WHY YOU NEED TO STOP MAKING TECHNOLOGY ROADMAPS

And What to Do Instead

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Chief Product Officer

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Senior Consultant

YOUR ROADMAP FOR TODAY

1. Exploring the valley
2. Finding companions
3. Reaching the summit

YOUR ROADMAP FOR TODAY

How do you improve conversion of R&D into revenue?

THE INFAMOUS FUNDING GAP

Since 2007, we have the notion of the Valley of Death of innovation.

Promising inventions are not funded for further development and deployment.

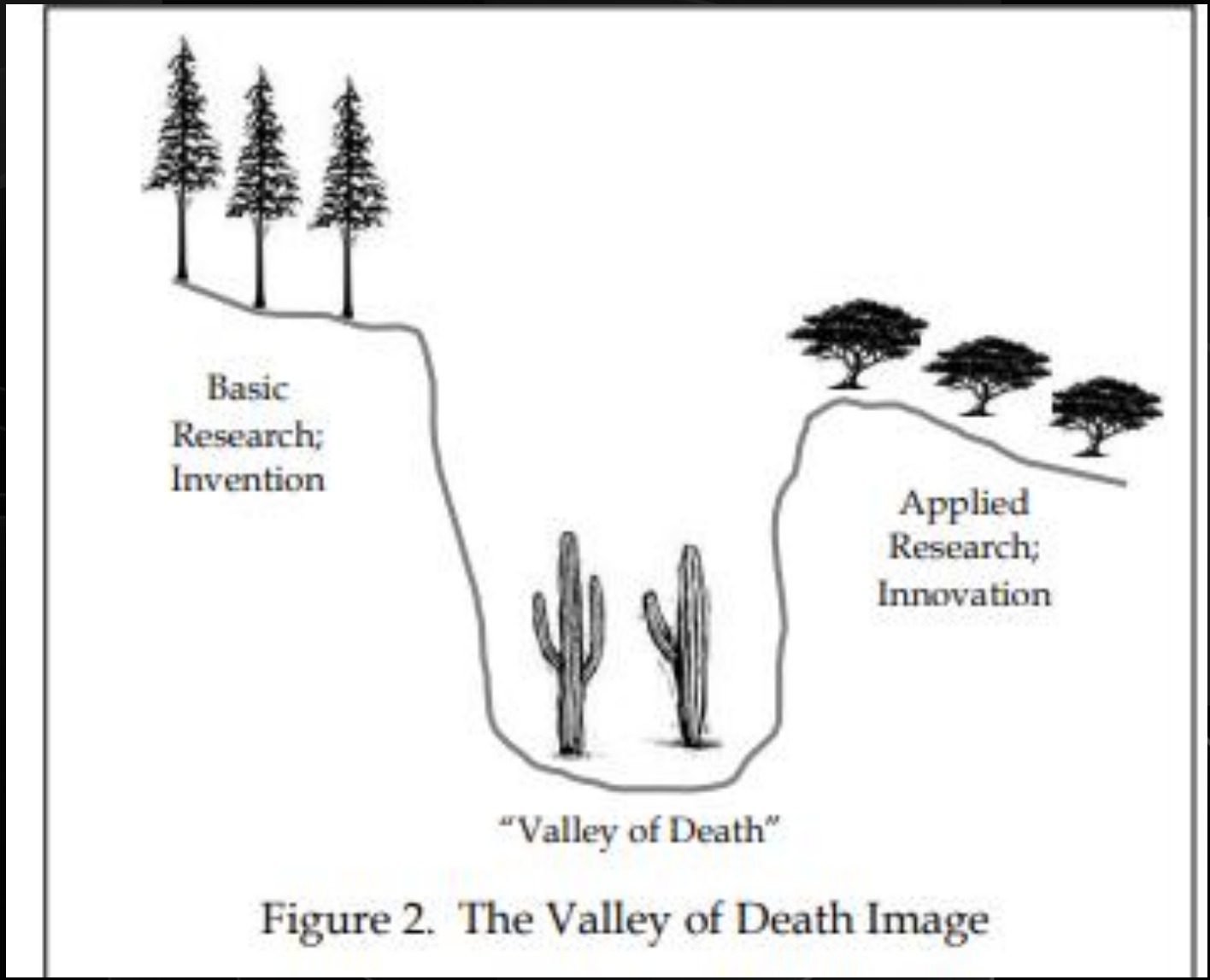


Figure 2. The Valley of Death Image

Figure from G.S. Ford et al., A valley of death in the innovation sequence: an economic investigation, Phoenix center, September 2007

THE INFAMOUS FUNDING GAP

The original study also found the reason: funding noneconomic projects at an early stage.

Note: This is not about technology risks in Stage 1.

