companies, and government labs who take ownership of these visions.

Several years ago, men's magazine *Esquire* described the DARPA PM to the American public: "What you get, generally, is about four years—four years to do something that's never been done before. Four years to do the impossible... It's what accounts for the fact that whole fields of inquiry rise up around the enthusiasms of program managers—fields of inquiry that

weren't there before and that keep going after the program manager is gone. Call them program managers if you want, but really, if the whole DARPA ethos works, they become fathers of their fields. Mothers of invention. Inventors."

### THE BASIC PROFILE

DARPA PMs display a certain telltale mix of attributes. While DARPA Directors adapt a general hiring profile when recruiting PMs, they ultimately rely on their gut for finding the right person, which boils down to a handful of key traits:

- Visionary thinking
- Technical expertise
- Leadership
- Communication skills
- Fiscal responsibility

Most importantly, PMs bring a vision of what they want to change in the world, looking to boost the magnitude of impact with DARPA funding. Usually technically trained, PMs bring deep expertise about the problem space from personal experience and years in the field. They

are also leaders in some form, either managing multidisciplinary research teams or directing large institutional programs. As leaders, they know the importance of communicating their visions tirelessly, creatively, and broadly. Lastly, they must oversee big budgets, which require fiscal responsibility.

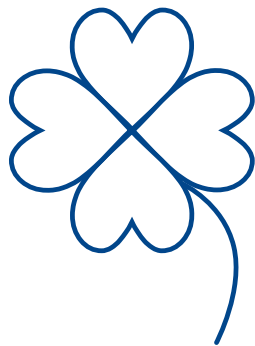
### WHERE TO FIND THEM

DARPA PMs are recruited from multiple spheres, including companies, universities, national laboratories, nonprofit and federally funded research centers, and the military services. By scouting across different innovation networks, the agency ensures diversity of talent with a related diversity of visionary ideas.



# CROWD CLOVERS

Crowd Clovers maps the various related components of a personal network focused on advancing new innovation ideas.



## WHEN TO USE IT

- To develop a map of your own or team's innovation network
- To assess which areas to bolster or change in your network
- To evaluate the balance between formal and informal relationships within a network

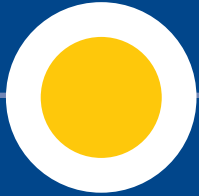
## WHY IT'S HELPFUL

As the global economy becomes increasingly interconnected, companies and other groups rely heavily on innovation networks to help them find, develop, and deliver new ideas to their partners and customers. The Crowd Clovers method provides a simple way to categorize and assess four primary ways your innovation network can support the development of a new innovation idea.

There are multiple forms and types of networks—such as an “open innovation network” or a “community of practice”. The Crowd Clovers network takes a slightly different angle. Generally, an open innovation network is focused on outsourcing ideas from external parties, relying on formal structures between people; however, a Crowd Clovers network considers the interplay between formal and informal relationships. In addition, a community of practice is defined by shared interests so all activities are designed around group learning and exchange; in contrast, a Crowd Clovers network map considers the actions different network members can take to push a new idea forward.

## WHAT YOU GET

By creating a Crowd Clovers map, you will characterize and map your group's innovation network.

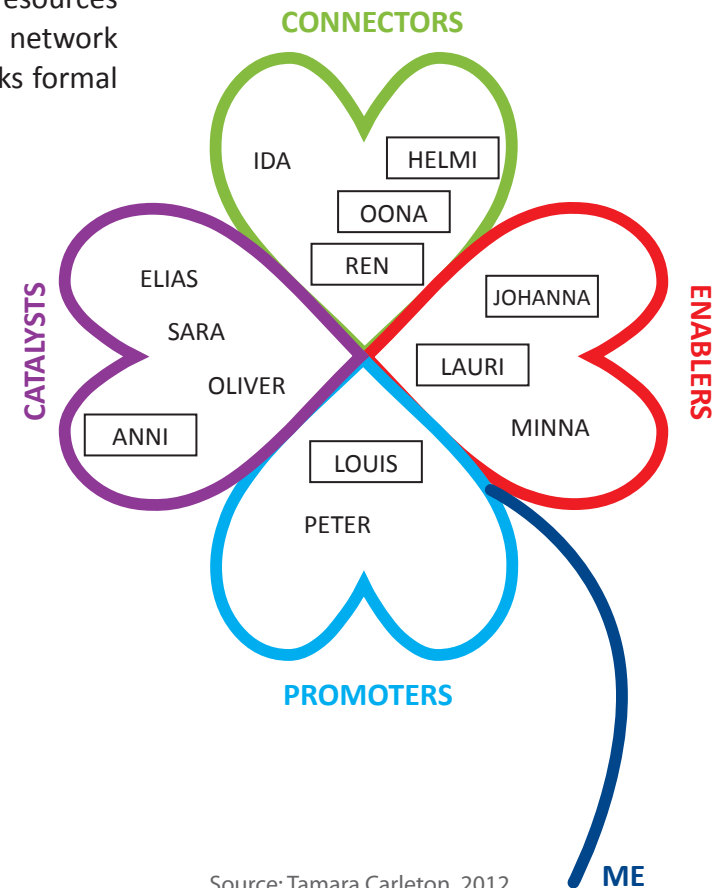


### LET'S LOOK AT AN EXAMPLE

Otto recently accepted a new position as senior innovation director at a medium-sized services firm, which has provided corporate training, technology consulting, and other services for the last 40 years. Otto now will direct the strategy and execution of the company's entire product portfolio, including R&D, pricing, and promotion activities.

One of his duties is to partner with other company business units and find internal resources to maintain synergies across all product categories. Nothing in Otto's job description notes the importance of leveraging external resources and building a greater community among partners and developers—which he knows is also crucial to his company's growth and success.

Otto maps his group's network, noting which people they rely on, both formally and informally, for help with inspiration (in the purple quadrant), resources (green), execution (red), and network outreach (blue). He further marks formal relationships with boxes.



Source: Tamara Carleton, 2012

ME



## INSTRUCTIONS

1. Draw a large four-leaf clover with the leaflets facing the four cardinal directions (i.e., north, south, east, west).
2. In the left (west) leaflet, write the names of people you know who give you new viewpoints or ideas in work and life. Who inspires or provokes you? Consider everyone from colleagues to children. You may label this leaflet "Catalysts."
3. In the top (north) leaflet, write the names of people you know who connect you to more resources, such as people or money. Consider everyone from supervisors to neighbors. Who helps you find ways to grow? You may label this leaflet "Connectors."
4. In the right (east) leaflet, write the names of people you know who

help you get things done. Who encourages you to take action? Consider everyone from employees to spouses. You may label this leaflet "Enablers."

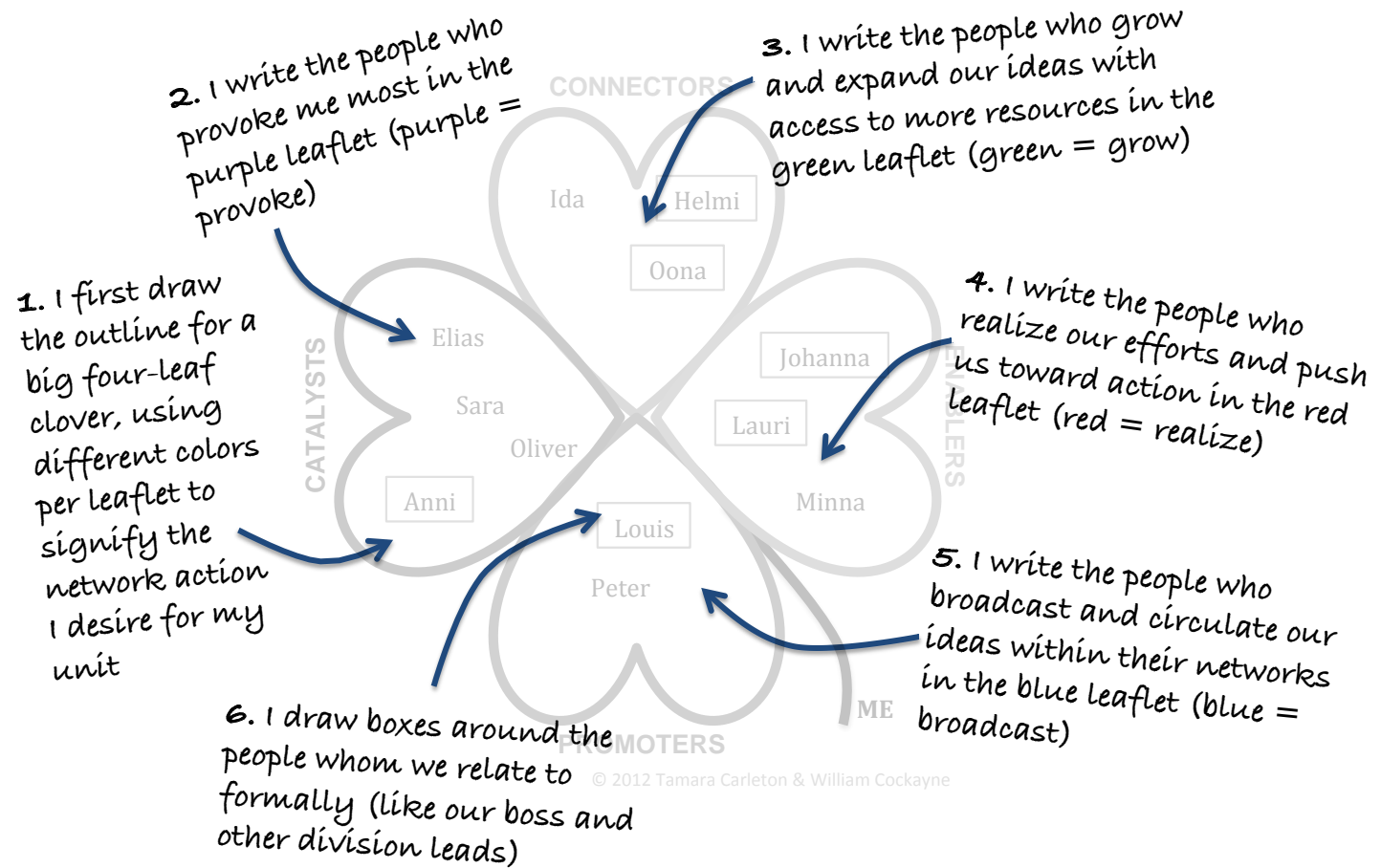
5. In the bottom (south) leaflet, write the names of people you know who promote you and your idea. Consider everyone from business partners to friendly acquaintances. Who can introduce you (and your idea) to other groups and networks? You may label this leaflet "Promoters."
6. Circle or draw boxes around the names of the people who you work with formally, such as your boss or supplier.

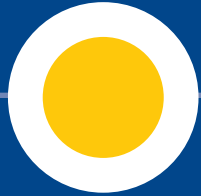
→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- Which quadrant was easy to complete?
- Which quadrant has the most number of formal versus informal relationships?
- How would you map other network dimensions, such as contact frequency?





## DRAWING INSIGHTS & IMPLICATIONS

Otto knows that there is more to tending an innovation network than simply adding more names to his LinkedIn rolodex. In fact, he was personally relieved that his group had connections across all four network categories.

He does see that they rely most on formal connections in two areas: finding resources and driving execution. These areas make sense for day-to-day business; however, he feels that they should cultivate more informal links to lay the foundation for longer-term measures.

The exercise also reinforces his first impression that the group lacks connections to promote their efforts outside the business unit. As one solution, Otto plans to hire a person to build their developer community.

