Unlocking Functional Performance through Materials Innovation

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What to Expect

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> " "
>
> A lot of times, people don't know what they want until you show it to them.

Steve Jobs

> " "
>
> If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask.

Albert Einstein

> " "
>
> If I had asked people what they wanted, they would have said faster horses.

Henry Ford

> " "
>
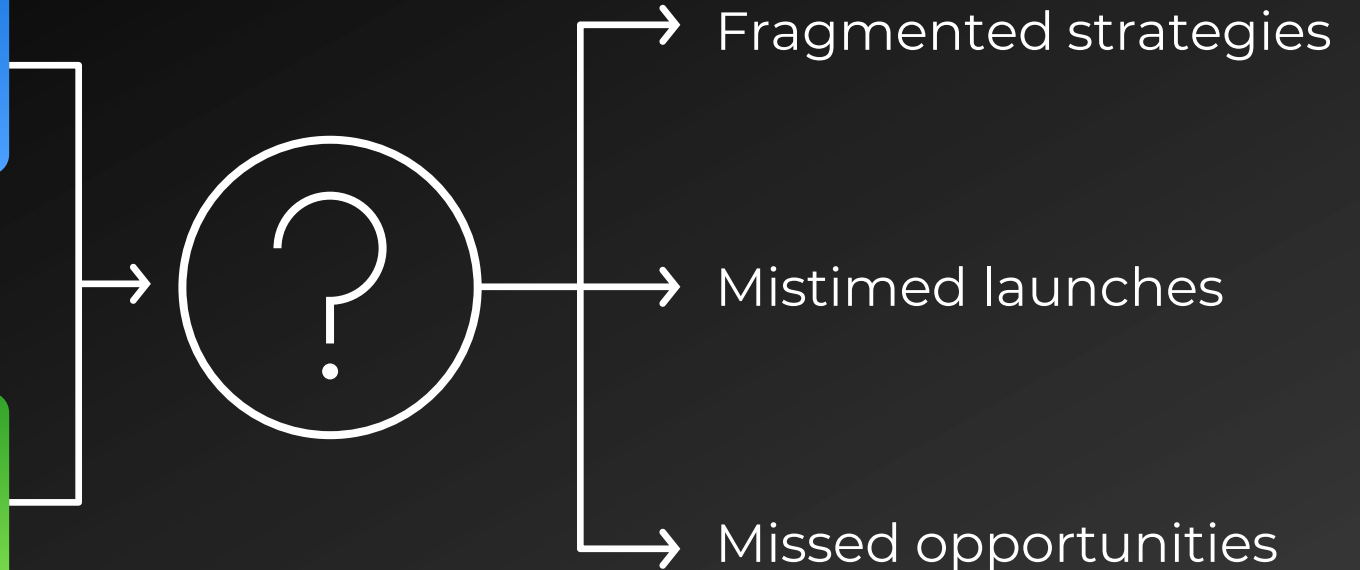> The mission of a manufacturer is to create products that bring happiness to people.