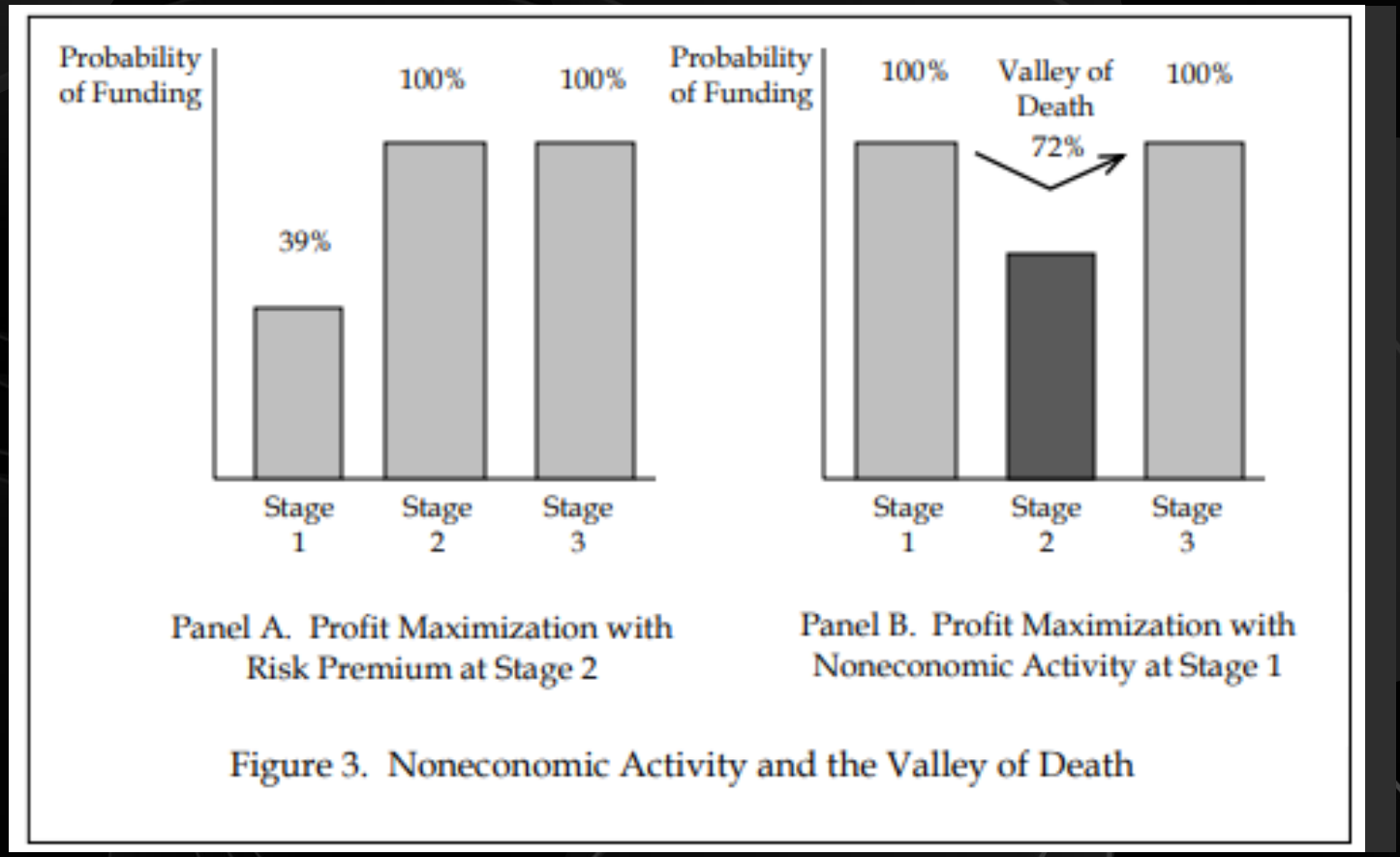
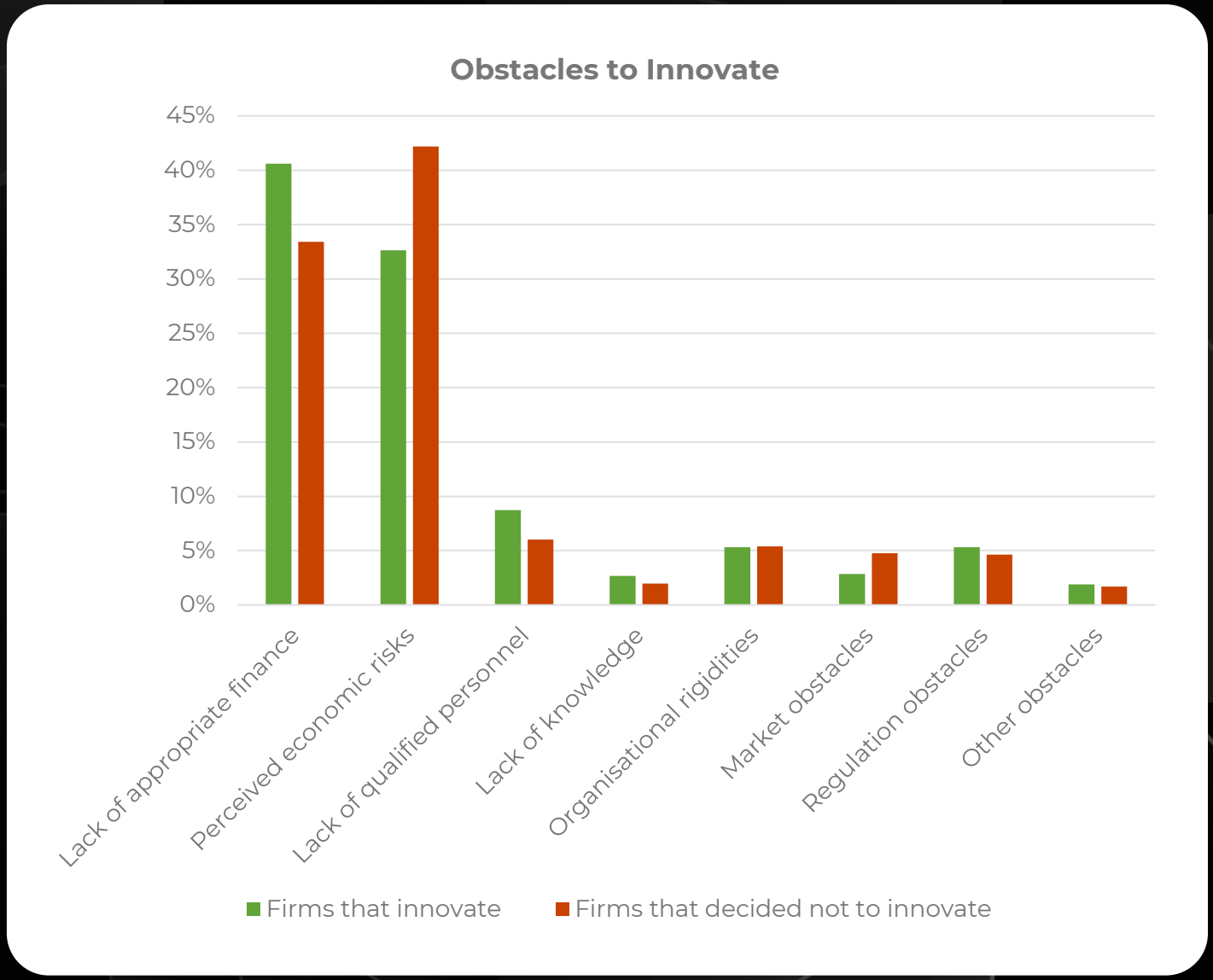


Figure 3. Noneconomic Activity and the Valley of Death

Figure from G.S. Ford et al., A valley of death in the innovation sequence: an economic investigation, Phoenix center, September 2007