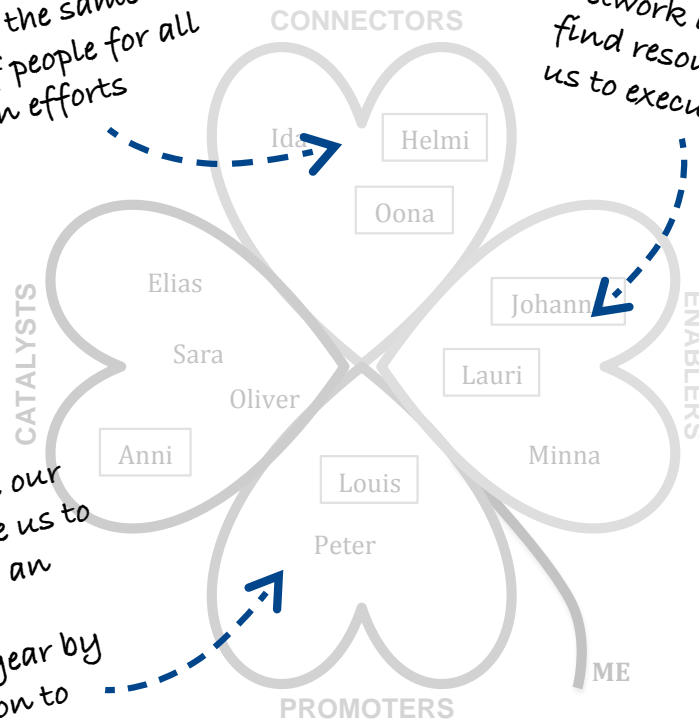
Insight	Possible network action to take
<b>My network feels too small.</b>	> Invite your contact to share stories from work and life over coffee or wine
<b>My network feels too small.</b>	> Ask your peers to introduce you to more people that they feel embody a particular network area
<b>I rely on the same people for everything.</b>	> Affirm existing relationships by sending a brief note of appreciation to each person
<b>My company is my network.</b>	> Increase diversity by meeting 3-4 non-work contacts from school, past jobs, military service, church, etc.
<b>I find it difficult to expand my network.</b>	> Ask existing supportive contacts for their suggestions to how to expand your connections
<b>I manage a team and want to improve their network connections.</b>	> Host a regular informal group gathering, such as a pizza lunch or afternoon coffee break, in which team members are encouraged to invite outsiders
<b>I would like to know more about the people in my network.</b>	> Share a set of personal stories with each person in exchange for their background information > Capture details about new contacts in a notebook or database immediately after meeting them
<b>I would like to improve my network position.</b>	> Invite feedback from your connections about what they think you do best, so you can do more



I was relieved to see that we did not rely on the same small group of people for all our innovation efforts

I see we rely most heavily on formal ties for two areas of network action, namely to find resources and to push us to execute

I know few people who help promote our ideas and expose us to other networks, an area I decide to improve this year by hiring a person to build our developer community



© 2012 Tamara Carleton & William Cockayne



Leaflet	Network action
<b>Catalysts</b>	People who provoke you with new insights and possibilities
<b>Connectors</b>	People who grow your idea or effort by providing access to other partners, workers, resources, funding, etc.
<b>Enablers</b>	People who help you realize your idea through action or by prodding you to proceed
<b>Promoters</b>	People who broadcast and circulate your idea (and you) with other networks

### TIPS & LESSONS FROM OTHERS

- Don't be disheartened if your network looks messy or chaotic. The process of visualizing it will bring clarity and help you identify what should change and where.
- Overlap people and leaflets as needed.
- If you like making lists, you may find it helpful to write down all the communities you participate with on a (semi-)regular basis and then identify key people within each community who you consider as your contacts.
- Include all types of relationships in your network analysis, including: public, private, family, friends, coworkers, mentors, online (digital), and physical.
- Realize that networks change over time, as your priorities change and as people move positions. Consider revisiting your innovation map frequently and updating it to fit your latest company or personal strategy.

- You can map your innovation network manually or through various software.
- Consider adopting the method to map the network for your innovation idea as a way to build its initial ecosystem.

### REFLECTION

*Which quadrant would your colleagues place you in most?*

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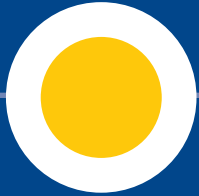
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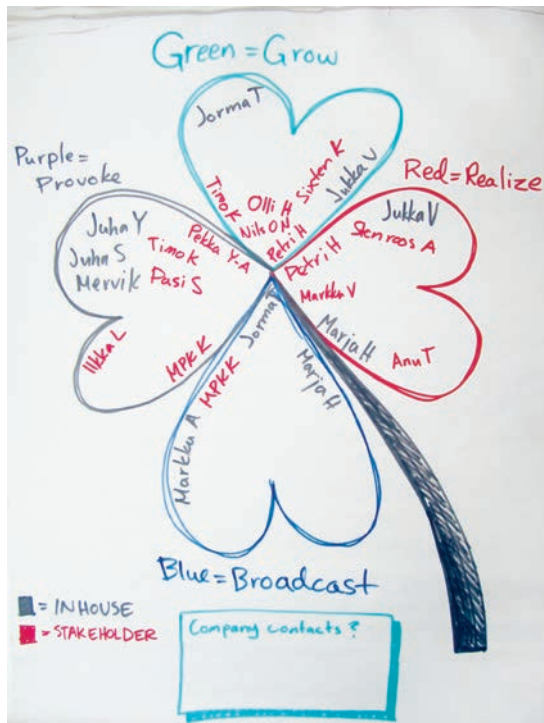
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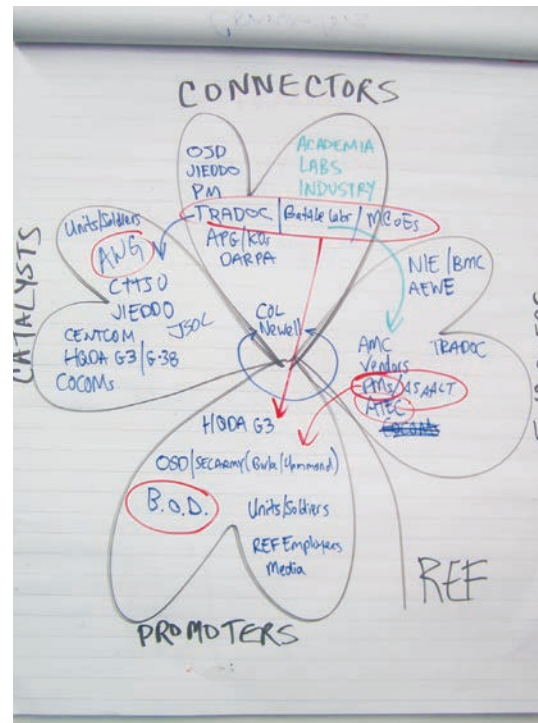
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## ADDITIONAL EXAMPLES

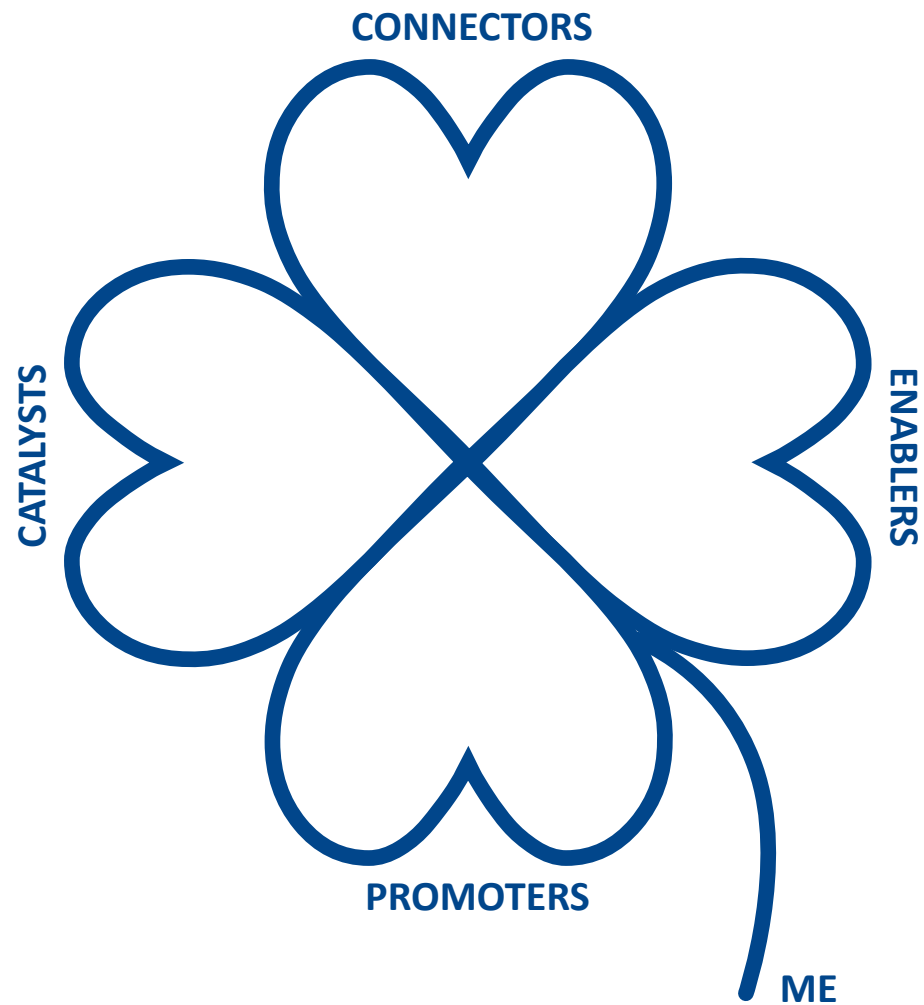


A European team evaluated their joint innovation network, looking at connections internally and externally to their organization.



An American military team evaluated the network connections and institutional relationships for their organization.

# CROWD CLOVERS | METHOD WORKSHEET



Circle the  
names  
of the people  
whom you work  
with formally

# CASE STUDY | DARPA'S LESSONS FOR INDUSTRY

Since 1958, the U.S. Defense Advanced Research Projects Agency—known as DARPA for short—has pursued radical innovation by provoking and funding numerous major inventions that have led to substantial global benefit. These inventions have led to the development of the worldwide Internet, computers that process human speech, radar systems, memory shaped alloys, global positioning satellites (GPS), aircraft stealth technology, X-ray lasers, mobile robots, and more.

Although a federal agency, DARPA's long track record offers many lessons for companies who seek to build their own practice of disruptive innovation. Seven of DARPA's most important lessons are discussed here.

## **1. ORGANIZE BY GRAND CHALLENGE**

The classic model of corporate research and development (R&D) is to organize around a business division or customer base. Over time, these structures reinforce existing product solutions. DARPA instead organizes around key development areas in technology and science, which present “grand challenges.” Grand challenges represent important unsolved problems, and each challenge can become a separate platform that sustains and unites multiple smaller solution areas.

## **2. MAINTAIN SHORT CONTRACTS**

Unlike most R&D organizations, DARPA hires all its directors and program managers on short contracts that average 3-4 years in length. Short contracts ensure focused participation and set a deadline for each person's vision. There is always a continual cycle of results on a grand scale. Short contracts also regularly infuse fresh energy into a group, bringing

new views and ideas into the existing mix. DARPA then relies on its alumni base and support staff to provide the agency's stability and memory long-term, which has worked remarkably well over time.

## **3. LIVE THE MISSION**

DARPA lives grandly. Its reputation has spawned multiple sister organizations that seek to replicate its formula for success. These include the Intelligence Advanced Research Projects Activity (IARPA) for the Director of National Intelligence, the Advanced Research Projects Agency in Energy (ARPA-E) in the U.S. Department of Energy, and the Homeland Security Advanced Research Projects Agency (HSARPA) in the U.S. Department of Homeland Security. Like DARPA, smart leaders continually evangelize how their organization desires radical innovators and, more importantly, provides them with the environment and incentives to continually innovate and take risks.

#### **4. OPERATE AS AN OPEN NETWORK**

For most groups, the standard hiring procedure is to recruit promising talent from a small circle of the top universities and research labs. DARPA expands this practice considerably. In addition to hiring from within, DARPA casts its hiring net wide outside the usual spheres, including tier II schools, foreign universities, research labs, nonprofits, and the military services. Beyond job candidates, DARPA's network is also a source for project advisors, project bids, technology reviews, and more. The agency relies heavily on internal referrals and its tightly knit alumni community to move ideas and people both into and out of DARPA.

#### **5. HIRE FOR VISION**

Few resumes contain ideas. DARPA skips the usual case interviews and considers the person's vision and ways of achieving it. At the minimum, DARPA's hiring conversations provide a source of novel ideas. At its best, DARPA gains someone who already brings a sense of mission

to the organization—coupled with the abilities to take that mission forward in a compressed timeframe.

#### **6. SHARPEN VISION AT THE START**

Across various agency eras, DARPA program managers have relied consistently on two primary mechanisms for sharpening their technology visions before these visions are announced publicly and opened formally to bid. The two mechanisms are expert workshops and proof-of-concepts, and program managers are trusted with the time to get their visions right.

Expert workshops are invite-only, small group discussions, designed to gather feedback on an emerging or partial vision from the relevant communities. Proof-of-concepts are directed feasibility studies that typically result in brief reports or demos. The aim is to pre-test a vision or validate a possible technology area before further action. By adopting these two mechanisms, companies would gain fast and affordable input into promising big innovation visions.

#### **7. KEEP A SHORT DECISION CHAIN**

DARPA does not have a stage-gate process with multiple phases for new ideas. There are no evaluation committees or external peer reviews in place, which introduces more people to veto a possible risky idea. Instead, each DARPA program manager knows that his or her office director and then ultimately the agency director makes the final call on a new program vision. DARPA alumni feel strongly that this short decision chain is the reason for the agency's success. Similarly, companies should consider a separate approval track for its radical ideas, which would allow more early winners to flourish within.

