

PhotonDelta

Peter van Arkel (CTO), Max van den Broek (Project Manager)

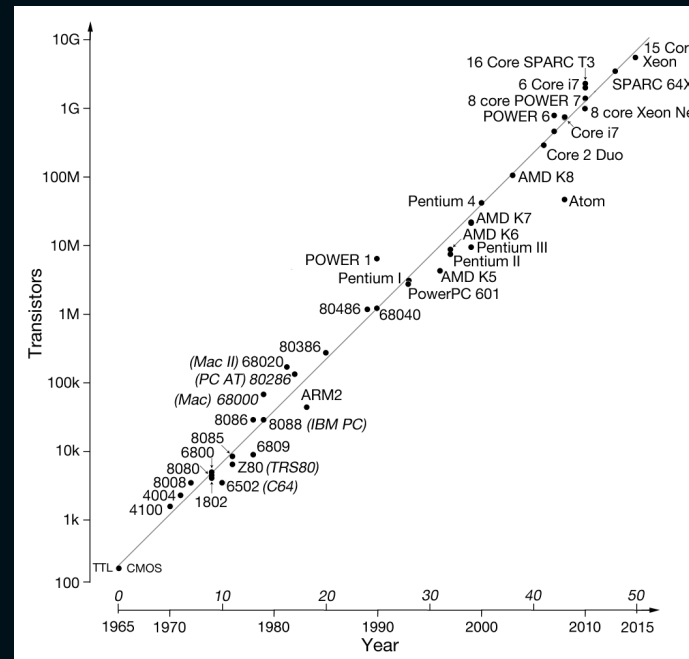
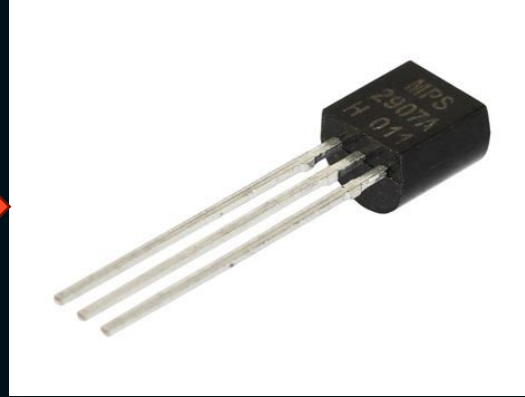
Agenda

- Introduction PICs and PhotonDelta
- History of PhotonDelta
- Evolution of ecosystems