PERCEPTION IS KING

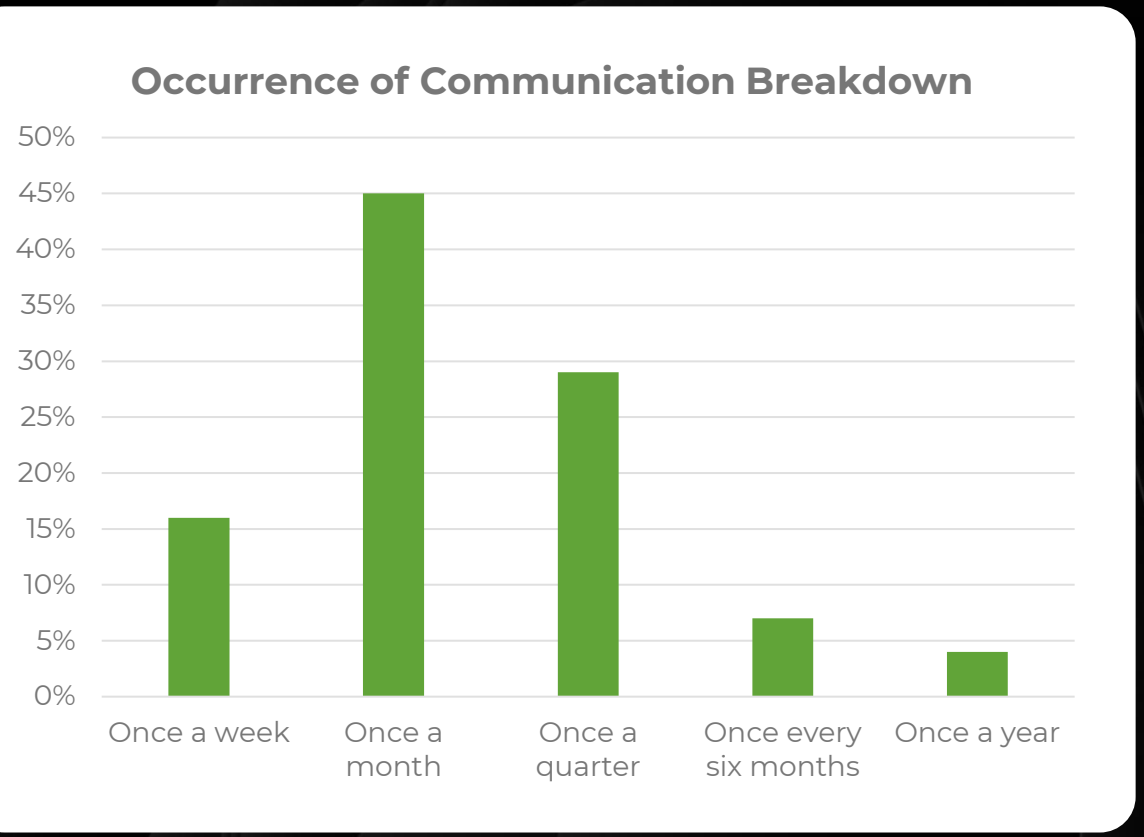
A recent survey of industrial firms shows that risk perception is the main reason not to pursue innovations.

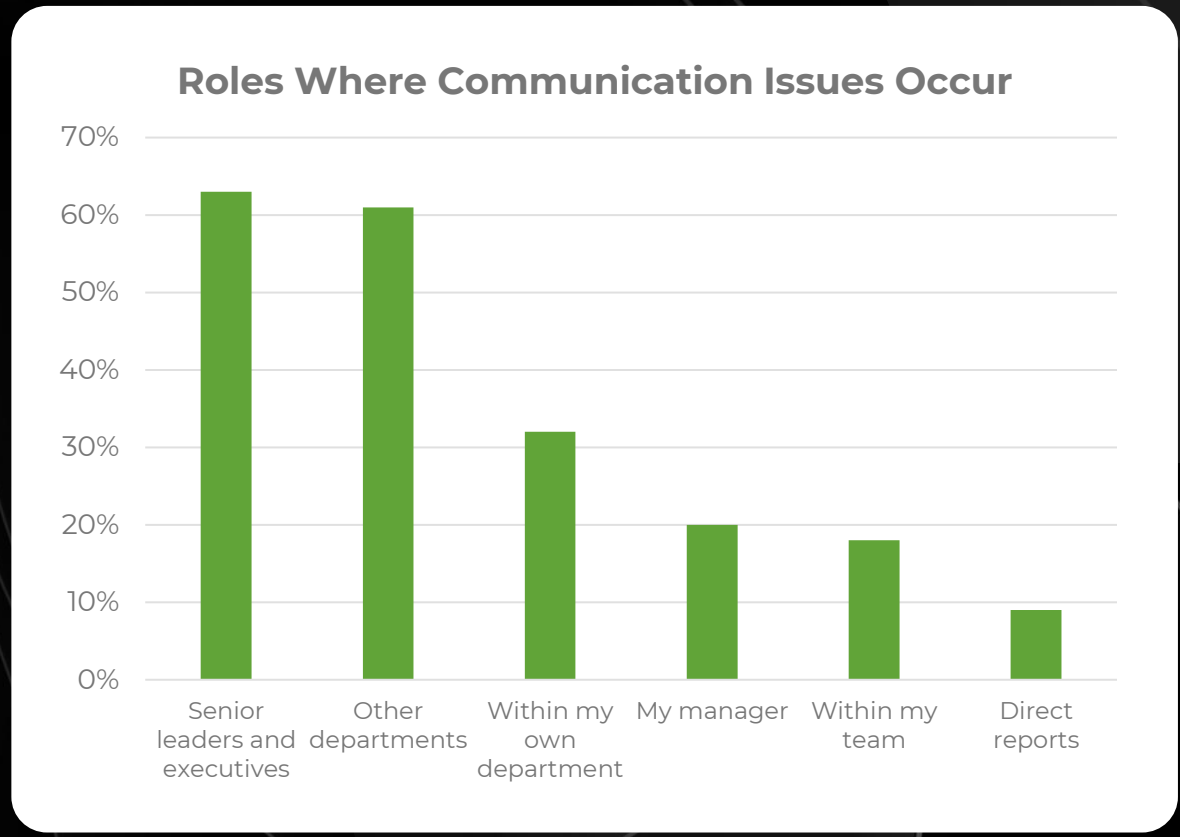


Data source: Francesco Aiello et al., Barriers to innovation and patenting, .Evidence from European family and non-family firms, *Journal of Economic Studies*, March 2025, pp. 18–35