Matsushita Konosuke

The innovation dilemma

Technologies race ahead, but *people* can't fit them in their lives.
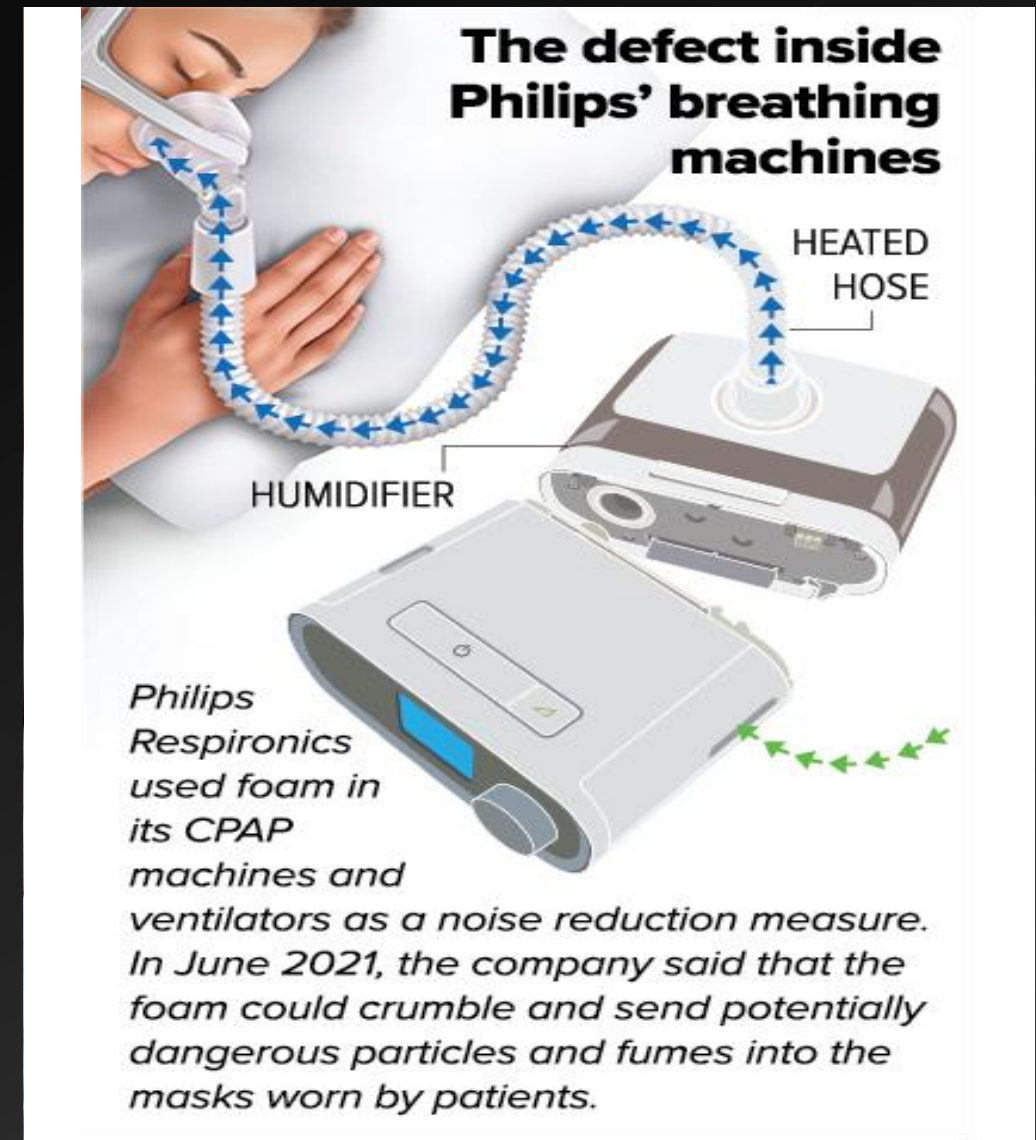
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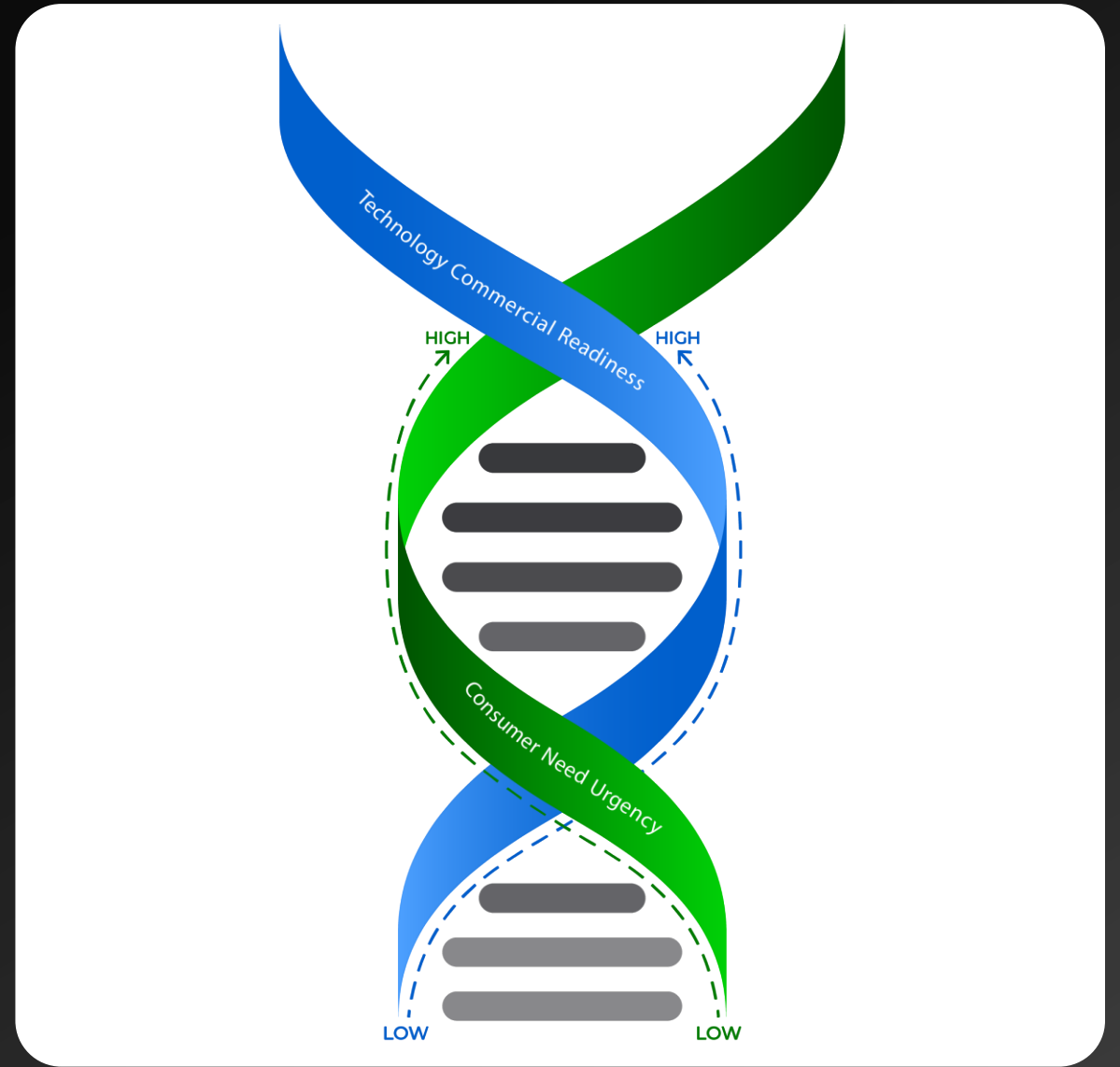**Consumers** signal needs, but *solutions* arrive too late, or never.