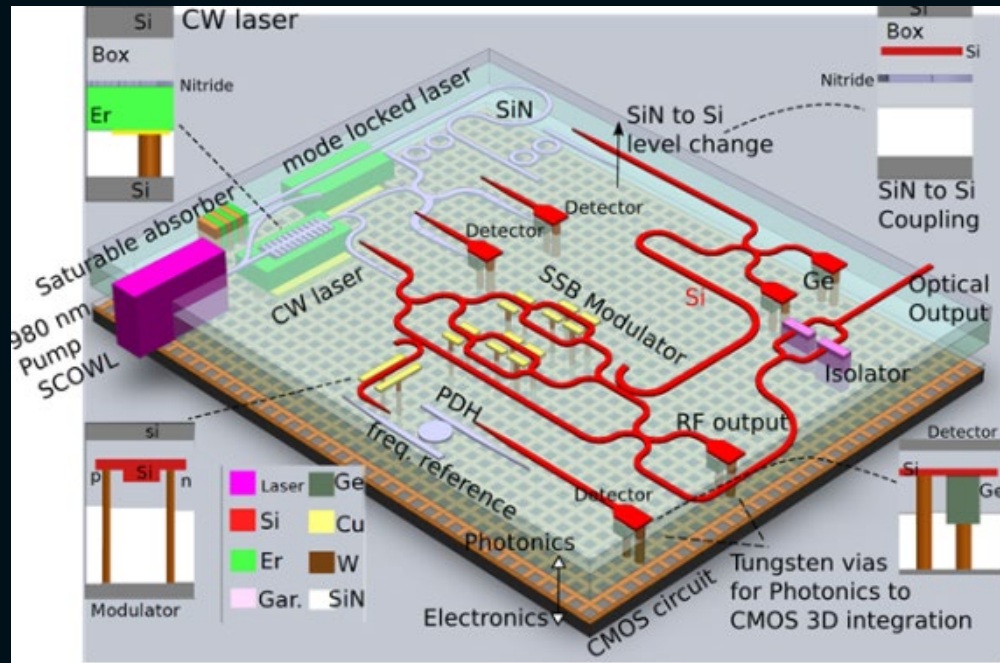
Introduction

Revolution in Electronics



Revolution in Photonics

- Lasers
- Detectors
- Waveguides
- Modulators



Source: EECS Berkeley

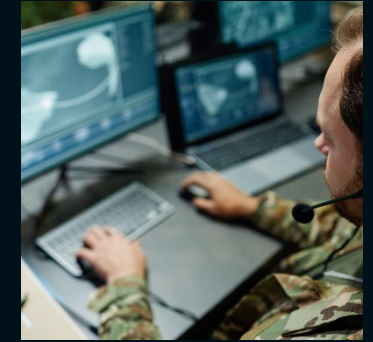
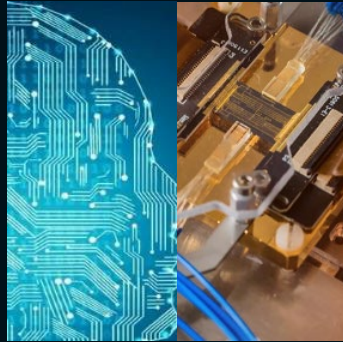
Level of miniaturization and integration

The diagram illustrates the evolution of optical coherence tomography (OCT) systems. On the left, a large, multi-component system is shown, consisting of a microscope, a computer workstation, and several external modules. A dashed orange arrow points from this system towards the right. On the right, a compact, handheld device is shown, which is a significant miniaturization of the system. A dashed yellow arrow points from the large system to the handheld device. The text 'Level of miniaturization and integration' is written vertically on the left side of the diagram. The text 'Optical coherence tomography' is written vertically on the right side of the diagram.

V.D. Nguyen, N. Weiss, W.P. Beeker, M. Hoekman, A. Leinse, R.G. Heideman, T.G. van Leeuwen, and J. Kalkman, "Integrated-optics-based swept-source optical coherence tomography". *Optics Letters*

Integrated photonics will revolutionise markets

In the same way semiconductors did, disruptive solutions for volume markets. Addressing global challenges