COMMUNICATION IS KEY

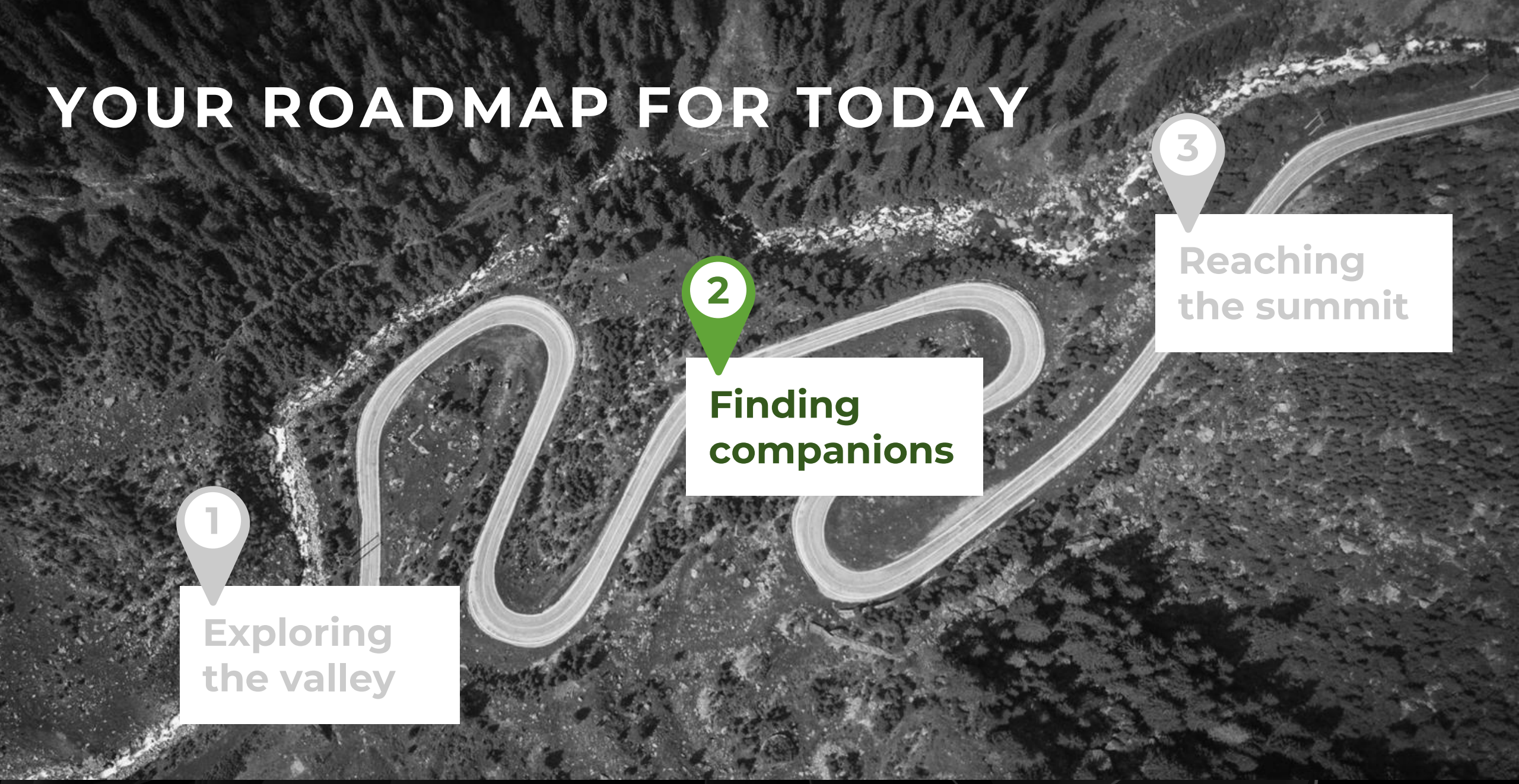
Aligning on the goal and value of innovation is a major concern





Data source: Doug William, The Role of Communication in Successful Innovation, IX Research survey Q3 2013

YOUR ROADMAP FOR TODAY



MORE THAN TECHNOLOGY

Lux Research's innovation maturity indicator looks at five aspects that must converge to allow the first-of-a-kind (FOAK) investment decision.