?

→ Fragmented strategies

→ Mistimed launches

→ Missed opportunities

Breakthroughs exist. But, without people, they fail.

The defect inside Philips' breathing machines

HEATED HOSE

HUMIDIFIER

Philips Respironics used foam in its CPAP machines and ventilators as a noise reduction measure. In June 2021, the company said that the foam could crumble and send potentially dangerous particles and fumes into the masks worn by patients.

The Lux Innovation Helix

The value of the Helix

Bridging human demand and technology readiness to make innovation inevitable, not accidental.

Executives
Cut thought the noise to reveal where growth will land.

R&D & Technology
Align pipelines with urgent consumer needs.

Consumer Insights
Turn human signals into influence over what gets built.

Structured, three-step process

1

Decode the consumer strand

Identify unmet needs through the Jobs-to-be-Done lens.

Prioritize those needs based on urgency.

2

Decode the technology strand

Pinpoint which technologies are most capable of solving those needs today, and tomorrow.

Prioritize those technologies based on readiness.

3

Create the bonds

Quantify the alignment of each need with each technology.

Identify the bonds with the highest alignment score, and map the clusters.

Step 1

Decode the consumer strand

Step 1. Decode the consumer strand

Jobs-to-Be-Done Framework

- Focuses on the task people want to accomplish.

- Reveals needs and frustrations — why current solutions fall short, and what people actually expect.

- Drawn from 50K–150K+ consumer reviews, decoded by anthropologists using predictive anthropology.

Why?