Datacom

- Digitisation
- Exponential growth of Data usage

Quantum/AI

- Secure communication
- Digitisation
- Continuation of Moore's law

Mobility

- Autonomous driving
- Electric vehicles

Healthcare

- Point of care
- Aging population

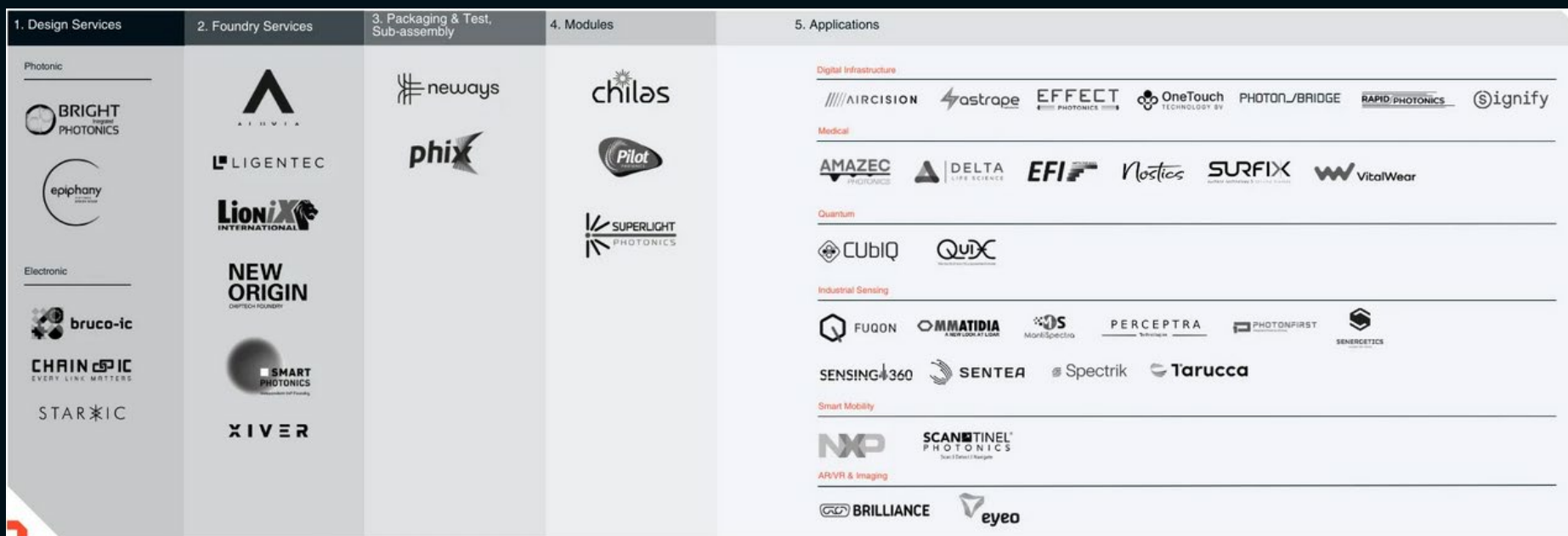
Agrifood

- Sustainable farming
- Climate change
- Precision agriculture

Defense

- Sensing for defence systems
- Secure communication systems

The PhotonDelta ecosystem: the full value chain



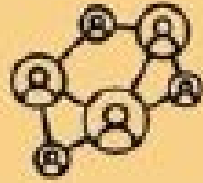
PhotonDelta Ecosystem | Tech Partners



PhotonDelta Ecosystem | Research & Development Partners



PhotonDelta foundation – Ecosystem accelerator



1. Ecosysteem ontwikkeling

1A: Talentprogramma

1B: Startup
ondersteuning

1C: Shared innovation
faciliteiten

1D: Internationalisering

1E: Programma management



History

History of PhotonDelta Foundation

People

2

7

28

Budget

€2M

€240M

€1.1B

2006

2014

2017

2022

▼ **Research institutions & universities**

- ▶ ASTRON
- ▶ Delft University of Technology
- ▶ Eindhoven University of Technology
- ▶ University of Amsterdam
- ▶ University of Twente
- ▶ VU Amsterdam

▼ **University medical centres**

- ▶ Amsterdam UMC
- ▶ Erasmus MC

▶ **Companies** 17

▶ **Top Sector**

High Tech Systems and Materials

▶ **Total budget** 7 million euro

▶ **Co-funding** 2.6 million euro

Berenschot

PHOTON
DELTA

Het fotonische
ecosysteem in en
rondom Eindhoven

PhotonDelta

Positie van en kansen voor de Nederlandse
geïntegreerde fotonica-industrie

Strategisch plan
PPS PhotonDelta

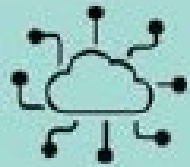
🏠 Nationaal Groeifonds >

PhotonDelta

2019



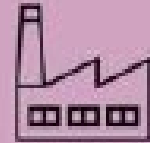
Evolution of the National Growth Fund: Phase 1



2. Applicatietechnologie

2A: Ontwerpbibliotheek

2B: Functionele optimalisatie
& combinatie



3. Industrialisatie en scale-up

3A: Hybride integratie

3B: Procesoptimalisatie

3C: Schaalbaarheid



Evolution of the National Growth Fund: Phase 2

User mission driven approach: Inspired by the EU Horizon Europe

“A problem solving approach to fuel innovation-led growth”