*“Establishing vision imposes great demands on management, but meeting the demands can produce a corporate renaissance.”*

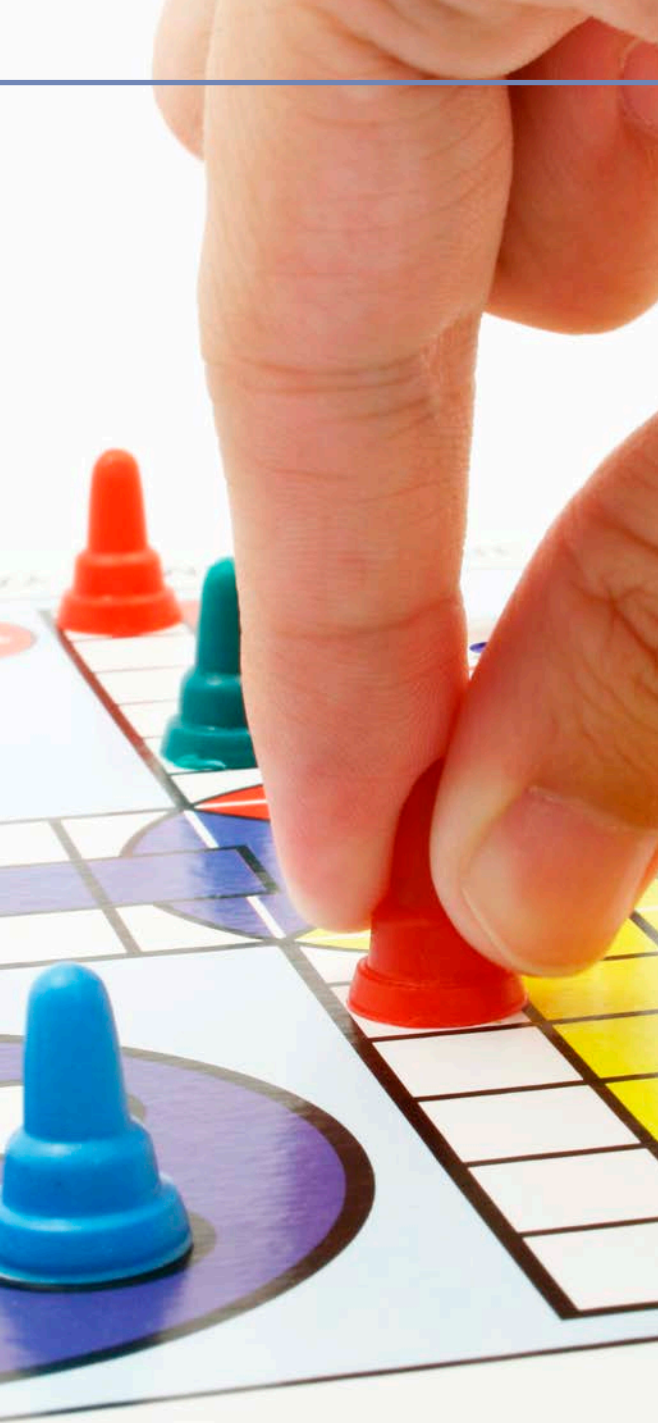
— *Richard N. Foster, management expert*  
(*BusinessWeek* article, 1982)

*“Where there is no vision, the people perish.”*

— *King James Bible, Proverbs 29:18*







 **VISION**  
CHAPTER 7

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## Shortcuts

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Phase V: Vision	201
Vision Statement	203
Case study: DARPA visions	212
DARPA Hard Test	213
Case study: DARPA criteria	227
Case study: EPCOT vision	228
Pathfinders	230

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## PHASE V: VISION

With a team in place, your next step is to turn your big idea into a vision that will excite more people, mobilize further action, and ultimately secure funding and support as part of a larger campaign.

A vision provides the destination for an innovation journey, allowing you to plan the route ahead. Simply put, it helps to know where to go next, and a vision orients everyone.

Visions may operate at different levels within an organization, specifically at the corporate, business unit, or product/project levels. These levels all help people imagine a future state of their idea, and each level determines the corresponding range of impact.

Visions work because they direct group energy toward creating something new. Without a vision, groups can survive, but they can't expect to achieve greatness. Many books and experts offer advice about the process of envisioning. They generally agree that good visions are ambitious, idealistic, credible, realistic, attainable, relevant, and tangible—at a minimum.

Many also underscore that a good vision is simple. Like an advertising slogan, a good vision should be easy to understand and easy to communicate. Visions provide the guidelines for action and commitment. All fine to say, and hard to do.

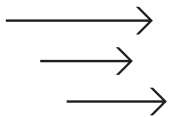
Three methods will help you find and form your innovation visions:

- Vision Statement
- DARPA Hard Test
- Pathfinders

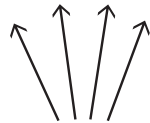


## PHASE V: VISION

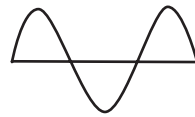
The fifth phase sharpens your team's vision so that it may take on a life of its own and guide everyone's actions forward.



The **Vision Statement** helps you tell your idea as a clear and concise summary.  
→ page 203



The **DARPA Hard Test** measures the visionary potential of your team's radical innovation.  
→ page 213



**Pathfinders** determines an idea's best path through your organization or network.  
→ page 230

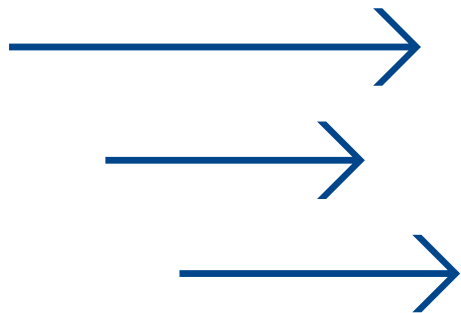
### **Questions that drive this phase:**

- *What is a good vision?*
- *How do we know we have a good vision?*
- *How do we develop a good vision?*
- *What is the best way to communicate our vision to others?*



# VISION STATEMENT

A Vision Statement provides a short vivid description of your idea in order to inspire, energize, and help others create a mental picture of your target future opportunity.



## WHEN TO USE IT

- To quickly and simply define a new idea, innovation solution, or business opportunity and its desired outcome
- To condense the essentials of your idea in a one-minute story
- To remind your team and partners what you are trying to build

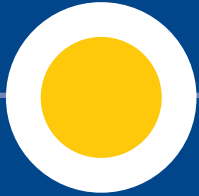
## WHY IT'S HELPFUL

Like the popular elevator pitch for new business ventures, a vision statement is a concise, carefully planned, and well-practiced statement about your future idea that anybody can understand in two minutes or less.

A vision statement creates a simple memorable framework for all your strategic planning. In a few words, it explains where you want to go and why. As an internal compass, the vision statement helps your team and employees focus their efforts. As an external filter, the vision statement helps investors, partners, customers, and others outside your team know what is (or isn't) in scope for your innovation.

## WHAT YOU GET

The template will help you craft and frame a clear vision statement. Once created, rehearse it regularly and then tailor it as needed for the members in your innovation network.



### LET'S LOOK AT AN EXAMPLE

An invite-only workshop was held to explore the "future of work" in 2030. One team was comprised of an R&D director, software manager, training specialist, and customer—all from different organizations. The team used the foresight methods to develop a shared understanding about future work needs. As their proposed vision, they decided to develop a smarter virtual helper to help senior executives save time.

While not a new or novel vision, the team felt the user need was still high, and market timing was now right. One reason was the increasing convergence of technologies in social networking tools, linguistics, semantic analysis, and related areas, which could overcome the limitations of prior products and services.

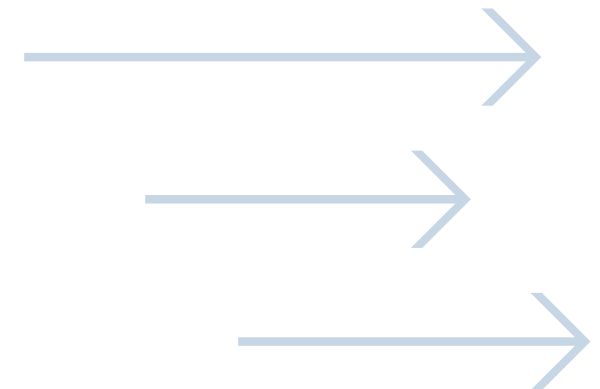
Our vision is to create a personal artificial executive assistant that makes sense of volumes of information to help you to make decisions on demand. It is almost impossible to achieve because the transformation of volumes of information requires technologies that we don't have today (e.g., systematic analysis of any type of information). The timing is right today due to the increasing convergence of technologies in social networking tools, linguistics, and semantic analysis. Precedents of this idea include personal digital assistants and the classic valet. By working with Google, SAP, Pixar, and Microsoft, we will make this vision real in 6 years by ...



## INSTRUCTIONS

1. Start by describing what you want to achieve in very simple terms: “Our vision is to \_\_\_\_\_.” The Paper Mockups and Futuretelling methods will help you find and express your idea. Use the White Spots and Dark Horse method to specify the unique value in your idea relative to competing solutions.
2. Next explain why your vision is truly visionary by stating: “It is almost impossible to achieve because \_\_\_\_\_.” The Context Maps and White Spots methods will offer hints on your team’s view of the existing challenge and state of the field. The Dark Horse method will also help to identify existing preconceptions.
3. Explain why your vision should be pursued now by stating: “The timing is right today due to \_\_\_\_\_.” The Progression Curves and Janus Cones will help you justify the next step in the idea’s timeline.
4. Briefly explain the background or precursors for your idea by stating: “Precedents for this idea include \_\_\_\_\_.” The Progression Curves and Janus Cones methods can help you uncover any relevant history.
5. Make your vision active and collaborative by stating 2-4 partners and/or supporters: “By working with \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.” The Future Users and Change Path methods can help determine who could be involved in building your idea.
6. Show commitment and set a timeline by stating: “we will make this vision real in \_\_\_ years.” The Progression Curves method will help you gauge past timeframes to estimate a future planning horizon.
7. Lastly, explain how you will make your idea happen by stating “by \_\_\_\_\_.” The Change Path method will let you name two big milestones that extend directly from today.

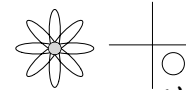
→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.



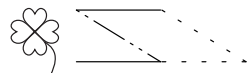
1. We start by referring back to the story we told in the Futuretelling exercise about our idea. The Dark Horse method lets us focus on what is essential to our innovation.



2. We then use the dimensions in the Context Maps to explain what made our idea such a bold opportunity.

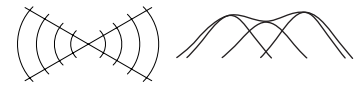


5. We name four companies which would be ideal partners for us, two of which are already working with us on other projects.



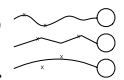
6. The Progression Curves help us estimate a realistic date.

3. Looking at the Janus Cones help us understand why our vision should exist now.

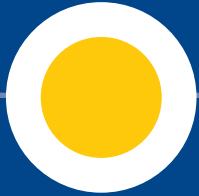


4. We decide to name only two popular past examples from our Progression Curves analysis to not overwhelm our users.

7. We need to discuss more which two big steps from our change path will show we are directly on track to achieve this big vision.



Our vision is to create a personal artificial executive assistant that makes sense of volumes of information to help you to make decisions on demand. It is almost impossible to achieve because the transformation of volumes of information requires technologies that we don't have today (e.g., systematic analysis of any type of information). The timing is right today due to the increasing convergence of technologies in social networking tools, linguistics, and semantic analysis. Precedents of this idea include personal digital assistants and the classic valet. By working with Google, SAP, Pixar, and Microsoft we will make this vision real in 6 years by ...



*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group's discussion and advance your thinking.*

### **Questions for team discussion**

- *How would your customer or investor describe your idea? What phrases would they use differently in your vision statement?*
- *If another team or company has attempted a version of your idea in the past, what elements or circumstances have changed since then?*
- *Which previous solutions or examples about your idea are the most familiar to your users? Why? Do these examples help or hinder your proposed vision?*

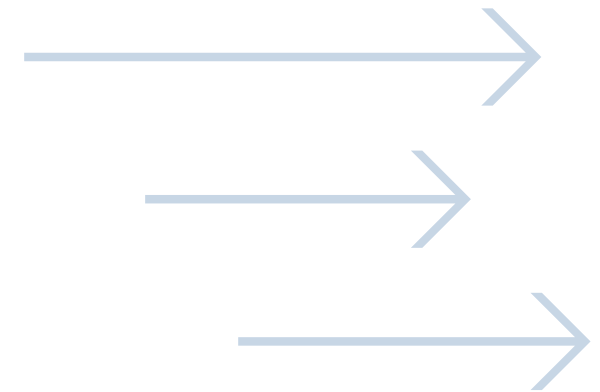
### **DRAWING INSIGHTS & IMPLICATIONS**

In a practice presentation, the workshop team tested their incomplete vision with several other colleagues. The audience feedback was useful.

First, the audience felt that the initial statement was slightly wordy, and they became lost in fluffy words such as “transformation.” In the next iteration, the team decided to remove the industry jargon and use simpler language to explain the core idea for everyone.

A second reaction was that their audience liked hearing specific details. Saying “Microsoft” instead of “large technology company” gave more credibility to the vision because it showed alignment with the R&D efforts of a real company. The team also considered replacing “personal digital assistants” with a more specific and accessible example, such as “Blackberry smartphone,” which would also help their audience understand the persistent user need for their vision.

Third, their vision statement generated quick interest in a possible path forward. Their audience wanted to hear what the team was seriously planning to do next. The team had spent more time wordsmithing the first draft of their vision statement that they missed valuable time to agree on next steps. The managers realized a good vision needed to end on a clear call to action, so that it could help generate commitment



Our audience quickly reacted to the long and geeky description of our vision, so we needed to remove jargon and simplify it.