To give companies a clear, evidence-based roadmap to build more relevant, competitive, and valuable offerings.
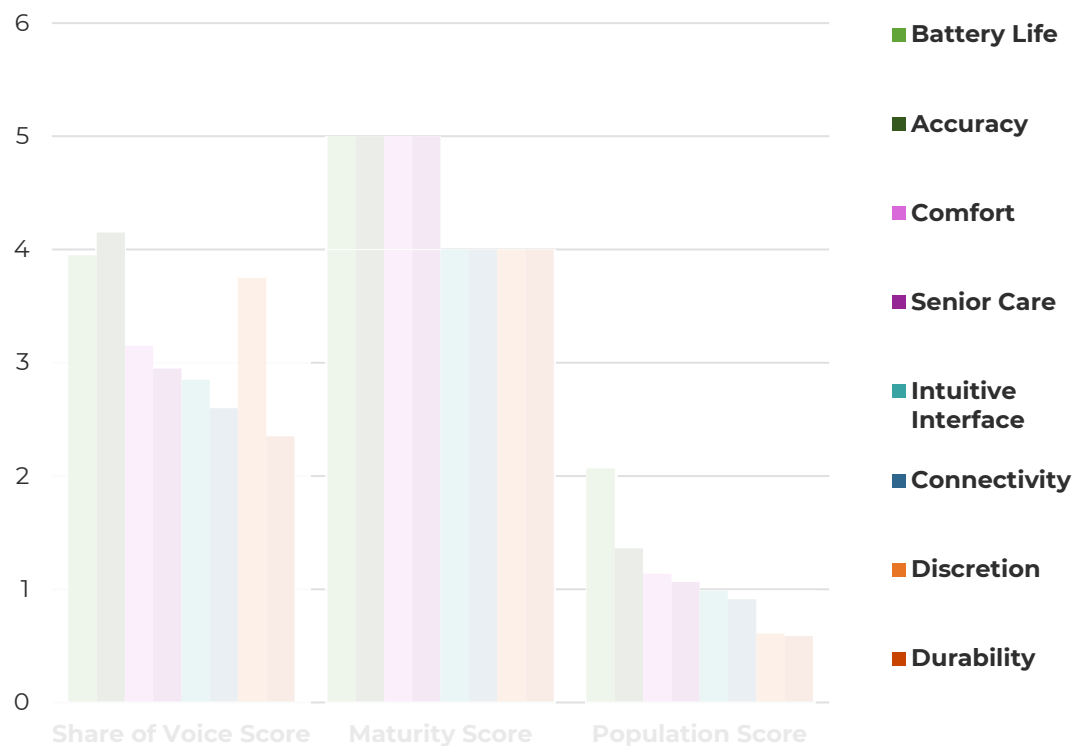
" "
At first, the battery lasts well, but after a couple of years or so, I feel let down. I don't need many features, just something simple and reliable for the long term.
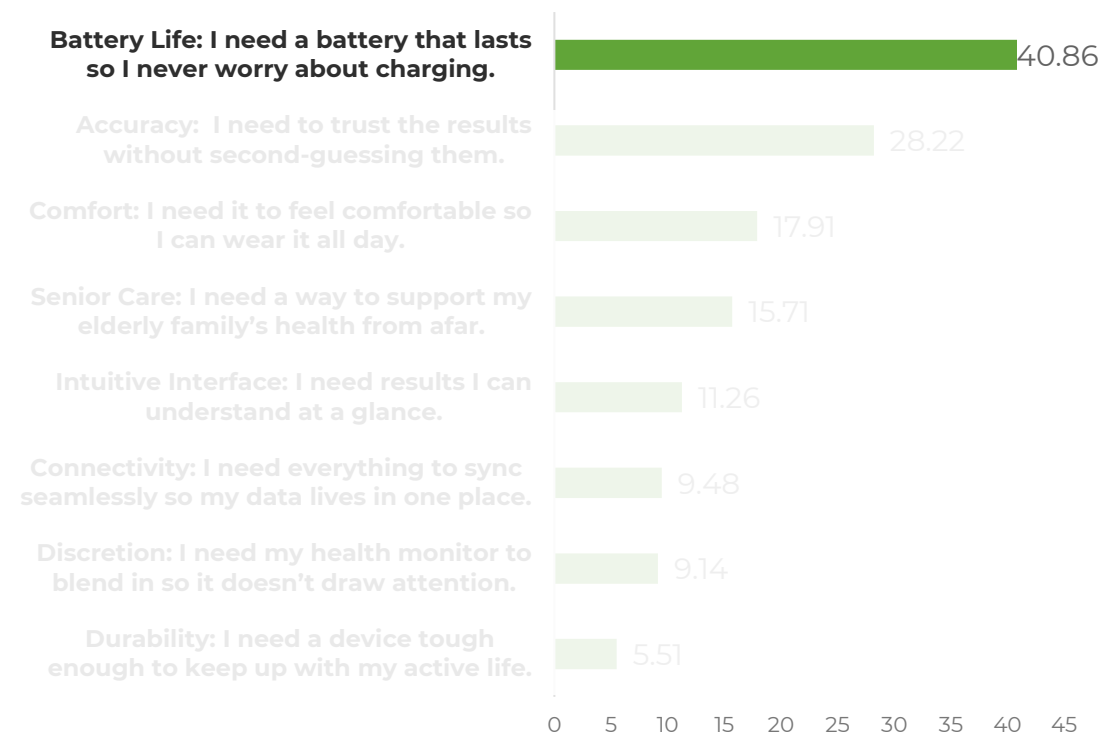
" "
I want to wear it for my health, but when my skin gets irritated or starts smelling bad, it makes me hesitate to keep wearing it.