TRL is just one of them.

WHAT'S NOT THERE…

Product: What need are you trying to fulfill with ICVs and when?

Market organization: How do laws and insurance keep up with developments?

Market readiness: Which groups of buyers should you address and when?

Production: How will the value chain develop?

Intelligent and Connected Vehicles Roadmap

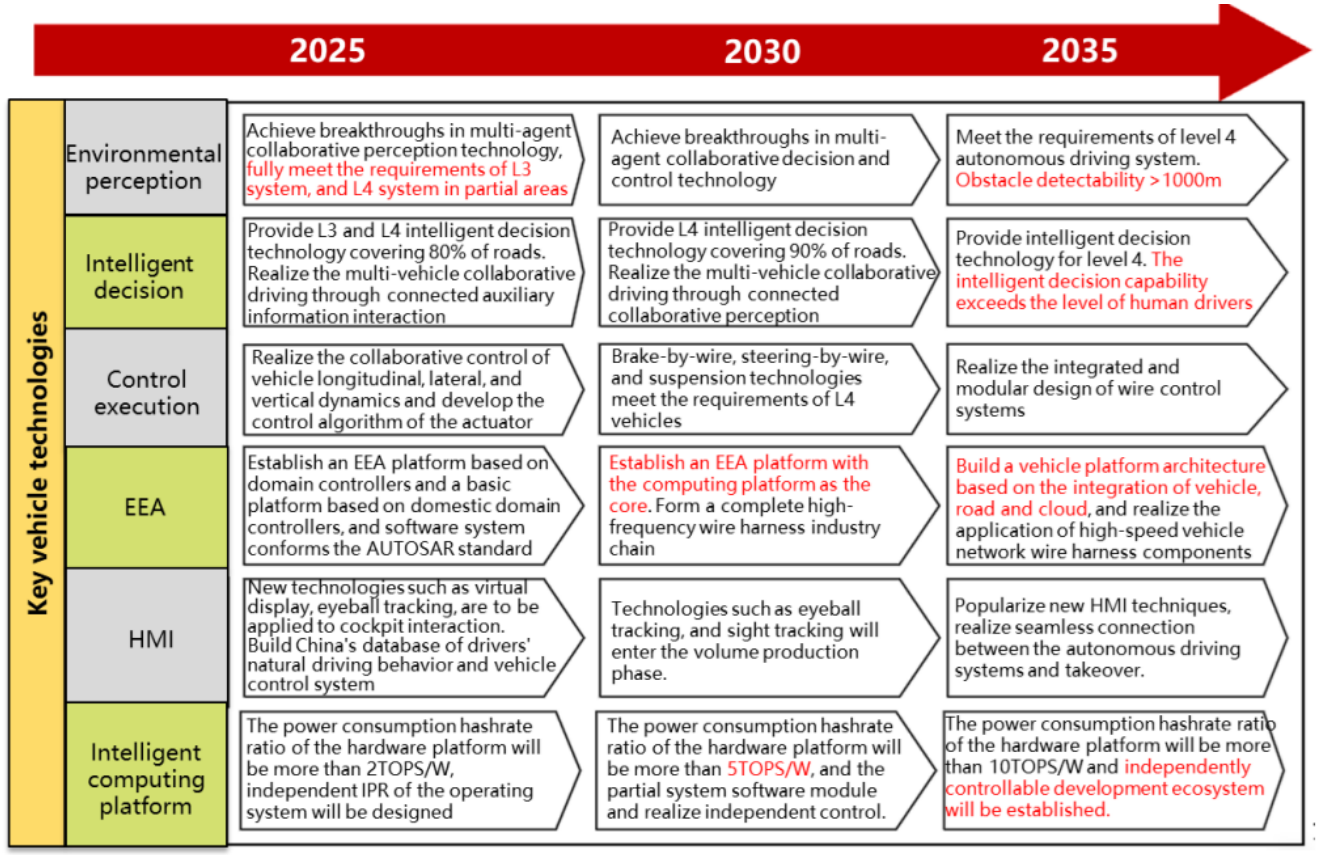
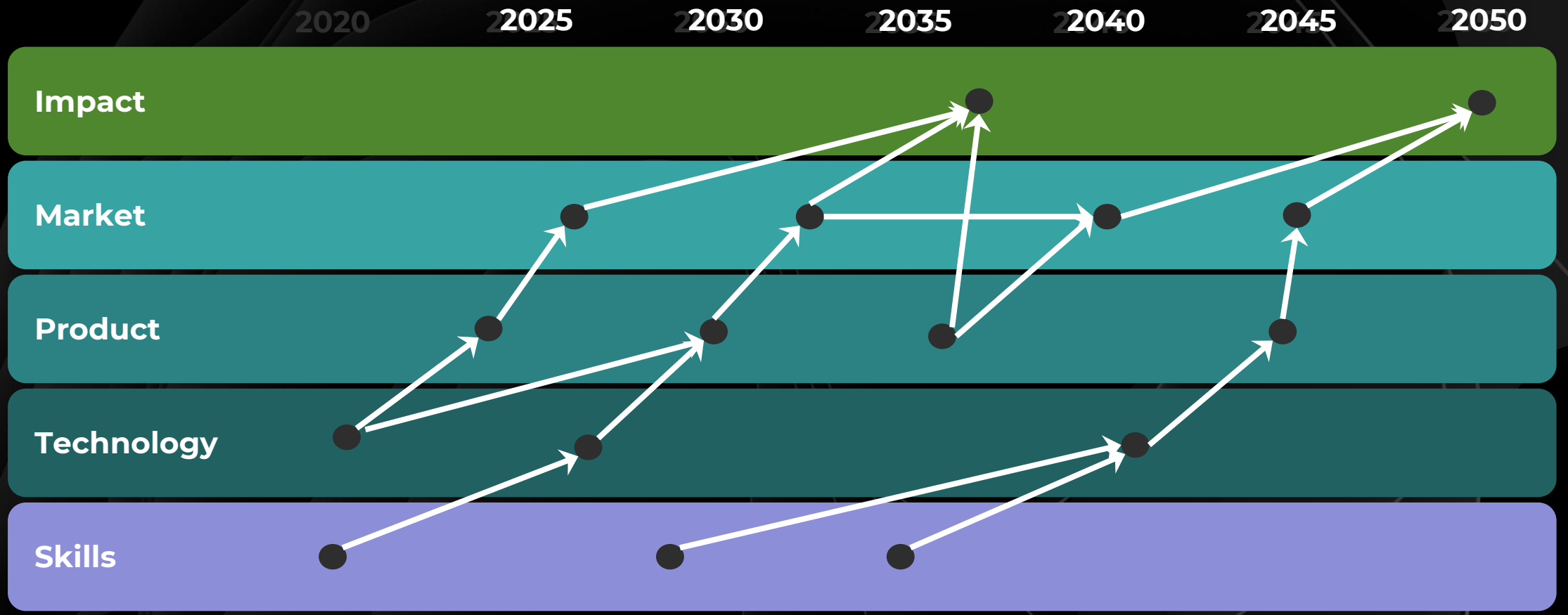