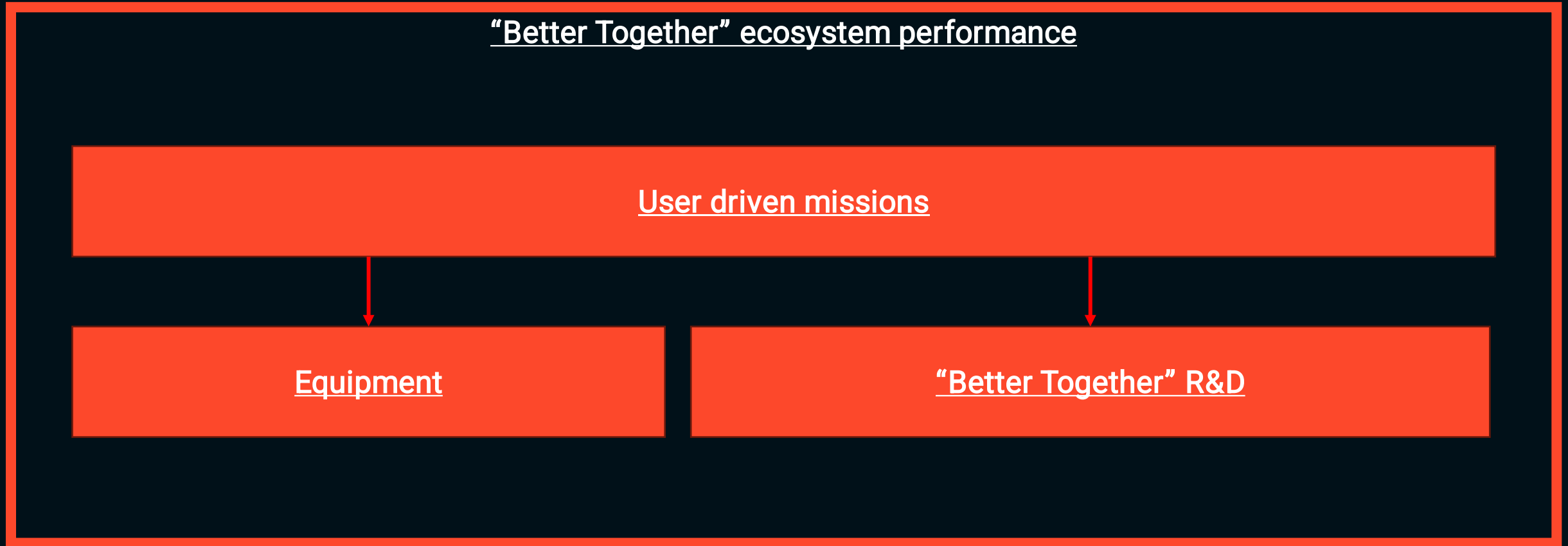
(based on Mazzucato, 2019)

A mission must be:

1. Aligned with societal challenges
2. Ambitious and realistic
3. Measurable goal and clear timeline
4. Multidisciplinary and cross-sectoral
5. Clear expected outcomes, with bottom-up solutions



Evolution of the National Growth Fund: Phase 2



Lessons learned: There is a time for everything (but when?)

1. 3CRM* is a moving target over time, speed of the essence
 - *Cost, Capability, Capacity, Reliability & Market readiness
2. Tech push VS market pull “balance” changes over time
3. Standardization is a process that grows with the industry

| Degree | Level of Standardization |
|-------------------------------------|--|
| 1 – Terminology alignment | Shared vocabulary |
| 2 – Data/communication conventions | Compatible information formats |
| 3 – Methodological guidelines | Similar approaches but flexible implementation |
| 4 – Parameter alignment | Shared technical parameters |
| 5 – Interface standards | Defined interaction boundaries |
| 6 – Industry standards | Formalized cross-industry standards |
| 7 – National / regulatory standards | Government-backed standards |
| 8 – Global mandatory standards | International regulatory or treaty-level standards |