Prioritize consumer needs by urgency

Breaking Down the Formula of Needs Urgency

Legend:
- Battery Life
- Accuracy
- Comfort
- Senior Care
- Intuitive Interface
- Connectivity
- Discretion
- Durability

X-axis: Share of Voice Score, Maturity Score, Population Score

Consumer Needs, Prioritized by Urgency

- **Battery Life: I need a battery that lasts so I never worry about charging.** — 40.86
- Accuracy: I need to trust the results without second-guessing them. — 28.22
- Comfort: I need it to feel comfortable so I can wear it all day. — 17.91
- Senior Care: I need a way to support my elderly family's health from afar. — 15.71
- Intuitive Interface: I need results I can understand at a glance. — 11.26
- Connectivity: I need everything to sync seamlessly so my data lives in one place. — 9.48
- Discretion: I need my health monitor to blend in so it doesn't draw attention. — 9.14
- Durability: I need a device tough enough to keep up with my active life. — 5.51

Step 2

Decode the technology strand

Step 2: Decode the technology strand

Prioritize by tech readiness

Each technology is further assessed for readiness based on:

Stage of development: Classified as concept, lab, development, introduction, or scale

Developer landscape: The number and maturity of active players, with more mature companies scoring higher

Time to scale: If not yet scaled, the estimated time to reach that stage, determined by Lux analysts.

Technologies, Prioritized by Readiness for Product Integration Today
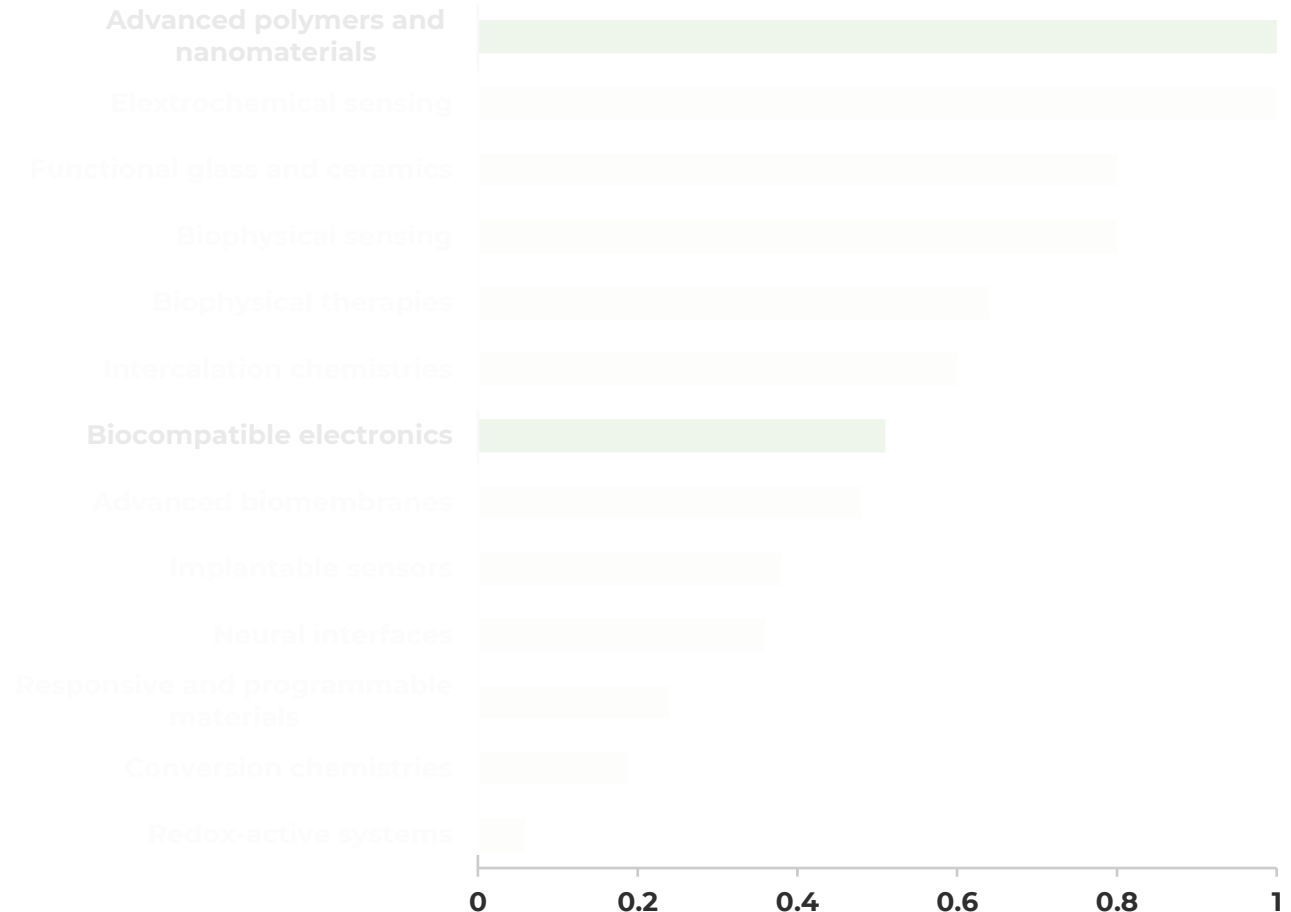
Step 3