We also learned that people liked hearing specific companies, which added more validity to our crazy idea.

Our vision is to create a personal artificial executive assistant that makes sense of volumes of information to help you to make decisions on demand. It is almost impossible to achieve because the transformation of volumes of information requires technologies that we don't have today (e.g., systematic analysis of any type of information). The timing is right today due to the increasing convergence of technologies in social networking tools, linguistics, and semantic analysis. Precedents of this idea include personal digital assistants and the classic valet. By working with Google, SAP, Pixar, and Microsoft, we will make this vision real in 6 years by ..

Once we hooked our audience's interest, they wanted to know what we would do next, so our team had some more work to do to complete the vision statement.






### TIPS & LESSONS FROM OTHERS

- Some of the best sources to spark new visions are your imagination, science fiction stories, and trips to other labs, companies, or countries—whatever shows a new perspective or practice.
- Sentences 2-3 in the vision statement address today’s situation. The last sentence addresses the future view.
- Avoid platitudes and generic phrases in your vision, which will tend to bore others and offer a poor planning guide for meaningful action.
- Refrain from tailoring your vision for your customer now because today’s customer will likely be different from tomorrow’s customer.
- The fewer words you use, the stronger and more memorable your vision will become.
- A really radical vision should be ridiculous or preposterous in some way to challenge the norm. That’s why the vision feels almost impossible.



### REFLECTION

*Why is your team’s vision interesting to you?*



\_\_\_\_\_

\_\_\_\_\_

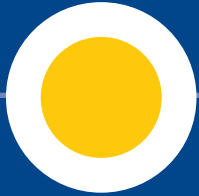
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## ADDITIONAL EXAMPLES

Our vision is to be the leading collaboration and  
method of operation <sup>platform for</sup>

It is almost impossible to achieve because the field is heterogeneous and  
multidisciplinary.

The timing is right today due to the positive momentum from current  
programs

Precedents of this idea include TECES technology programs.

By working with companies, universities, and TECES,  
we will make this vision real in 5 years

by building new programs and connecting new  
stakeholders, media and funding.

A Finnish team tested a rough vision for an industry consortium with colleagues, quickly learning better and more concrete ways to tell their story.

Our vision is to PRODUCE A REVOLUTIONARY COMBAT  
UNIFORM WITH MULTIPLE INTEGRATED SYSTEMS

It is almost impossible to achieve because  
TECHNOLOGY MATURITY & THE LEVEL OF INTEGRATION  
REQUIRED

The timing is right today due to  
INCREASING CONVERGENCE OF SENSORS & TECHNOLOGIES IN ORDER  
TO REDUCE SOLDIER LOAD WHILE PROVIDING INCREASED SA & PROTECTION  
<sup>upgrading</sup>  
<sup>comm</sup>

Precedents of this idea include  
FUTURE FORCE WARRIOR, LAND WARRIOR, NASA (SPACE SUITS)  
HALO (VIDEO GAME), stit Suit (Duma)

By working with  
DARPA, PEO SOLDIER, INDUSTRY, ACADEMIA

We will make this vision real in 3-5  
years by FORMING IPT's  
TO ACHIEVE THE INTEGRATION REQUIRED FOR SUCCESS.

An American military team tested a rough vision for a new soldier uniform that integrated the latest technologies in fashion, sensors, communications, and power that was truly designed for the young generation.

# VISION STATEMENT | METHOD WORKSHEET

TODAY  
→  
→  
→

*Our vision is to \_\_\_\_\_.*

*It is almost impossible to achieve because \_\_\_\_\_.*

*The timing is right today due to \_\_\_\_\_.*

*Precedents of this idea include \_\_\_\_\_.*

FUTURE  
→  
→  
→

*By working with \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_,*

*we will make this vision real in \_\_\_\_\_ years*

*by \_\_\_\_\_.*

## CASE STUDY | TECHNOLOGY VISIONS AT DARPA

Since 1958, the U.S. Defense Advanced Research Projects Agency—known as DARPA for short—has pursued radical innovation, providing at least a half-century of sustained practice and countless examples of successful (and also failed) visions of technology-driven innovation.

### AUGMENTED COGNITION PROGRAM

In 2001, DARPA's Augmented Cognition program presented a bold vision that laid the groundwork for the emerging field of empathetic avionics. The DARPA program manager stated: "The goal... is to extend, by an order of magnitude or more, the information management capacity of the human-computer relationship for the 21st century warfighter."

Several groups responded to the DARPA call. In particular, Boeing Phantom Works built a new type of helmet, in which the pilot becomes a part of the avionics system, interacting electrically with his or her aircraft.

### LEGGED SQUAD SUPPORT SYSTEM

As another example, DARPA's Legged Squad Support System (LS3) program described a vision in 2008 for a new type of military pack mule. The vision stated: "LS3 is envisioned to augment squads by maneuvering with them in complex terrain where wheeled tactical vehicles cannot go."

Boston Dynamics, a U.S. engineering firm, built a functioning prototype called BigDog. The first of its kind, BigDog carries heavy loads independently.



Photo: Jeff Corwin Photography, Boeing

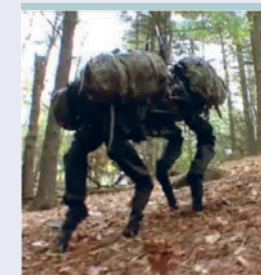
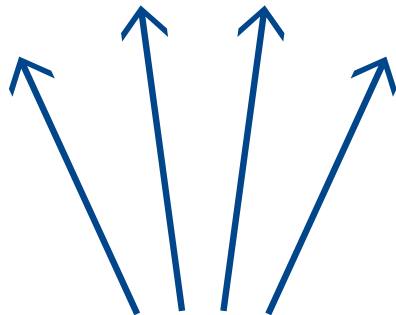


Photo: Boston Dynamics



# DARPA HARD TEST

Adapted from DARPA, the DARPA Hard Test describes four qualities of a radical innovation vision: far-reaching, technically challenging, multidisciplinary, and actionable.



## WHEN TO USE IT

- To change the state of the field by an order of magnitude
- To find visionary ideas that, if they could succeed, would be a large step beyond what existing science and technology can permit

## WHY IT'S HELPFUL

A DARPA Hard vision is a daring technology challenge that cannot be solved easily, typically requiring new knowledge or invention to be addressed through unorthodox measures. These visions are seemingly impossible, which is what ultimately characterizes them as truly radical. They are deliberately designed to be both high risk and high reward.

When you apply the DARPA Hard Test

to your innovation idea, you gain a quick way to gauge how disruptive your idea may (or may not) be. It lets you see where some gaps exist and, if desired, offers a chance to stretch your vision further to be truly visionary.

In layman's terms, the four vision qualities assess how big is it (far-reaching), how to do it (technically challenging), what you know (multi-disciplinary), and when you start (actionable).

## WHAT YOU GET

You ensure that your innovation vision is completely and genuinely radical from the start. With the DARPA Hard Test, you also apply a benchmark that has proven to be a smart "rule of thumb" for radical innovation visions.

## THE NOTION OF DARPA HARD

Since 1958, the U.S. Defense Advanced Research Projects Agency—known as DARPA for short—has pursued radical innovation. Unlike other U.S. government agencies that fund science and engineering research, DARPA focuses on the forward edge of technology. DARPA has funded ideas that have led to the internet, aircraft stealth technology, the global positioning system (GPS), ultrasound imaging, and more.

Over the years, DARPA program managers have pursued visionary ideas that they call “DARPA Hard.” The term is shorthand for something considered extremely hard to achieve. Although not every idea they fund may be a success, every project starts as DARPA Hard with the promise to deliver truly revolutionary capabilities. A DARPA Hard idea is both high risk and high reward.

## FOUR VISION COMPONENTS

Those outside DARPA can apply a similar principle to their innovation efforts. What

is the equivalent of DARPA Hard in your organization? How do you know when you have ideas that merit radical innovation? You can use the DARPA Hard Test.

Adapted from DARPA, the DARPA Hard Test has four related dimensions: far-reaching, technically challenging, multidisciplinary, and actionable. While each dimension may exist independently, it is the combination that describes a real visionary idea. The idea is not just a hard and complex problem to address; it becomes DARPA Hard. Let’s review each dimension now.

**I. Far-Reaching:** A far-reaching idea may impact many people, extending widely in influence and/or effect. These ideas change the nature of the game, creating a “paradigm shift,” a term coined by philosopher Thomas Kuhn in 1962. For example, once people experienced the new interaction model for a touchscreen mobile phone, they cannot return to an older way of usage. The idea fundamentally changed how they

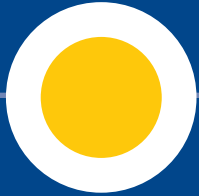
thought mobile phones should work.

**II. Technically Challenging:** A technically challenging idea resets the limits of today’s knowledge. New inventions and scientific discoveries often push innovation ahead. As writer Sir Arthur Clarke once wrote, “Any sufficiently advanced technology is indistinguishable from magic.” DARPA Hard visions often provide an irresistible challenge for engineers. Another aspect of a technical challenge is the integration of existing system components.

**III. Multidisciplinary:** A multidisciplinary idea takes more than one person to execute it. While the solution may be complex and even complicated, approaching the idea requires combining several professional specializations and/or fields of academic study.

**IV. Actionable:** Actionable ideas are intended to be built. As visions, these ideas are more than fantasy or political rhetoric. They should invoke immediate action.

Vision dimension	Definition	End of scale (1)	Top of scale (7)
<b>I. Far-Reaching</b>	The solution requires a completely new mental model, passing through a paradigm shift	Requires no change in how people think about a solution	Requires a paradigm shift in how a solution is viewed across society
<b>II. Technically Challenging</b>	The goal is difficult to implement either in terms of inventions or system integration required	Requires no new specialized expertise	Requires major advancements in specialized expertise
<b>III. Multidisciplinary</b>	The solution requires multiple bodies of knowledge that rarely exist within one industry	Requires only one class of knowledge	Requires multiple, distinct bodies of knowledge
<b>IV. Actionable</b>	The right people can see a path to the impossible and can make progress beginning today	Requires so much clarification that the next step is another meeting	Requires little effort to begin taking actions toward the solution



## LET'S LOOK AT AN EXAMPLE

All DARPA Hard dimensions are measured on seven-point interval scales. Each scale's end point is defined to indicate what "low" and "high" entail for that dimension.

Five visions for well-known innovations are ranked across these scales, providing a general benchmark to help you evaluate your own visionary idea. These visions are described briefly.

### A. Manhattan Project

You are a physics graduate student at an American university in 1942, and your advisor has asked you to join a new secretive military project. The goal is to build the world's first atomic bomb. The United States joined the WWII fight after Pearl Harbor was bombed on December 8, 1941, and one day after, the U.S. government commissioned a large-scale atomic project, which became known as the Manhattan Project.

### B. Man on the moon

On a very hot summer's day in 1962, you are sitting at a football stadium at Rice University in Texas, hearing U.S. President John F. Kennedy give a speech about outer space. As a mid-career engineer, you knew that the Soviet Union opened the final frontier of space, when it sent the Sputnik satellite into orbit in 1957 and sent a man to space in 1961. Kennedy says: "We choose to go to the moon in this decade... because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too."



### **C. Doubling human life**

In 2008, you decide to attend the first U.S. conference about human aging, hosted by The Methuselah Foundation at the University of California in Los Angeles. For several years, British researcher Aubrey de Grey has claimed that humans could live for 1,000 years. You've also been following the work of Bill Andrews, director of molecular biology at California-based biotech firm Geron. Diseases related to aging, like dementia and heart disease, currently block humans from reaching long life, and human body parts wear out from use. In the quest for immortality, scientists should focus on unlocking the molecular mechanisms of aging.

### **D. 100-Year Spaceship**

You are reading the *Washington Post* newspaper over your hotel's morning coffee. On January 2012, DARPA and NASA jointly announced a new initiative called the 100-Year Spaceship (100YSS) intent on sending explorers to another star system in 100 years. You find the 100YSS mission statement from DARPA that states: "100 Year Starship will unreservedly dedicate itself to identifying and pushing the radical leaps in knowledge and technology needed to achieve interstellar flight while pioneering and transforming breakthrough applications to enhance the quality of life on earth... Programs to establish a human presence on the moon, Mars, or elsewhere in our solar system will be stepping-stones to the stars."

### **E. Barcelona City Protocol**

You are an European city planner invited to an early planning workshop. In the spring of 2012, the city of Barcelona announced that it aims to be "a global reference model for sustainable urban development" in 10 years. Part of the vision entails developing a "City Protocol" model, which will be "the first certification system for smart cities" that will measure the efficiency and quality of a city. Planned city services for Barcelona will include a smart bus network, the energy monitoring of public buildings, and pay-per-use model for city lighting. Barcelona's mayor stated, "Barcelona has a strong commitment to become a smart city and a show case for the rest of the world in sustainable urban development."