Evolution

Building foundation with R&D and infrastructure investments



Science + R&D

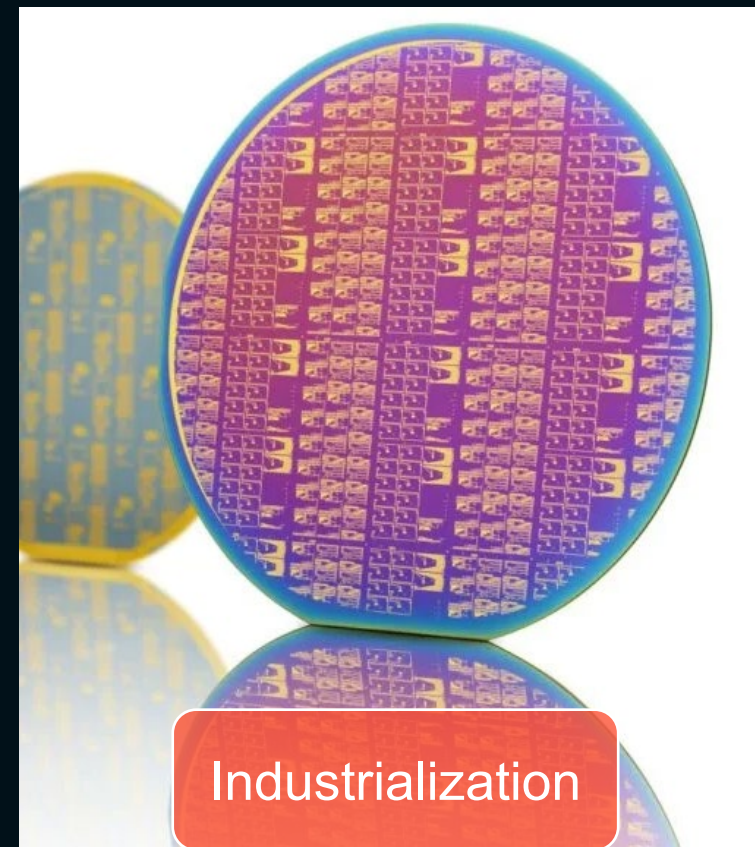
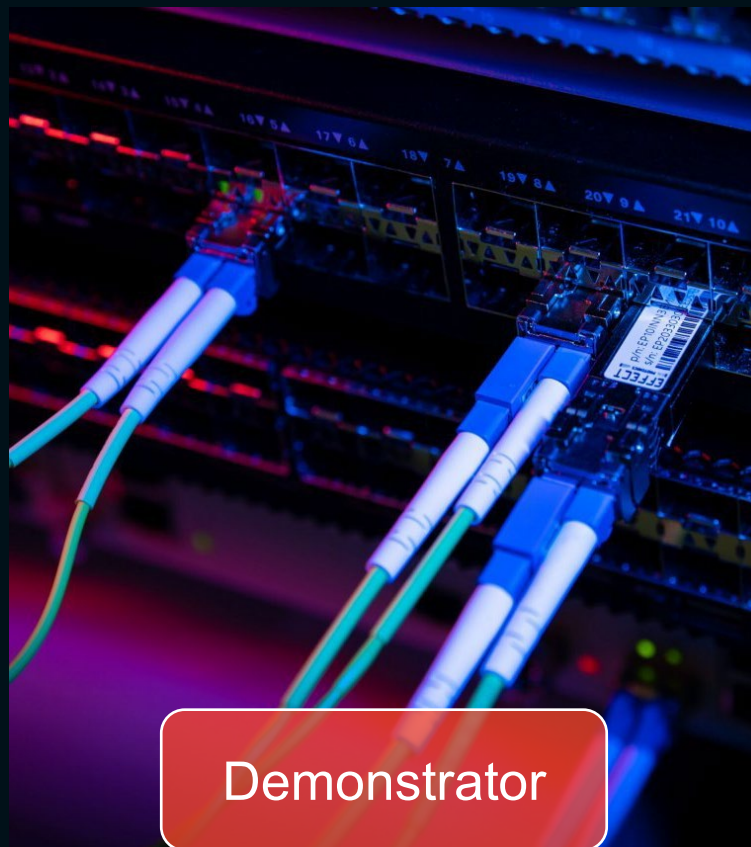
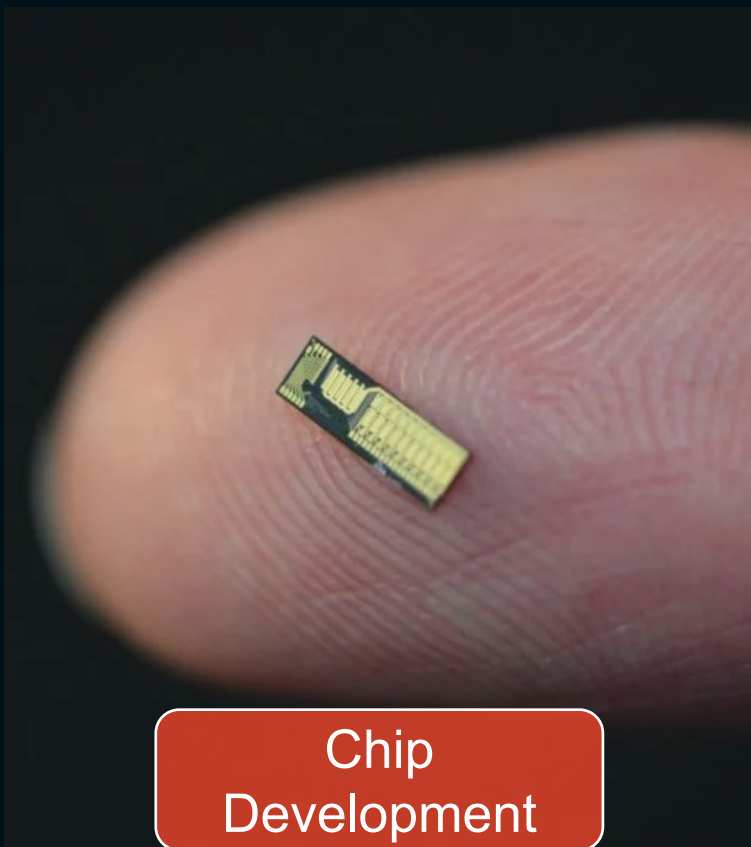