___

Create the bonds

Step 3. Create the bonds

	Battery Life	Accuracy	Comfort	Senior Care	Intuitive Interfaces	Connectivity	Discretion	Durability
Advanced polymers and nanomaterials								
Electromagnetic sensing								
Functional glass and ceramics								
Biophysical sensing								
Biophysical therapies								
Intercalation chemistries								
Biocompatible electronics and surfaces								
Advanced biomembranes								
Implantable sensors								
Neural interfaces								
Responsive and programmable materials								
Conversion chemistries								
Redox-active systems								

Step 3. Create the bonds

Need Urgency
Prioritized from left to right

Tech Readiness
Prioritized from top to bottom

Bond Creation
Clusters are discovered to pinpoint innovation needs and potential

Legend: | 5 | 4 | 3 | 2 | 1 |

Note: 5 denotes the strongest alignment and, hence, bond.
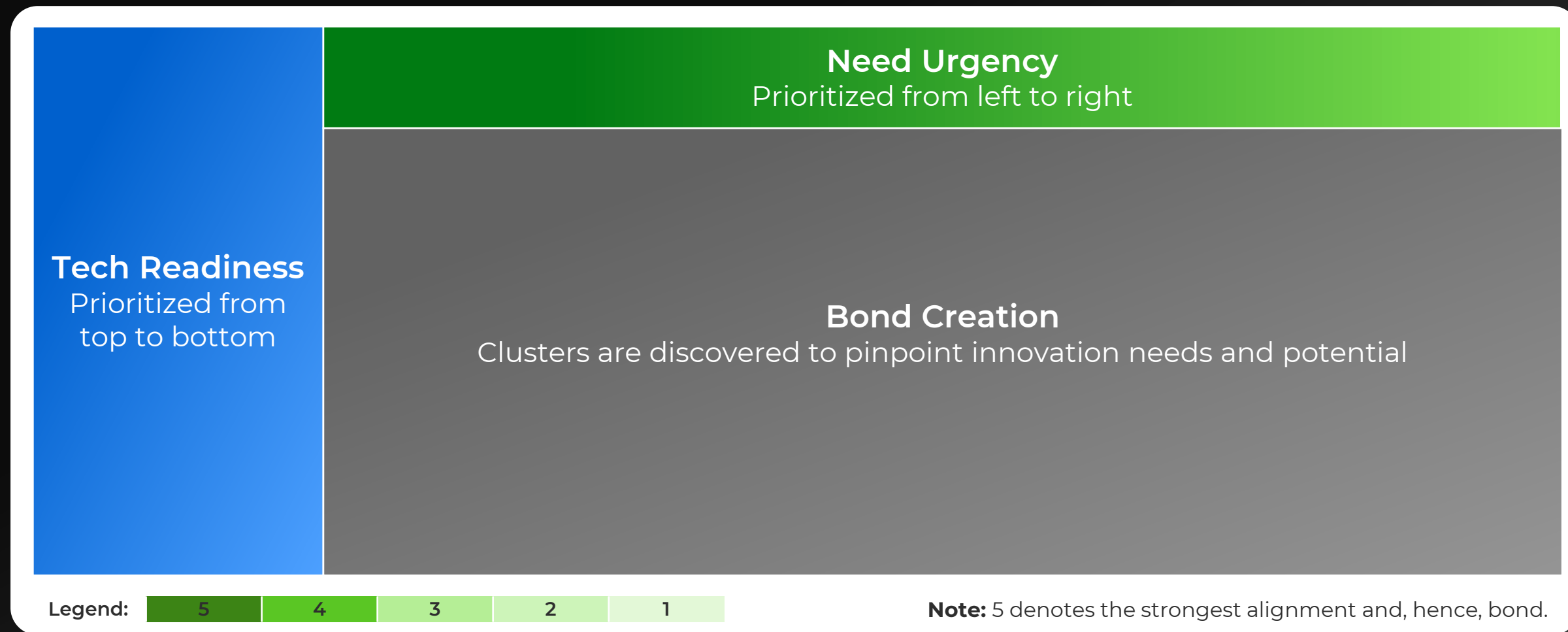
You're here to know where YOUR innovation will land — and when