Image: ICV Roadmaps, a worldwide perspective

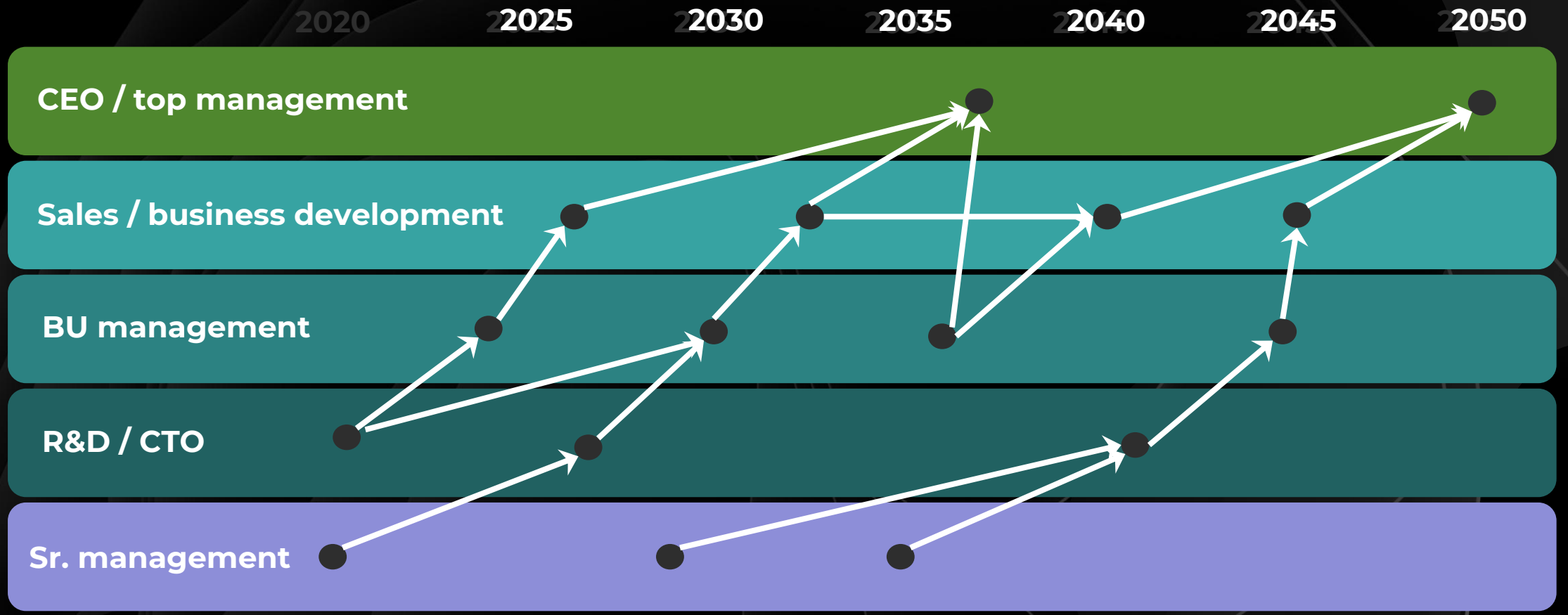
LAYERED STRATEGY ROADMAPS

Rather than focusing on technology, take an integrated approach



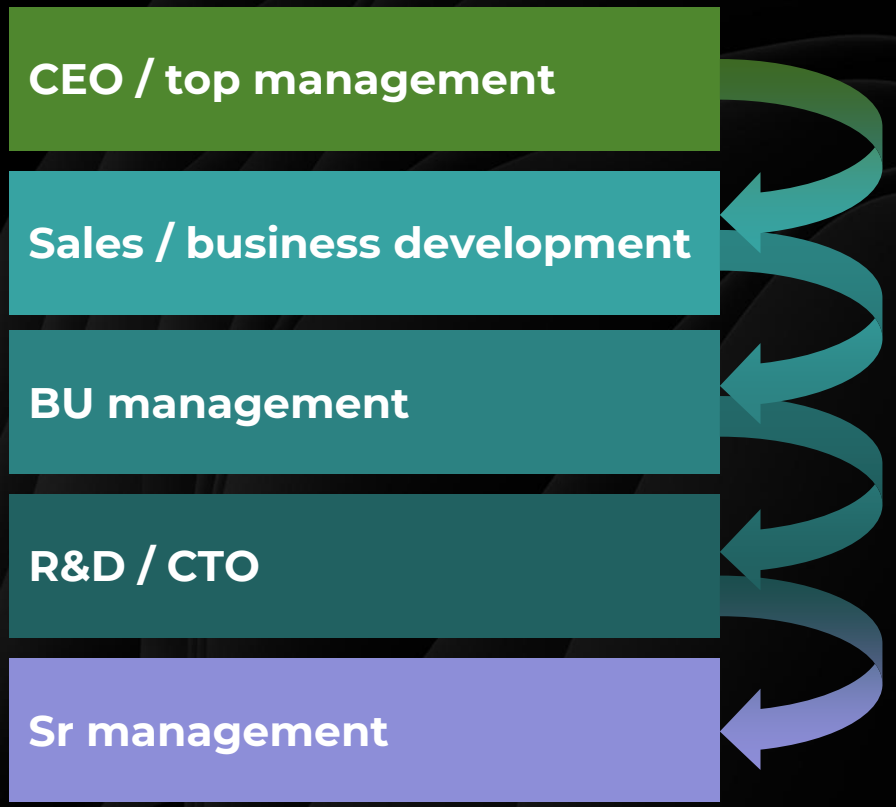
A PLATFORM FOR COMMUNICATION

Involve all stakeholders at the right level and time



POSING THE RIGHT QUESTIONS

Backcasting the strategy by articulating the right questions



Where should we grow, given our strategy?

What products can we develop to enter?

What new functionality or improvements should we offer?

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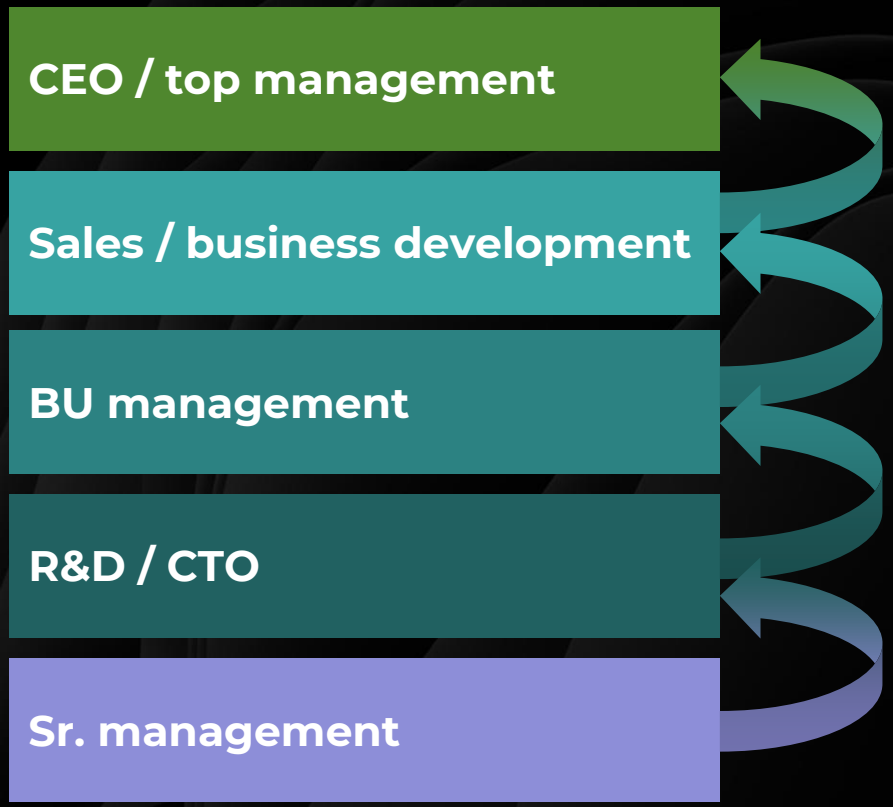
PROVIDING RELEVANT ANSWERS