Infrastructure

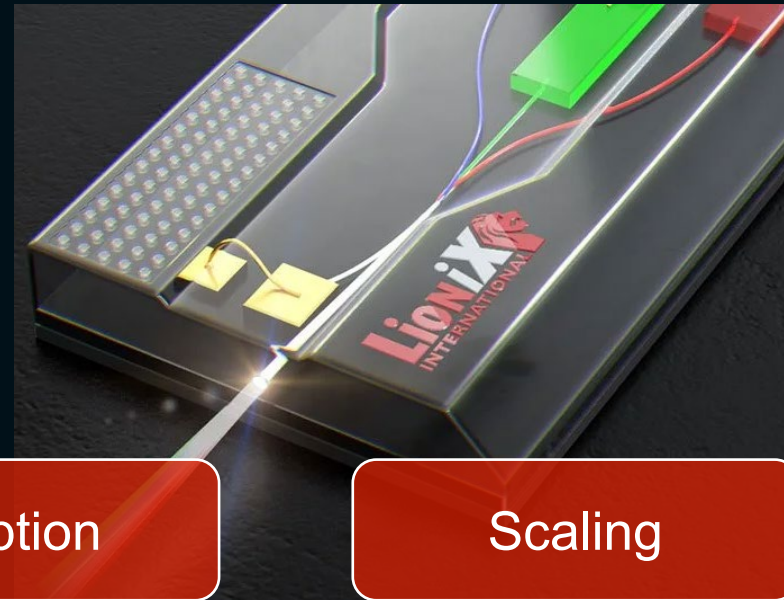
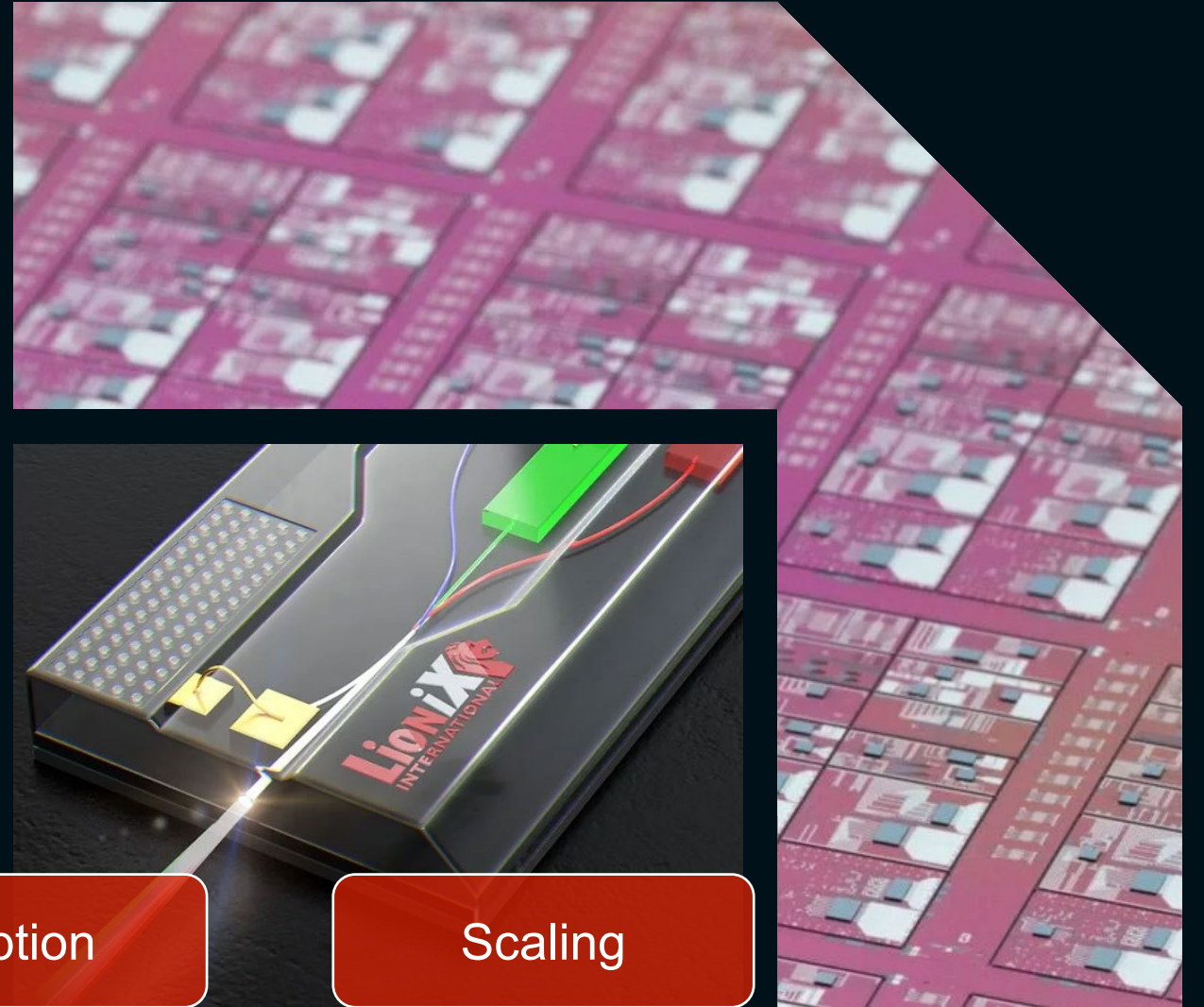
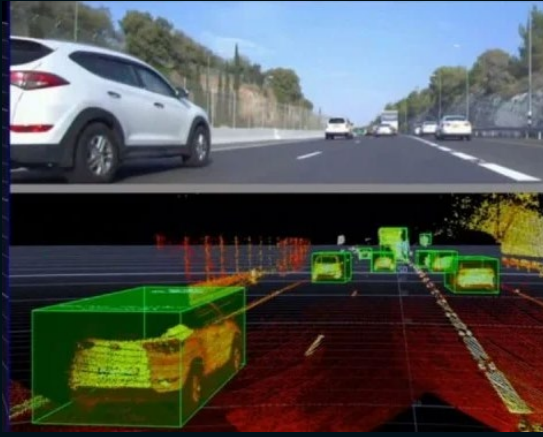
PhotonDelta Lands €1.1 Billion To Usher in a New Generation of Semiconductor Technology Investment