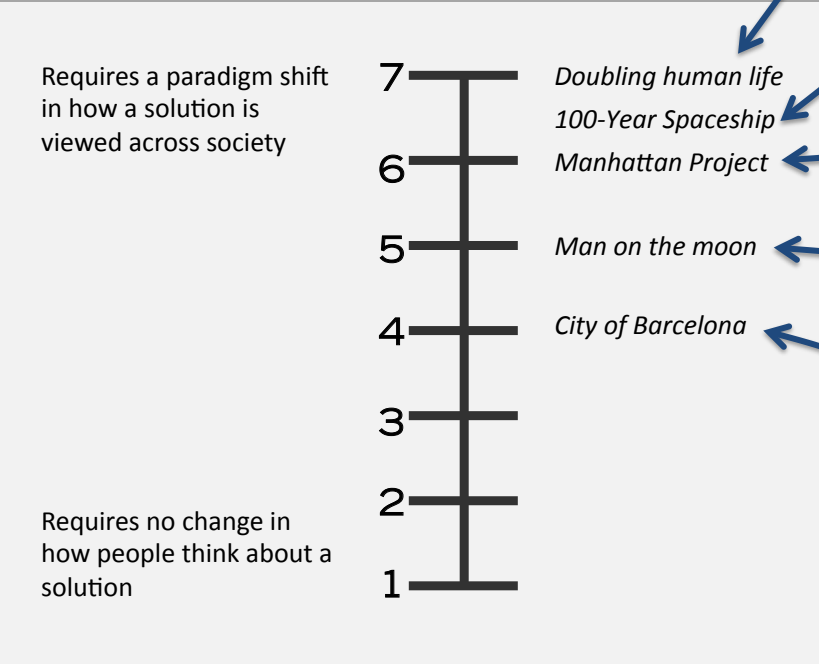
## INSTRUCTIONS

1. First assess how far-reaching your vision is and score it on scale I.
  2. Evaluate the level of technical challenge for your vision and score it on scale II.
  3. Next gauge the level of multidisciplinary commitment your vision requires and score it on scale III.
  4. Finally evaluate the ability to take immediate action on your vision and score it on scale IV.
- See the adjacent diagram for an annotated example. The letters for each vision correspond to the letters in the diagram.

Vision dimension	Questions for team discussion	Suggested methods to help address
<b>Far-Reaching</b>	<ul style="list-style-type: none"><li>&gt; How does the launch horizon compare to your organization and industry timelines?</li><li>&gt; Do you want to create a new technology use or create a new market?</li></ul>	<ul style="list-style-type: none"><li>&gt; Use the Janus Cones to gauge past timeframes to develop a baseline</li><li>&gt; Try the Dark Horse Prototype to question hidden preconceptions</li></ul>
<b>Technically Challenging</b>	<ul style="list-style-type: none"><li>&gt; Is the problem almost unthinkable to solve due to complex interdependencies and high levels of ambiguity?</li></ul>	<ul style="list-style-type: none"><li>&gt; Use Progression Curves to review the state of the field and idea precedents</li></ul>
<b>Multidisciplinary</b>	<ul style="list-style-type: none"><li>&gt; Does your vision fall outside of the usual boundaries and at least two academic fields?</li></ul>	<ul style="list-style-type: none"><li>&gt; Apply the Context Maps and White Spots methods to assess the idea from the view of various fields</li></ul>
<b>Actionable</b>	<ul style="list-style-type: none"><li>&gt; Can you present the vision as a single challenge to those who will build it?</li></ul>	<ul style="list-style-type: none"><li>&gt; Use the Vision Statement method to sharpen and simplify your story</li></ul>

### DARPA Hard Test: Far-Reaching

Definition: The solution requires a completely new mental model, passing through a paradigm shift



C. An idea that baffles the mainstream scientific community

D. Stuff of science fiction to travel to stars

A. A contemporary bold idea that humans could control nuclear power safely and strategically

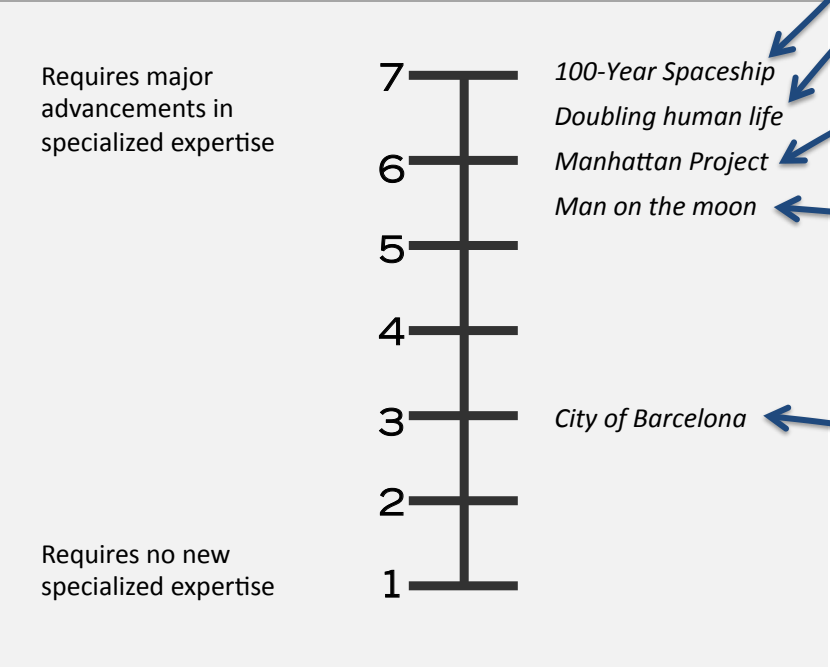
B. A stretch goal that built on previous efforts to put a satellite and man into orbit

E. An ambitious goal to build next generation city services for one region

### DARPA Hard Test: Technically Challenging

I II III IV

Definition: The goal is difficult to implement either in terms of inventions or system integration required



D. Requires radical advancements in many systems from life-support to ship propulsion to manufacturing

C. No proven solutions to date that reverse or stop human aging

A. Requires inventing new precision techniques for mass produced explosives

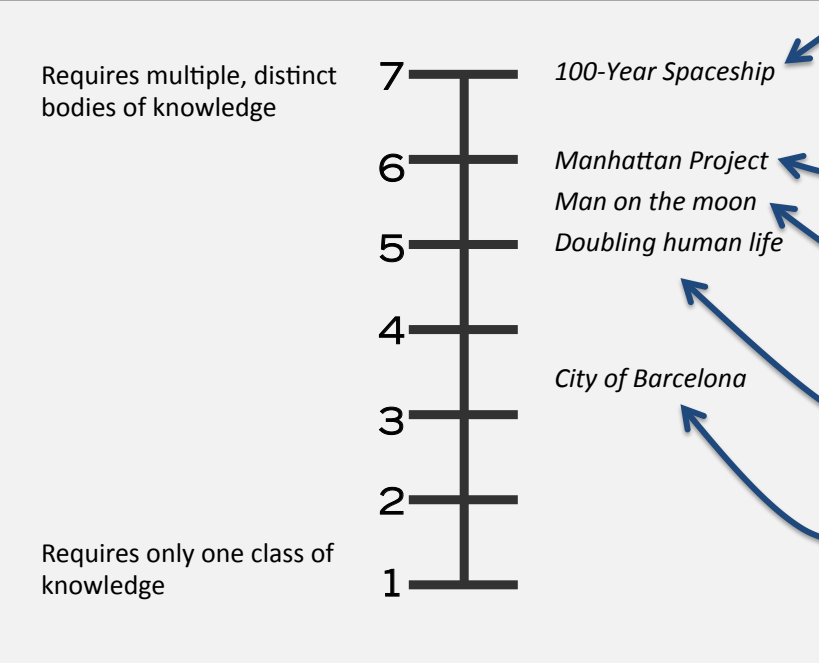
B. Difficult problem without computer aid, drawing on earlier success of the first Russian cosmonaut

E. Requires the integration of existing pervasive and physical network infrastructures

### DARPA Hard Test: Multidisciplinary

I II III IV

Definition: The solution requires multiple bodies of knowledge that rarely exist within one industry



D. vision can only be achieved by the cooperation of multiple diverse groups

A. Assimilated concepts and leaders from all scientific fields and engineering disciplines

B. Helped create a new field of aerospace engineering

C. Fostering a new scientific discipline of geroscience

E. Joint coalition between different government groups, city planners, and businesses

### DARPA Hard Test: Actionable

I II III IV

Definition: The right people can see a path to the impossible and can make progress beginning today

Requires little effort to begin taking actions toward the solution



Doubling human life

Manhattan Project

Man on the moon

100-Year Spaceship

City of Barcelona

Requires so much clarification that the next step is another meeting

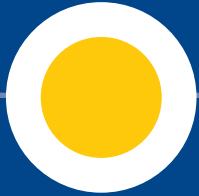
C. Biomedical research grants now available from several groups

A. President's approval expedited efforts and funding nation-wide

B. Established a new U.S. space agency called NASA to centralize and mobilize efforts

D. First step was to conduct feasibility study and provoke possible partners

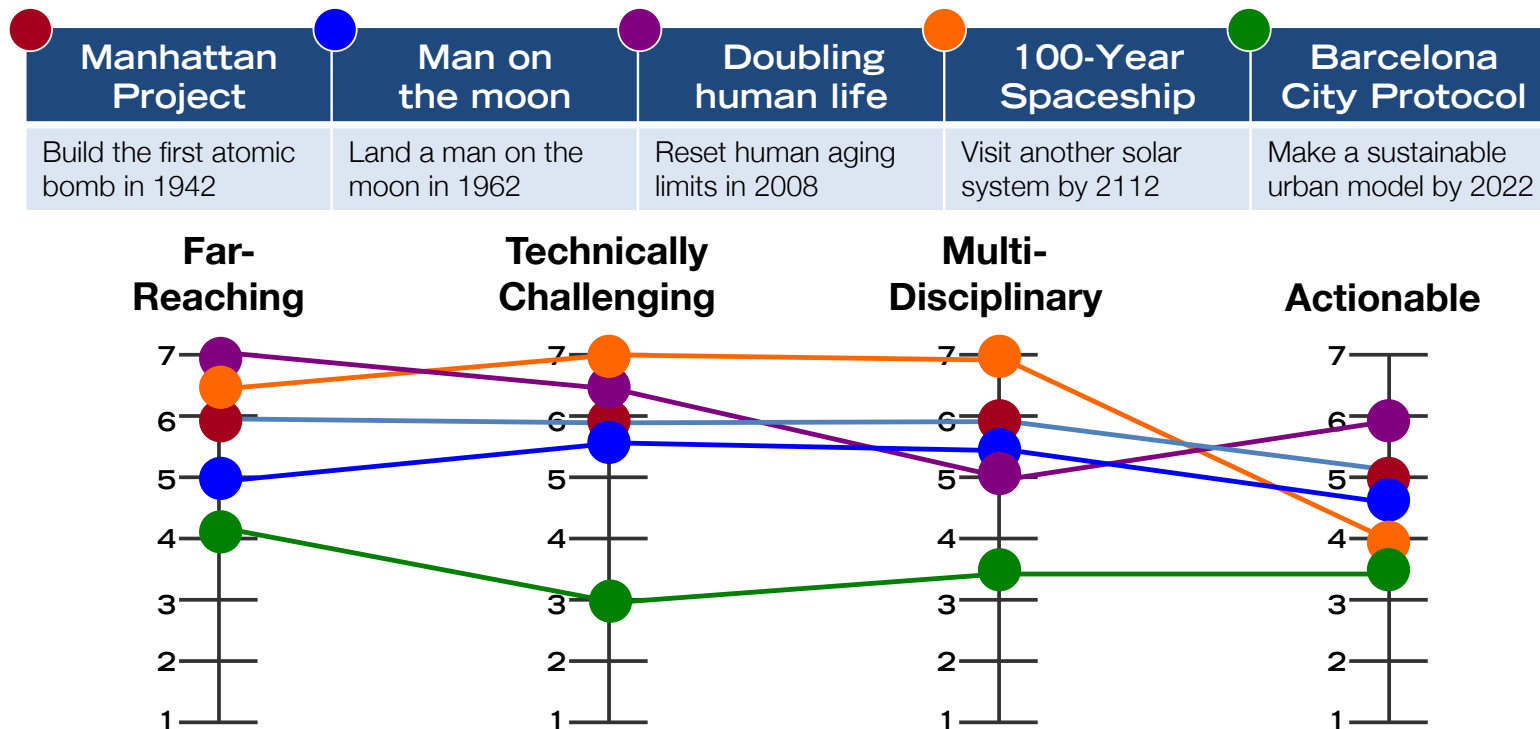
E. A committee-driven approach managed by a global technology company



## DRAWING INSIGHTS & IMPLICATIONS

The benchmark analysis of five well-known innovations reveal that their vision

scoring differs slightly across all scales. Moreover, each vision's scoring may shift during different stages of its development and in context to society's views of the time.





### TIPS & LESSONS FROM OTHERS

- Don't try to score perfectly from the start. Instead use the DARPA Hard Test to pre-test your vision, which you will want to then rework and co-develop with your broader network.
- Consider averaging scores from colleagues and partners as a way to gauge your network's impression of your idea's visionary potential.