Executives

Dilemma: Strategic paralysis

The Lux Innovation Helix: Cuts through noise to reveal where growth will land.

R&D & Technology

Dilemma: Staying relevant

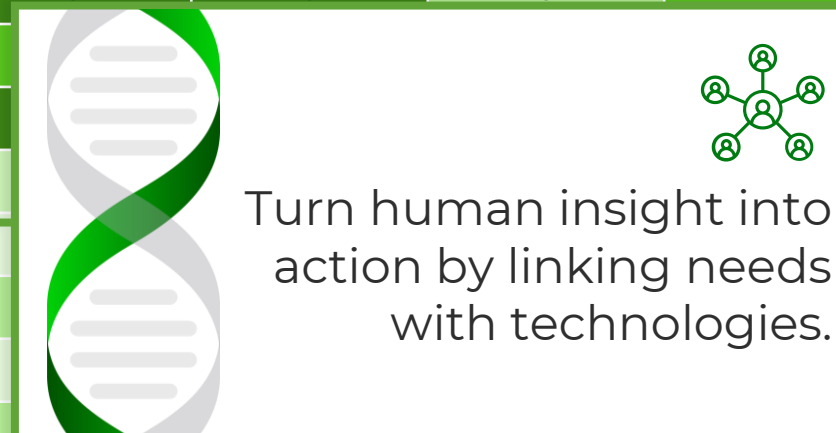The Lux Innovation Helix: Aligns pipelines with urgent consumer needs.

Consumer Insights

Dilemma: Too far from innovation

The Lux Innovation Helix: Translates human signals into bonds that shape what gets built.

Insights Team: From passenger to pilot

	Battery Life	Accuracy	Comfort	Senior Care	Intuitive Interfaces	Connectivity	Discretion	Durability
Advanced polymers and nanomaterials	4	5	5	4	2	2	5	5
Electromagnetic sensing	3	5	3	5	5	5	3	4
Functional glass and ceramics	4	3	3	3				
Biophysical sensing	3	5	3	5				
Biophysical therapies	1	3	2	5				
Intercalation chemistries	5	2	1	2				
Biocompatible electronics and surfaces	3	4	5	4				
Advanced biomembranes	3	4	4	5				
Implantable sensors	1	5	2	4				
Neural interfaces	1	3	2	3	5	4	2	2
Responsive and programmable materials	3	4	4	3	4	2	5	2
Conversion chemistries	5	2	1	2	1	2	1	3
Redox-active systems	5	2	1	2	1	2	1	4

Turn human insight into action by linking needs with technologies.