A productive dialogue to make coherent choices

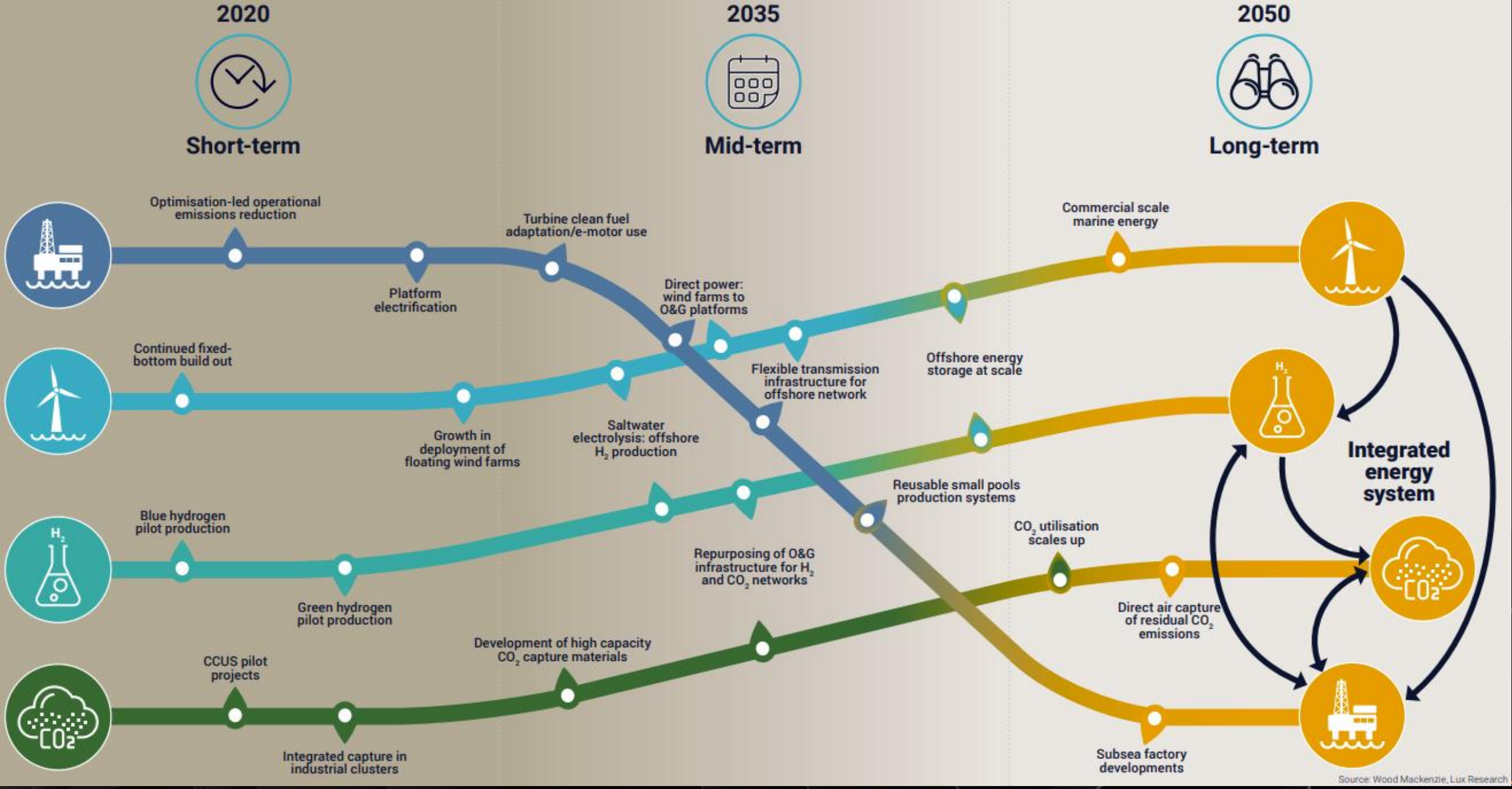


Adjacent business opportunities to develop

New product launches, new manufacturing assets

R&D proposal, venture investments, partners

New skills and assets for the future



Source: Closing the gap, technology for a net-zero North Sea, Wood MacKenzie and Lux Research for the Net Zero Technology Centre

YOUR ROADMAP FOR TODAY

START BY LAYING THE FOUNDATION

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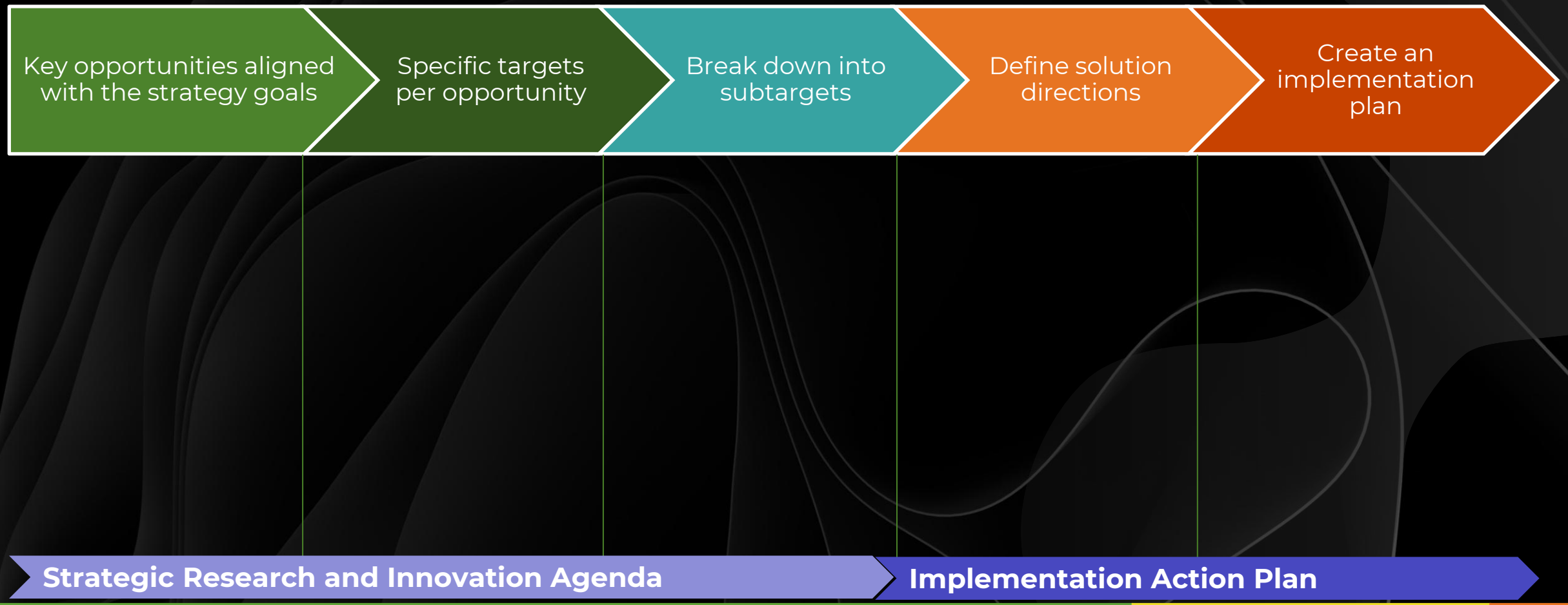
TWO DECISIONS, FIVE STEPS

Establish a strategic agenda first, then define the actions



TWO DECISIONS, FIVE STEPS

Establish a strategic agenda first, then define the actions

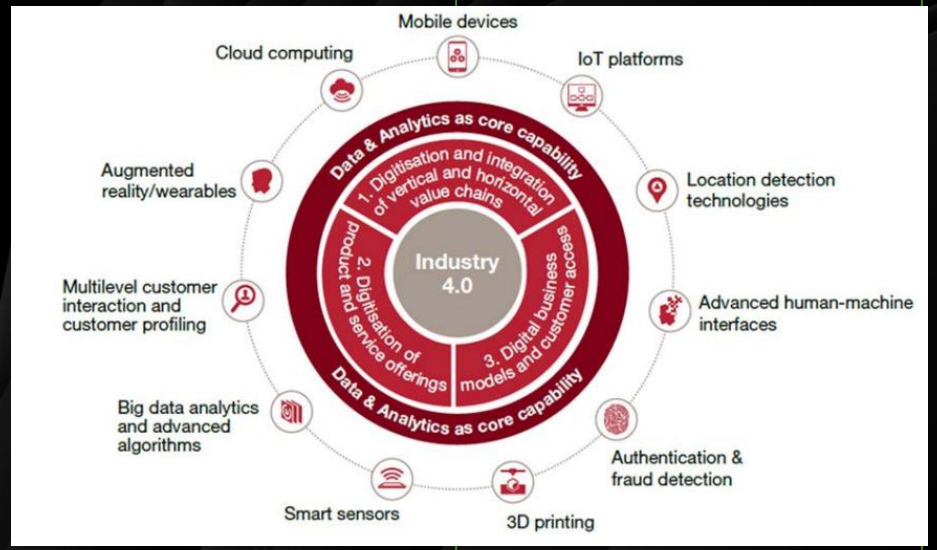
Key opportunities aligned with the strategy goals

Specific targets per opportunity

Break down into subtargets

Define solution directions

Create an implementation plan



The smart industry roadmap identifies 10 opportunities for product development, originating from the Industry 4.0 trend.