### REFLECTION

*Which dimension of the DARPA Hard Test will be most challenging for your organization?*

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# DARPA HARD TEST | METHOD WORKSHEET #1

## COMPARISON EXAMPLES

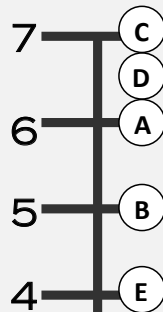
- A. Manhattan Project
- B. Man on the moon
- C. Doubling human life
- D. 100-Year Spaceship
- E. Barcelona City Protocol

### Far-Reaching

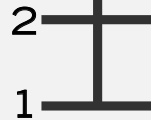
I II III IV

Definition: The solution requires a completely new mental model, passing through a paradigm shift

Requires a paradigm shift in how a solution is considered across society



Requires no change in how people think about a solution

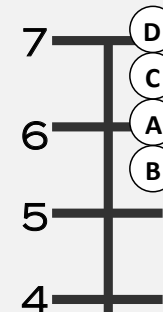


### Technically Challenging

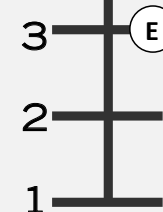
I II III IV

Definition: The goal is almost technically impossible without becoming "magical"

Requires major advancements in technical knowledge



Requires no new technical knowledge



# DARPA HARD TEST | METHOD WORKSHEET #2

## COMPARISON EXAMPLES

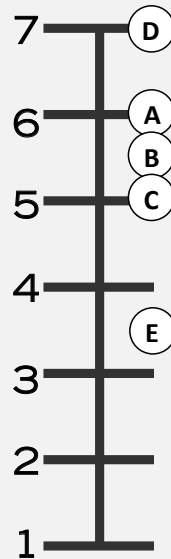
- A. Manhattan Project
- B. Man on the moon
- C. Doubling human life
- D. 100-Year Spaceship
- E. Barcelona City Protocol

### Multidisciplinary



Definition: The solution requires multiple bodies of knowledge that rarely exist within one industry

Requires multiple, distinct bodies of knowledge



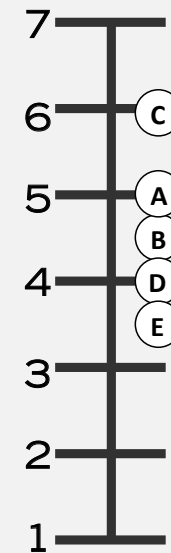
Requires only one class of knowledge

### Actionable



Definition: The right people can see a path to the impossible and can make progress beginning today

Requires little effort to begin taking actions toward the solution



Requires so much clarification that the next step is just another meeting

## CASE STUDY | THE HEILMEIER CATECHISM AT DARPA

When George Heilmeier was the director of DARPA (then called ARPA) in the mid-1970s, he expected every proposal for a new research program to answer a standard set of questions. These questions have been called the Heilmeier Catechism or Heilmeier's criteria. Known by many technology managers, his questions helped ensure a technical idea had practical application.

Heilmeier's criteria are a useful way to test your own group's vision and as a way to convey to others what you hope to accomplish. Several versions have circulated since, and the most common version is as follows:

1. What is the problem, and why is it hard? (articulate your objectives using absolutely no jargon)
2. How is it done today, and what are the limits of current practice?
3. What's new in your approach, and why do you think it will be successful?
4. Who cares? If you're successful, what difference will it make?
5. What are the risks and the payoffs?
6. How much will it cost? How long will it take?
7. What are the midterm and final "exams" to check for success?

## CASE STUDY | THE ORIGINAL VISION OF EPCOT

Many people know Walt Disney for his empire of Disneyland, Disney World, and Disney cartoons. Beyond creating new industries in animation and amusement parks in his lifetime, Disney also influenced American society in other ways. For example, during the 1950s, he explored the ideas of space exploration and space travel in several Disneyland TV shows, which helped create strong public support for the burgeoning U.S. space program.

Disney also influenced how people think about sustainable cities. His last film presented a bold vision for a concept called the “Experimental Prototype Community of Tomorrow”, otherwise known as EPCOT.

EPCOT was an idealized city, where people would live, work and play. Building on familiar ideas of the time, EPCOT evokes the European concept of Garden Cities and the popular World Fairs.

### A GRAND CHALLENGE

The vision for EPCOT was first presented in October 1966 to the American public on national television as part of the weekly Disneyland series.

In his film, Disney’s vision is structured in three parts that correspond to the first three phases of the foresight process: Perspective, Opportunity, and Solution.

In the first section, the narrator presents a brief history of Disney’s work, quoting experts and establishing credibility with the audience—all of which offers perspective to the viewers. A good vision embodies the beliefs and values of the time, and it was no different with EPCOT. For example, the city location was deliberately placed at the intersection of two major highways, just as the American interstate system was flourishing and family road trips were becoming popular.

In the next section, Disney outlines the opportunity for his big idea, showing

why it addresses the needs of workers, families, and businesses. EPCOT was to be a self-sustaining and self-governing city designed for public need, not entertainment. Disney hoped that EPCOT would have a big impact on urban planning and community development because the city would “become a pilot operation for the teaching age—to go across the country and across the world.”

In the final section, he explains how EPCOT could work as a solution and helps people to imagine the new community by showing animated sketches, illustrations, and other rough prototypes. Disney posed his vision as a challenge to the general American public, saying: “I don’t believe there’s a grand challenge anywhere in the world that’s more important to people everywhere than finding solutions to the problems of our cities.”



Source: Walt Disney Studios Home Entertainment

### WAS THE VISION DARPA HARD?

Walt Disney's vision for EPCOT was bold and unbelievable to many. The language throughout the film is wonderfully scripted, reinforcing the four qualities of a radical vision.

1. **Far-Reaching:** EPCOT was a big idea that would take both time and complex integration to build.
2. **Technically challenging:** EPCOT was an entirely new city with new infrastructure ideas, such as a regulated climate system, in a location far away from the Disney enterprise—truly DARPA Hard.
3. **Multidisciplinary:** While Disney was the spokesperson, he needed the participation of multiple groups from government, industry, and the community to make the idea of EPCOT real.
4. **Actionable:** Disney appealed to other companies to help show how they could get involved immediately.

### THE VISION OF EPCOT TODAY

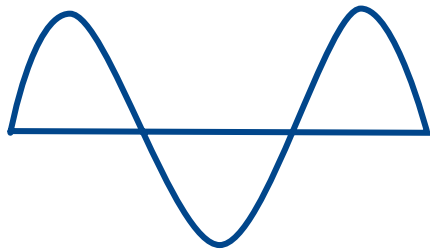
Disney died soon after his video aired, and the momentum for EPCOT stopped for a time. A visionary is often closely linked to his/her vision. Although Disney's brother and management team pursued parts of the idea, they built a different version under the same name—which included a theme park that opened in 1982 and a planned city called Celebration that was developed in the mid-1990s.

Was EPCOT a failed vision? No, because another team pursued a different idea. Ultimately, many of the ideas behind the original EPCOT vision were gradually embraced by American society in the ensuing decades.



# PATHFINDERS

Pathfinders charts the path for an idea to find success based on formal and informal rules within an organization or network.



## WHEN TO USE IT

- To help your team review the organizational trails of past innovation ideas
- To chart the success path for your new idea

## WHY IT'S HELPFUL

Once a promising big idea is found, many managers are often challenged to take the idea back to senior management or to the main organization for a welcome reception. Many times successful ideas do not follow standard procedure or the prescribed stage-gate process in an organization. These ideas usually have to create their own paths to success.

The Pathfinders method borrows from the practice of wayfinding, which is the human process of using visual cues and landmarks to navigate physical space. For example, wayfinding is critical in airports and conference centers, which rely on

multiple types of signs to orient and direct crowds.

Knowing how your team likes to proceed, as well as the organizational paths from previous ideas, will help you advance and navigate a new idea. Different types of navigators exist. Landmark navigators look for distinctive buildings or upcoming events in the near distance to pick which direction to go next. Route navigators determine new paths by connecting or extending from familiar locations and street signs. Map navigators rely on spatial relationships, preferring site diagrams and "you are here" indicators. Wanderers meander indirectly to their destination at no set pace, versus hunters who move rapidly to a target.

## WHAT YOU GET

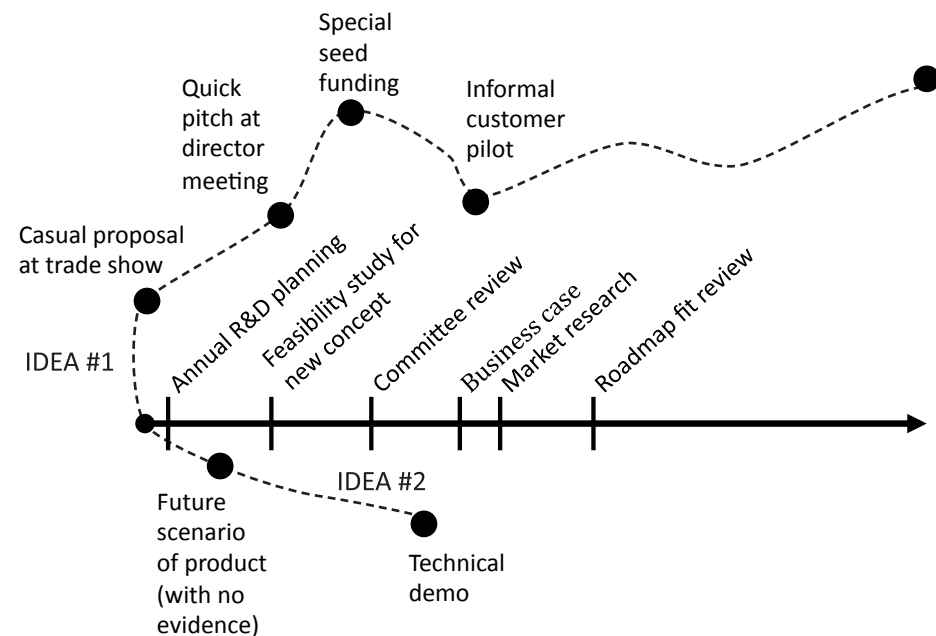
A visual map for your idea's path to success will provide clear cues and landmarks on how to navigate the stated and unstated rules within the organization.

## LET'S LOOK AT AN EXAMPLE

A team of user experience researchers at a large consumer electronics manufacturer wanted to ensure that their latest idea would fly through their division's approval process. From past experience, they knew that a new idea faced multiple organizational tests and obstacles.

Using the Pathfinders method, they drew a straight line that represented an idea's assigned path. Along this line, they began to note typical milestones, such as a feasibility study for a new concept.

Then, they considered two ideas that had been pursued in the past year: one which had stalled after several months and another which quickly got the attention of the CTO. They charted the path of both ideas from the start of the straight line, marking additional events in each idea's early formation. Events that helped to accelerate development were noted above the line and events that hindered an idea's progress were placed below the line.



Source: Tamara Carleton, 2012



## INSTRUCTIONS

1. Draw a straight line that represents the recommended route for new ideas within your organization (or group) and note all the major milestones your group should follow for successful approval to execute. The starting point is the initial concept by an individual or team, and the end point is when the idea is fully accepted by management. We will call this the “innovation water line.”
2. Now identify 2-4 different innovation ideas that were pursued within your organization and start their paths from the same starting point at the left side of the straight line.

3. For each idea, note all the actions or major steps that allowed each idea to move ahead. These actions may include proposal deadlines, department discussions, funding evaluations, committee reviews, or review by other units and stakeholders outside your division.
4. Draw the idea’s path up above the water line if a particular action or group accelerates the idea’s progress. Draw the path down under the line if an action or group slows down or hinders the idea’s progress.

→ See the adjacent diagram for an annotated example. The numbers in the instructions correspond to the numbers in the diagram.

*After your team has completed an initial analysis, we suggest you reflect briefly on what you have learned in the process. Here are some questions to frame your group’s discussion and advance your thinking.*

### **Questions for team discussion**

- Which ideas followed similar paths?
- Where did certain peaks occur?
- What skills are required to move an idea along?