R&D Team: From tech first to opportunity led

	Battery Life	Accuracy	Comfort	Senior Care	Intuitive Interfaces	Connectivity	Discretion	Durability
Advanced polymers and nanomaterials	4	5	5	4	2	2	5	5
Electromagnetic sensing	3	5	3	5	5	5	3	4
Functional glass and ceramics	4					2	2	5
Biophysical sensing	3					5	4	2
Biophysical therapies	1					1	2	1
Intercalation chemistries	5					2	1	4
Biocompatible electronics and surfaces	3					5	5	4
Advanced biomembranes	3					1	5	3
Implantable sensors	1					5	5	3
Neural interfaces	1	3	2	3	5	4	2	2
Responsive and programmable materials	3	4	4	3	4	2	5	2
Conversion chemistries	5	2	1	2	1	2	1	3
Redox-active systems	5	2	1	2	1	2	1	4

Identify urgent consumer needs that your technology can address.

Executive Team: From noise to clarity

	Battery Life	Accuracy	Comfort	Senior Care	Intuitive Interfaces	Connectivity	Discretion	Durability
Advanced polymers and nanomaterials	4	5	5	4	2	2	5	5
Electromagnetic sensing	3	5	3	5	5	5	3	4
Functional glass and ceramics	4	3	3	3	4	2	2	5
Biophysical sensing	3	5	3	5				
Biophysical therapies	1	3	2	5				
Intercalation chemistries	5	2	1	2				
Biocompatible electronics and surfaces	3	4	5	4				
Advanced biomembranes	3	4	4	5				
Implantable sensors	1	5	2	4				
Neural interfaces	1	3	2	3				
Responsive and programmable materials	3	4	4	3	4	2		2
Conversion chemistries	5	2	1	2	1	2	1	3
Redox-active systems	5	2	1	2	1	2	1	4

Uncover clusters of opportunities.

How to use the Lux Innovation Helix

New Product Creation

Purpose:
Solve unmet consumer needs with ready-now tech

Example:
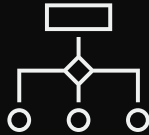Continuous blood pressure monitor

Product Enhancement

Purpose:
Target consumer needs with highest urgency

Example:
Enhancing battery life in health devices

Repositioning Capabilities

Purpose:
Align underused R&D assets with emerging needs

Example:
Antimicrobial coating, waterproof health sensors

Discovering Adjacencies

Purpose:
Apply proven tech from one sector to another

Example:
Industrial membranes → at-home biosensors

Portfolio Prioritization

Purpose:
Focus resources where adoption likelihood is highest

Example:
Prioritize aesthetics for noninvasive diagnostics

Foresight

Purpose:
Anticipate market disruptions and shifts before anyone else

Example:
Time your innovation & new product launches

Technology-centric roadmaps are over.

The future of innovation starts with human insight.

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Key Takeaways

1

Breakthroughs exist, but without people, they fail.

Despite constant breakthroughs, innovation often fails because it arrives mistimed, fragmented, or disconnected from what consumers truly need.

2

The Lux Innovation Helix as a strategic framework.

The Helix transforms innovation from a series of accidental successes into an inevitable, repeatable process by identifying where growth will land.

3

Putting the Helix into practice: Self-monitoring health devices.

By decoding consumer needs and aligning them with emerging materials technologies, Lux identified clear innovation clusters to focus on in an evidence-based way.

Lux Client Action Items

1 | **Engage with the Lux Innovation Helix.**

Uncover where human needs and technological capabilities reinforce each other — the intersections where innovation has both market pull and technical feasibility.

2 | **Set clear priorities.**

Decide where to act immediately, where to invest for long-term growth, and where to adjust direction — turning scattered possibilities into focused, evidence-based action.

3 | **Align teams around a common framework.**

Unite executives, R&D, and consumer insights under one shared language — a genetic code for growth that ensures every decision draws from the same foundation.

4 | **Measure, learn, and evolve.**

Use Helix cycles to track outcomes, validate assumptions, and feed new insights back into the model — making your innovation strategy not just aligned, but adaptive and resilient.

Thank You

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About Lux

Lux Research fuels innovators to not only imagine what's possible in the future but also operationalize innovation success in the near term. We deliver research and advisory services to inspire, illuminate, and ignite innovative thinking that reshapes and grows businesses. Using quality data derived from primary research, fact-based analysis, and opinions that challenge traditional thinking, our experts focus on finding truly disruptive innovations that are also realistic and make good business sense.

The "Lux Take" is trusted by innovation leaders around the world, many of whom seek our advice directly before placing a bet on a startup or partner — our clients rely on Lux insights to make decisions that generate fantastic business outcomes. We pride ourselves on taking a rigorous, scientific approach to avoid the hype and generate unique perspectives and insights that innovation leaders can't live without.

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