Strategic Research and Innovation Agenda | **Implementation Action Plan**

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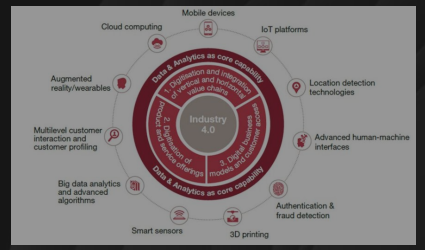

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Production Equipment Technology Requirements

Year of Production	*2015*	*2017*	*2019*	*2021*	*2023*	*2025*	*2027*	*2029*
DRAM ½ Pitch (nm) (contacted)	24	22	18	15	12	10	9	8
Wafer Diameter (mm)	*300*	*300*	*300*	*450*	*450*	*450*	*450*	*450*
Process equipment availability (A80)--300mm	>95%	>95%	>96%	>96%	>96%	>96%	>96%	>96%
Process equipment availability (A80)--450mm			93%	> 93%	>93%	>93%	>93%	>93%
Metrology equipment availability (A80)--300mm	>98%	>98%	>98%	>98%	>98%	>98%	>98%	>98%
Metrology equipment availability (A80)--450mm			> 95%	> 96%	>96%	>96%	>96%	>96%
Maximum allowed electrostatic field on wafer and mask surfaces (V/m) for ESD prevention	2,600	2,000	1,550	1,300	1,000	775	650	TBD
Maximum recommended electrostatic field at chrome mask surfaces (V/m) for EFM	500	500	500	500	500	500	500	500
Minimum equipment data output rates (Hz) from a tool	10Hz	100Hz	100Hz	1kHz	1kHz	>1kHz	>1kHz	TBD
Pervasiveness of APC as an integral part of equipment design and operation	Partial	All	All	All	All	All	All	All
Pervasiveness of predictive technologies such as virtual metrology PdM, yield prediction and predictive scheduling in certain equipment components (e.g., vacuum, abatement, gas supply systems) feeding into overall equipment predictive solution, to support improvements such as reduction in unscheduled downtime and improved yield.	Partial	Partial	Partial	All	All	All	All	All
Pervasiveness of Equipment Health Monitoring capability as a common health indication capability across tools	Partial	All	All	All	All	All	All	All

The semiconductor industry roadmap is very specific about targets to hit per year.

Strategic Research and Innovation Agenda → **Implementation Action Plan**

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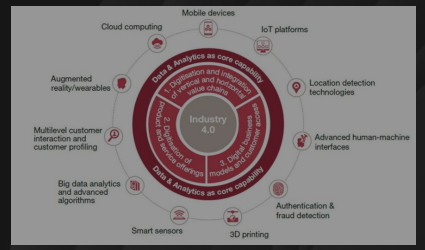

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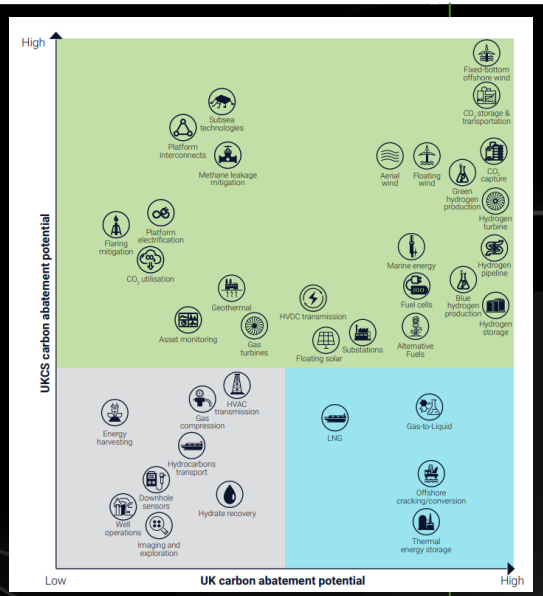

For the U.K. net-zero technology centre, we mapped solutions by impact and attractiveness

Strategic Research and Innovation Agenda → **Implementation Action Plan**

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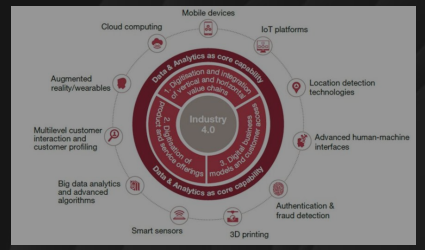

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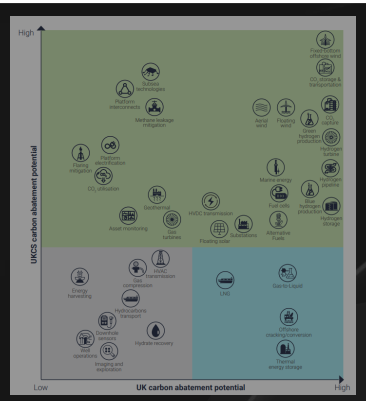

For the UK net-zero technology centre, we mapped solutions by impact and attractiveness

The implementation plan is a description of all projects to be developed.

Strategic Research and Innovation Agenda | **Implementation Action Plan**

KEY TAKEAWAYS

1

Roadmaps are a communication platform.

By labeling your roadmap a “technology” roadmap, you diminish its power as a platform for the innovation dialogue in your company.

Make sure to involve all stakeholders when developing the roadmap.

2

Roadmaps require a carefully structured development process.

The main purpose of the roadmap is to create alignment. This must happen across various levels and functions.

The roadmapping process must first develop the “right” questions and then propose the “best” answers.

3

A strategic innovation roadmap must consider 5 factors.

Technology deployment depends on five critical factors that must converge.

Instead of just considering technology, an innovation roadmap must ensure convergence of all these factors.

LUX CLIENT ACTION ITEMS

1 **Lux can help you hit the ground running for your roadmap.**

Before developing the roadmap, you must have a clear overall goal. Use our consumer insights and our annual trends reports to define it or ask Lux consultants to help.

2 **Use patent and news trends to identify white spaces.**

Use the Lux patent trends and news trends reports to identify white spaces and opportunities to put on your roadmap.

3 **Use Consumer Insights and our case studies to define clear targets.**

Define quantitative targets for the selected opportunities using the Lux Research case studies and the virtual anthropologist.

4 **Use Lux's analysts as a sounding board or our consultants as a team extension.**

Lux is here to provide you with the latest insights, feedback, and new ideas. You can do this through inquiry or by getting the help of our team of experienced consultants.

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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