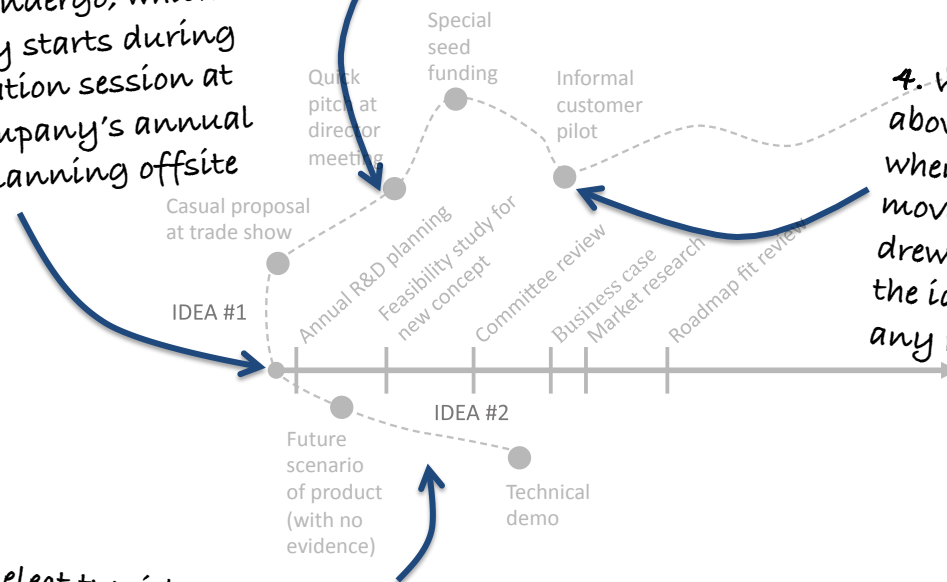


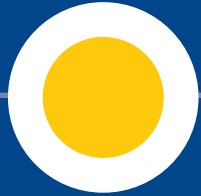
1. On the straight line, we note the standard milestones an idea must undergo, which usually starts during an ideation session at our company's annual R&D planning offsite

3. We then trace each idea's progress, marking specific events in its timeline

4. We drew the path up above the "water line" when a particular event moved the idea ahead and drew the path down when the idea slowed down for any reason

2. We select two ideas that were pursued in the past year: one which stalled after several months and another which quickly got the attention of the CTO





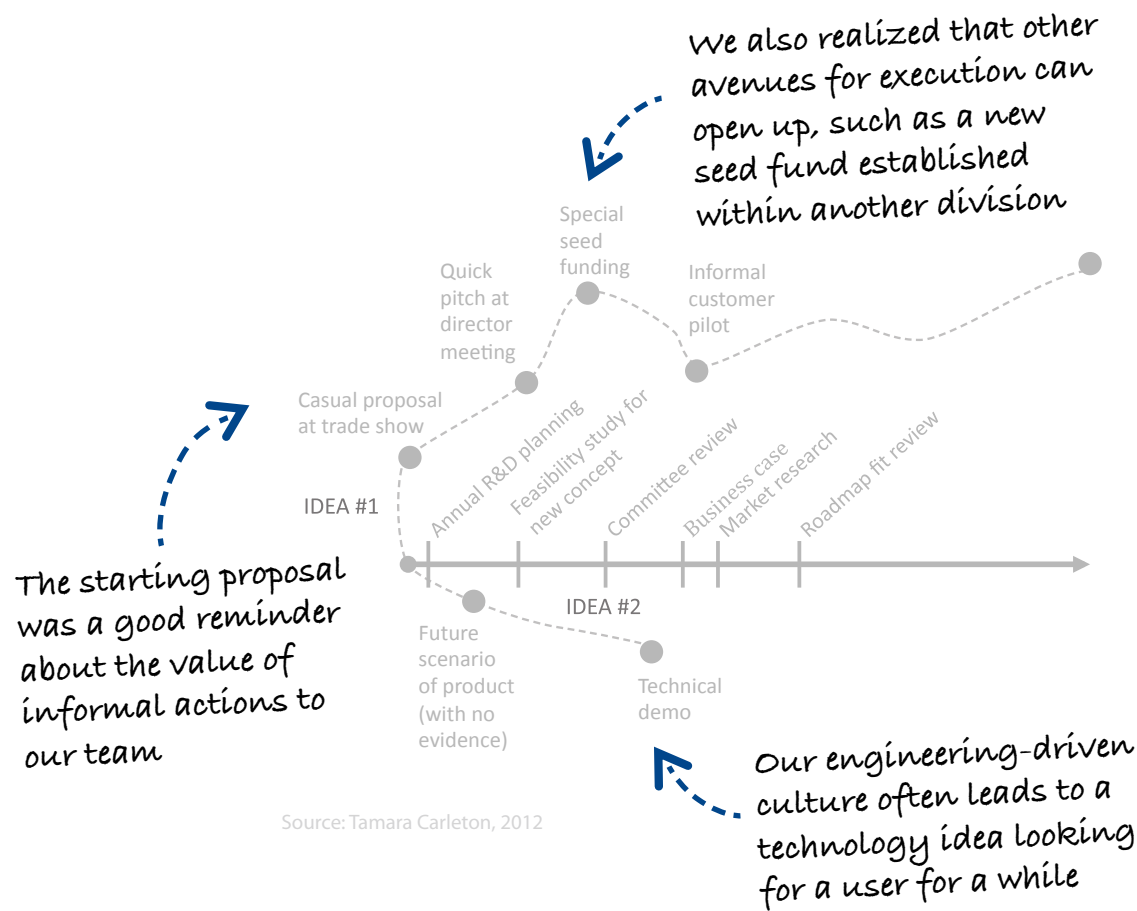
## **DRAWING INSIGHTS & IMPLICATIONS**

By comparing the paths of two previous ideas, the team reaffirmed that the real path for an idea was a mix of the formal route with informal measures. In particular, they saw that one idea slowed down considerably from inception until it completed stalled.

On further reflection, the team saw that the idea below the innovation water line was heavily technology-led. The idea did not go through a standard feasibility study nor did it include any user feedback. Since their team operated in an engineering-driven culture, they knew it was common and highly acceptable to propose and develop new ideas based around a new

technology. The drawback was that much effort was spent during later stages looking for potential markets and also reworking the technical solution around unexpected user feedback. In contrast, the more successful idea incorporated an informal customer pilot that helped validate its value to management from the start.

Lastly, the team did not use any scales to judge positive or negative direction. By simply drawing the idea paths up or down, they discovered that peaks on the upper side of the water line is what they wanted to mimic for their new idea, while dips on the lower side offered clues on what to address early or simply avoid. Overall, it was a good quick exercise to help them plan ahead with foresight.





### TIPS & LESSONS FROM OTHERS

- Some teams like to draw depth markings for low, medium, and high above and below the innovation water line as a way to note the amount of progress (or lack of) for each idea.
- Chart the trails of multiple ideas so your team has more points to compare and contrast.

### REFLECTION

*What type of navigator (e.g., landmark, route, map, wanderer, hunter) are you at work?*

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# PATHFINDERS | METHOD WORKSHEET #2



*"不聞不若聞之，聞之不若見之，見之不若知之，  
知之不若行之；學至於行之而止矣。"*

*(Smelling is better than nothing;  
seeing is better than smelling;  
understanding is better than seeing;  
doing is better than understanding;  
and doing shows true learning.)*

*— Chinese proverb*

*"Isoja kaloja kannattaa pyytää vaikkei saisikaan."*

*(Fishing for big fish is worth it,  
even if you don't catch one.)*

*— Finnish proverb*





# APPENDIX

## Shortcuts

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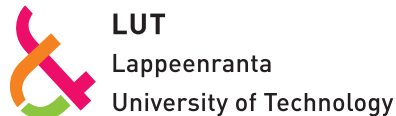
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## ABOUT OUR SPONSORS

The playbook team gratefully acknowledges generous support from **Tekes** and the **Lappeenranta University of Technology (LUT) in Finland**.



### TEKES

As the the Finnish Funding Agency for Technology and Innovation, Tekes is the most important publicly funded expert organization for financing research, development and innovation in Finland.

The agency boosts wide-ranging innovation activities in research communities, industry and service sectors. Tekes promotes a broad-based view on innovation: besides funding technological breakthroughs, Tekes emphasizes the significance of service-related, design, business, and social innovations.

Tekes works with the top innovative companies and research units in Finland. Every year, Tekes finances some 1,500 business research and development projects, and almost 600 public research projects at universities, research institutes and polytechnics.

Research, development and innovation funding is targeted to projects that create in the long-term the greatest benefits for the economy and society. Tekes does not derive any financial profit from its activities, nor claim any intellectual proprietary rights.

→ [www.tekes.fi/en](http://www.tekes.fi/en)

## LAPPEENRANTA UNIVERSITY OF TECHNOLOGY

Ever since its foundation in 1969, Lappeenranta University of Technology (LUT) has brought together technology and economics in a pioneering spirit. LUT's strategic focus areas are green energy and technology, the creation of sustainable competitiveness and operation as a hub of international Russian relations. LUT's international scientific community consists of 7,000 students and experts.

See more about Finland's greenest campus at  
→ [www.greencampus.fi/en](http://www.greencampus.fi/en)

## Lahti School of Innovation

A regional unit of LUT, Lahti School of Innovation (LSI) was established in 1996 as a multidisciplinary research unit focused on practice-based innovation. LSI applies a wide concept of innovation. Two goals are to break the traditional linear model of innovation and to overcome boundaries through intellectual cross-fertilization. The work of LSI is characterized by strong interaction between research and development activities.

Approximately 30 researchers and developers work together at LSI, representing the various disciplines of engineering sciences, business economics, education, social sciences, arts, theatre, and geography.

Fields of research include:

- Innovation systems, collective creativity, innovation policy
- Management of foresight knowledge
- Entrepreneurship, management and leadership, networks
- Service innovations
- Performance measurement, productivity and management accounting

LSI contributes actively to developing approaches, methodologies, and evaluation tools for introducing, applying and disseminating innovation practices and results of R&D activities in public, private and third sector organizations.

LSI's research and collaboration results are introduced in the book entitled *Practice-Based Innovation: Insights, Applications and Policy Implications* (Springer, 2012).

→ [www.lut.fi/lahti/en/](http://www.lut.fi/lahti/en/)



## ABOUT THE DEVELOPMENT TEAM

### **TAMARA CARLETON, PH.D.**

Tamara Carleton, Ph.D., is founder and chief executive of Innovation Leadership Board LLC, a global leader in the design of tools and processes that enable radical innovation. Client organizations have included Deutsche Bank, Microsoft, Samsung, SAP, Tekes, and Volvo.

Carleton currently serves as a fellow at the U.S. Chamber of Commerce Foundation, exploring themes of innovation and abundance that affect American growth and prosperity. Previously, she was a fellow with the Foundation for Enterprise Development and also a fellow for the Bay Area Science and Innovation Consortium.

Carleton teaches organizational innovation and foresight strategy in Stanford University's School of Engineering executive education program. Drawing on her business experience, Carleton's research agenda focuses on industry innovation, particularly issues related to technical visionary leadership,

innovation culture, regional innovation, and foresight strategy. This work builds on her pioneering study of the innovation practices of the U.S. Defense Advanced Research Projects Agency (DARPA).

A former management consultant at Deloitte Consulting LLP, Carleton specialized in emerging solutions in enterprise applications, customer experience, and marketing strategy. At Deloitte, she developed two proprietary methodologies, the Customer Experience Audit and Persona Design, which were incorporated into client service offerings.

Carleton holds a doctorate in mechanical engineering from Stanford University, a masters of science in public relations from Syracuse University, and a bachelor's degree in communication from The George Washington University. She has been published in a variety of technical journals, as well as the general business press. Most recently, Carleton edited the book *Sustaining Innovation: Collaboration Models for a Complex World*

(Springer, 2011) that explores emerging institutional models of sustainable innovation from multiple international viewpoints. She is frequently invited to discuss her work and research in the United States and abroad.

### **WILLIAM COCKAYNE, PH.D.**

William Cockayne, Ph.D., is a technology innovator and leader. He is the CEO and founder of Handstand Inc., which is an award-winning application developer of content, digital media, and educational products.

Previously, he held senior roles in technology research and product development at SK Telecom Americas, Eastman Kodak, DaimlerBenz, and Apple Computer. A seasoned entrepreneur, Cockayne was also co-founder and chief technology officer of Scout Electromedia, a consumer mobile company that pioneered mobile advertising, social media, and barcodes on mobile displays.

Cockayne brings his real-world experience to universities. He teaches emerging technologies and innovation

strategy in ME410, Innovation & Foresight, within the School of Engineering at Stanford University. Cockayne has also introduced new curricula in high-technology entrepreneurship for the tier-one research universities across Switzerland and also in digital modeling, virtual environments, and simulation (MOVES) at the Naval Postgraduate School in California.

Cockayne holds a doctorate in mechanical engineering and a masters of science in computer science. He is a regular speaker and advisor on topics of industrial research and development, disruptive innovation, and technology entrepreneurship. He holds multiple patents and has authored many publications, including the book *Mobile Agents* (Prentice Hall, 1998).

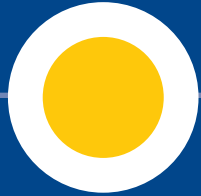
**ANTTI-JUSSI TAHVANAINEN, PH.D.**

Antti-Jussi Tahvanainen, Ph.D., has been part of the playbook development team as a senior researcher in the Lahti School of Innovation at Lappeenranta University of Technology in Finland and as a research scholar with the Center for Design Research, affiliated with the Foresight & Innovation lab, at Stanford University. His area of expertise lies in technology management and policy.

Since 2002, Tahvanainen has worked as a research economist at the Research Institute of the Finnish Economy (ETLA), conducting studies on entrepreneurship, technology transfer, national innovation systems, and other topics. In 2009,

Tahvanainen was closely involved in the international evaluation of the Finnish innovation system (InnoEval), commissioned by Finland's Ministry of Employment and the Economy.

Tahvanainen has taught bio-entrepreneurship, technology transfer, and foresight at the University of Helsinki, Aalto University, and the University of Tampere. He holds a doctorate in industrial engineering and management, specializing in strategy and international business, from Aalto University (Finland) and a M.Sc. in economics, technology management and policy from the Helsinki School of Economics (Finland).



## ABOUT OUR RESEARCH PARTNERS

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Vesa Harmaakorpi, D.Sc. (Tech.), is Dean of Faculty of Technology Management and a Professor of Innovation Systems in the Lahti School of Innovation at the Lappeenranta University of Technology in Finland. His research interests are innovation systems and processes, as well as innovation environments linked to regional development. Harmaakorpi is a pioneer in the research and development of practice-based innovation activities in Finland. His publication activities have been extensive, and he has also received international awards for his journal articles in 2006 and 2008.

### **TUIJA OIKARINEN, D.SC.**

Tuija Oikarinen, D.Sc. (Econ. & Bus. Adm.), works as a senior researcher in the Lahti School of Innovation at the Lappeenranta University of Technology in Finland. Her research interest is in organizational renewal studied from the viewpoints of organizational learning, practice-based innovation, and human resources management. Her background is in business life and entrepreneurship.

### **SAKU J. MÄKINEN, PH.D.**

Saku J. Mäkinen, Ph.D., is Professor of Technology and Innovation Management at Tampere University of Technology (TUT), Finland. Mäkinen was formerly with the Department of Marketing, Faculty of Business Administration, at the National University of Singapore. He received an M.Sc. in Electrical Engineering and a Ph.D. in Technology Strategy, both from TUT, Finland. He has widely published in international forums like *Technological Forecasting and Social Change* and *IEEE Transactions on Engineering Management* in the areas of his research interests, which include technology and innovation management, strategy, and technology and industry co-evolution.

### **PEKKA BERG, PH.D.**

Pekka Berg, holding a Ph.D. in innovation management, is Research Director of BIT (Business-Innovation-Technology) Research Centre of Aalto University, as well as the founder and director of the Innovation Management Institute under BIT.

Berg's research interests cover the examination of innovative operations and maturity methods at the following levels: the mechanisms of the national innovation systems, national research, development and technology programs and organizational innovation and R&D operation. The methods developed by Berg have been piloted in 15 national research and technology programs, which totaled 500 million euros. Information about approximately 400 enterprises in

Finland and abroad has been collected on the subject of improving the innovation activities of firms.

Previous research programs have studied the management of intangibles, rapid innovation practices, requirements for innovative environments, national innovation systems, and national R&D/technology programs.

Berg also teaches in several courses at Aalto University. His main courses are "Innovation and Project Management IPR" and "Collaborative Innovation Management CO-INNO".

Between 2000 and 2006, Berg was a member of the assessment group of the EU financed programme "Improvement of the Quality and Effectiveness of Education and Learning".



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## INTERNAL DEVELOPMENT

Parties interested in applying the methods for internal development, university teaching, or other purposes may refer to an online FAQ.

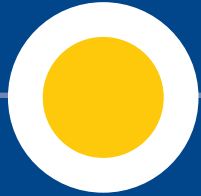
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## SUGGESTED READINGS

Over the years, we have used a wide variety of books, journal pieces, news articles, industry reports, multimedia, and other materials with business leaders and university students. Below is a brief selection for further reading and to complement your own efforts in foresight and long-term innovation. This list will evolve.

### FORESIGHT THINKING

**Wendell Bell (1996) *Foundations of Futures Studies: Human Science for a New Era (Volume I)*. Transaction Publishers.**

Bell is an eminent social scientist who accidentally became a futurist. The first of two volumes, this book offers extensive discussions of the social science justifications and history of pure foresight tools.

**Olaf Helmer (1983) *Looking Forward: A Guide to Futures Research*. Sage Publications.**

Helmer is best known for developing the Delphi survey technique and cross-impact analysis from his work at RAND Corporation. In this book, he reviews the concepts and methods of futures research, providing an overview of the field of futurism and foresight by one of the founding fathers.

**Jane Jacobs (1961) "The kind of problem a city is." from *The Death and Life of Great American Cities*. Vintage Books.**

In Jacobs' seminal urban studies book, the last chapter acts almost as an addendum that attempts to classify "the kind of problem a city is". Following her references you will understand the foundations of complex problem thinking at its nadir.

### PHASE I: PERSPECTIVE

**Gary Hamel and C. K. Prahalad (1994) *Competing for the Future*. Harvard Business School Press.**

This is "strategy 101" for the long range. The authors make a compelling and intellectual case about the importance of industry foresight. However, the book is missing clear recommendations about what to do before the vision setting or after the design stage.

**Peter Drucker (1998) "The discipline of innovation." *Harvard Business Review*. November-December, pp. 3-8.**

This article is an HBR classic. How much of innovation is inspiration, and how much is hard work? The answer lies somewhere in the middle, says Drucker. The article was originally adapted from his 1985 book *Innovation and Entrepreneurship: Practice and Principles*, which outlines several timeless recommendations on how to search for innovation.

## PHASE II: OPPORTUNITY

Neil Howe and William Strauss (2007) “The next 20 years: How customer and workforce attitudes will evolve.” *Harvard Business Review*. July-August, pp. 41-52.

Howe and Strauss are well-known social demographers. The ideas in this article have powered a collection of books that the two have published over the past two decades. Social and demographic data are often an underutilized source of foresight, and this article offers a compelling view of American generational cycles and the implications for business.

## PHASE III: SOLUTION

Royal Dutch Shell (2005) *The Shell Global Scenarios to 2025: The future business environment: Trends, trade-offs and choices*. Shell International Limited (SIL).

In 1971 in Europe, a team of planners within Royal Dutch Shell began using a new forecasting tool called “scenario planning” as part of the company’s long-range planning process. French futurist Gaston Berger had described the tool several years earlier in a French forecasting journal. The Shell team began using scenarios as an intermediary stage between forecasting and the company’s long-range planning process, and the first report proved pivotal to Shell’s future abilities to succeed during the 1970s OPEC oil crisis. The Shell 2025 report builds on its early scenario tradition.

Dan Roam (2009) *The Back of the Napkin: Solving Problems and Selling Ideas with Pictures*. Portfolio.

Drawing on twenty years of experience and the latest discoveries in vision science, Roam teaches readers how to clarify any problem or sell any idea using a simple set of tools. He shows that even the most analytical right-brainers can work better by thinking visually.

#### PHASE IV: TEAM

Thomas Kelley and Jonathan Littman (2005) *The Ten Faces of Innovation: IDEO's Strategies for Defeating the Devil's Advocate and Driving Creativity Throughout Your Organization*. Currency/Doubleday.

Tom Kelley helped IDEO grow from a small product design shop to a renowned innovation firm. Written with Jonathan Littman, Kelly's second book discusses the type of worker and the importance of team building, rather than the work environment, needed to build the right culture.

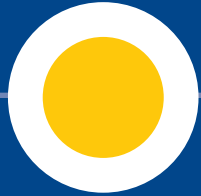
#### PHASE V: VISION

Belfiore, M. (2009). *The Department of Mad Scientists: How DARPA is Remaking Our World, From the Internet to Artificial Limbs*. Smithsonian Books / HarperCollins.

Belfiore offers an entertaining and informative introduction to DARPA, its culture, and inventions.

Chip Heath and Dan Heath (2007) *Made to Stick: Why Some Ideas Survive and Others Die*. Random House.

Good ideas often have a hard time succeeding, and the Heath brothers explain how to communicate ideas effectively so that people listen and care.



## DATA SOURCES: EMERGING TECHNOLOGIES

### TECHNOLOGY QUARTERLY

→ <http://www.economist.com/technology-quarterly/>

Published quarterly by the editors of *The Economist*, each special section covers emerging technologies in the context of the people, market uses, and potential businesses that may emerge. We like the online archive to find older articles, which capture the zeitgeist at that time.

### TECHNOLOGY REVIEW

→ [www.techreview.com](http://www.techreview.com)

Published by the Massachusetts Institute of Technology (MIT), *Technology Review* claims to be the oldest technology magazine in the world (est. 1899), aiming to “promote the understanding of emerging technologies and to analyze their commercial, social, and political impacts”. TR provides an easy way to follow new technology developments on the horizon and is a good source of technology-into-product narratives. The magazine is published monthly, and there are also licensed editions across the globe.

# DATA SOURCES: LOCATION & POPULATION

## **ECONOMIST INTELLIGENCE UNIT**

→ [www.eiu.com](http://www.eiu.com)

Affiliated with *The Economist* magazine, EIU provides ongoing historical analysis and forecasts for over 200 countries and 8 key industries, including medium- and long-term economic and business forecasts for 82 major markets. The reports are useful for the even-handed analysis, global outlook, and economic focus.

## **EUROSTAT**

→ <http://ec.europa.eu/eurostat>

Established in 1953, Eurostat is the Statistical Office of the European Union (EU) member states and related communities. Its task is to provide the EU with comparable statistics at the European level for policy purposes. Eurostat provides free access to all its databases and electronic publications.

## **ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT**

→ [www.oecd.org](http://www.oecd.org)

The OECD is another reliable source of comparable statistics and economic and social data. As well as collecting data, OECD monitors trends, analyses and forecasts economic developments and researches social changes or evolving patterns in trade, environment, agriculture, technology, taxation, and more across 100+ countries and economies. The website contains reports, publications, and statistics separated by country, department, and topic. The International Futures Programme was established in 1990 and analyzes long-term concerns to help governments better plan future strategies.

## **U.S. CENSUS BUREAU INTERNATIONAL DATA BASE**

→ [www.census.gov/population/international/data/idb](http://www.census.gov/population/international/data/idb)

Maintained by the U.S. Census Bureau, the International Data Base contains past, present, and future demographic data for 226 countries and areas of the world. It is a quick source of standardized population data. Of special interest may be the Population Pyramids that summarize past population trends and offer future projections by region.

# DATA SOURCES: FUTURE TRENDS

## GLOBAL BUSINESS NETWORK

→ [www.gbn.com](http://www.gbn.com)

Founded in 1987 and part of Monitor since 2000, GBN are scenario consultants. GBN collaborates with corporate, nonprofit, and governmental organizations to explore emerging uncertainties, understand rising risks and opportunities, and develop robust, adaptive strategies for the future.

## INSTITUTE FOR THE FUTURE

→ [www.iftf.org](http://www.iftf.org)

Founded in 1968, the IFTF is an independent nonprofit research group. The group provides ongoing forecasts and research reports on health and technology concerns to member institutions.

## PRICEWATERHOUSECOOPERS CENTER FOR TECHNOLOGY & INNOVATION

→ [www.pwc.com/us/en/](http://www.pwc.com/us/en/)

### technology-innovation-center

The PricewaterhouseCoopers (PwC) Center for Technology and Innovation (CTI) provides leading-edge research and analysis of technology trends and their effects on companies, industries, and markets. CTI is widely known for its technology forecast publications and briefings on technology trends.

# DATA SOURCES: FINLAND

## **ETLA, THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY**

→ [www.etla.fi](http://www.etla.fi)

Established in 1946, ETLA is the leading private economic research organization in Finland. ETLA carries out research on economics, business and social policy as well as makes economic forecasts. Publications may be ordered online for a fee.

## **FINNISH SCIENCE AND TECHNOLOGY INFORMATION SERVICE**

→ [www.research.fi](http://www.research.fi)

This portal contains key statistics and other data on Finnish science and technology. There are also links for more in-depth information, including statistical and other publications, documents and databases, that are categorized into four general categories: resources, performance, research environments, and viewpoints.

## **NATIONAL BOARD OF PATENTS AND REGISTRATION OF FINLAND (NBPR)**

→ [www.prh.fi](http://www.prh.fi)

Beyond patent searches, NBPR is a great source for general company information, such as balance sheet information, annual reports, historical data, and more.

## **POPULATION RESEARCH INSTITUTE**

→ [www.vaestoliitto.fi/in\\_english/population\\_research\\_institute/](http://www.vaestoliitto.fi/in_english/population_research_institute/)

The Population Research Institute carries out research on Finnish couple relationships, family formation, sexuality, and immigrants' everyday life and integration into the Finnish society. The research produces information for the use of media, adult education, researchers, and social and health care professionals as well as for Väestöliitto's advocacy work.

## **STATISTICS FINLAND**

→ [www.stat.fi/index\\_en.html](http://www.stat.fi/index_en.html)

Statistics Finland is the national statistical institution in Finland founded federal authority provides information about the country's demographics, mass media usage, education, households, and other topic areas. Many studies are free.

## **TEKES**

→ [www.tekes.fi](http://www.tekes.fi)

Tekes is the national funding agency for technology and innovation in Finland. Every year Tekes publishes dozens of reports and reviews about the latest developments in research, technology, and innovation in Finland. Tekes also maintains an image bank for journalists and an extensive presentation library, which offers short presentations about Tekes activities and the Finnish innovation environment. All Tekes publications are free of charge.

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[www.lut.fi/innovation](http://www.lut.fi/innovation)  
[foresight.stanford.edu/playbook](http://foresight.stanford.edu/playbook)  
[www.innovation.io/playbook](http://www.innovation.io/playbook)

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