From research to chips, demonstrators, and industrialization



Next steps: PIC-driven systems and scaling production



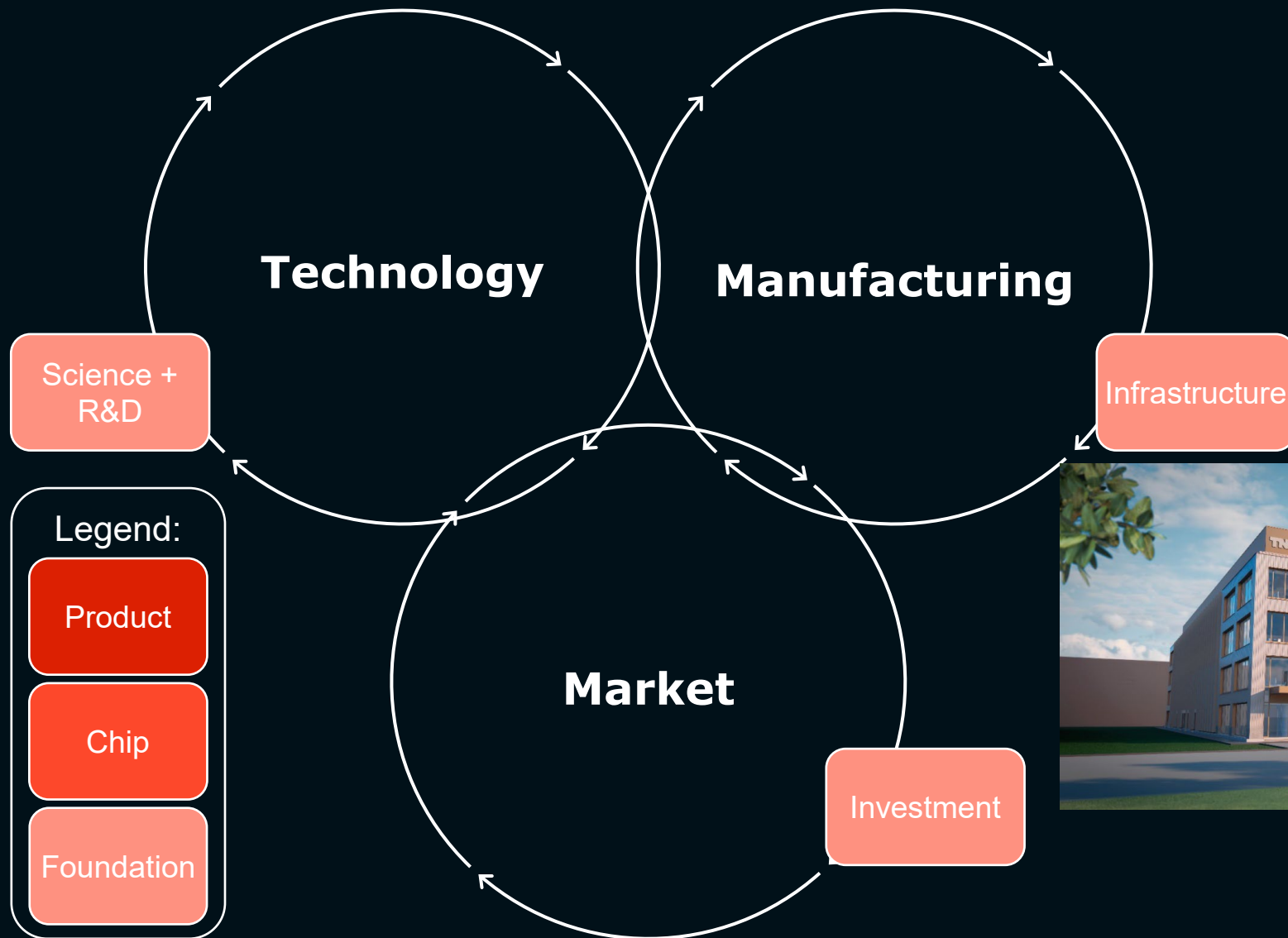
Product Development

Adoption

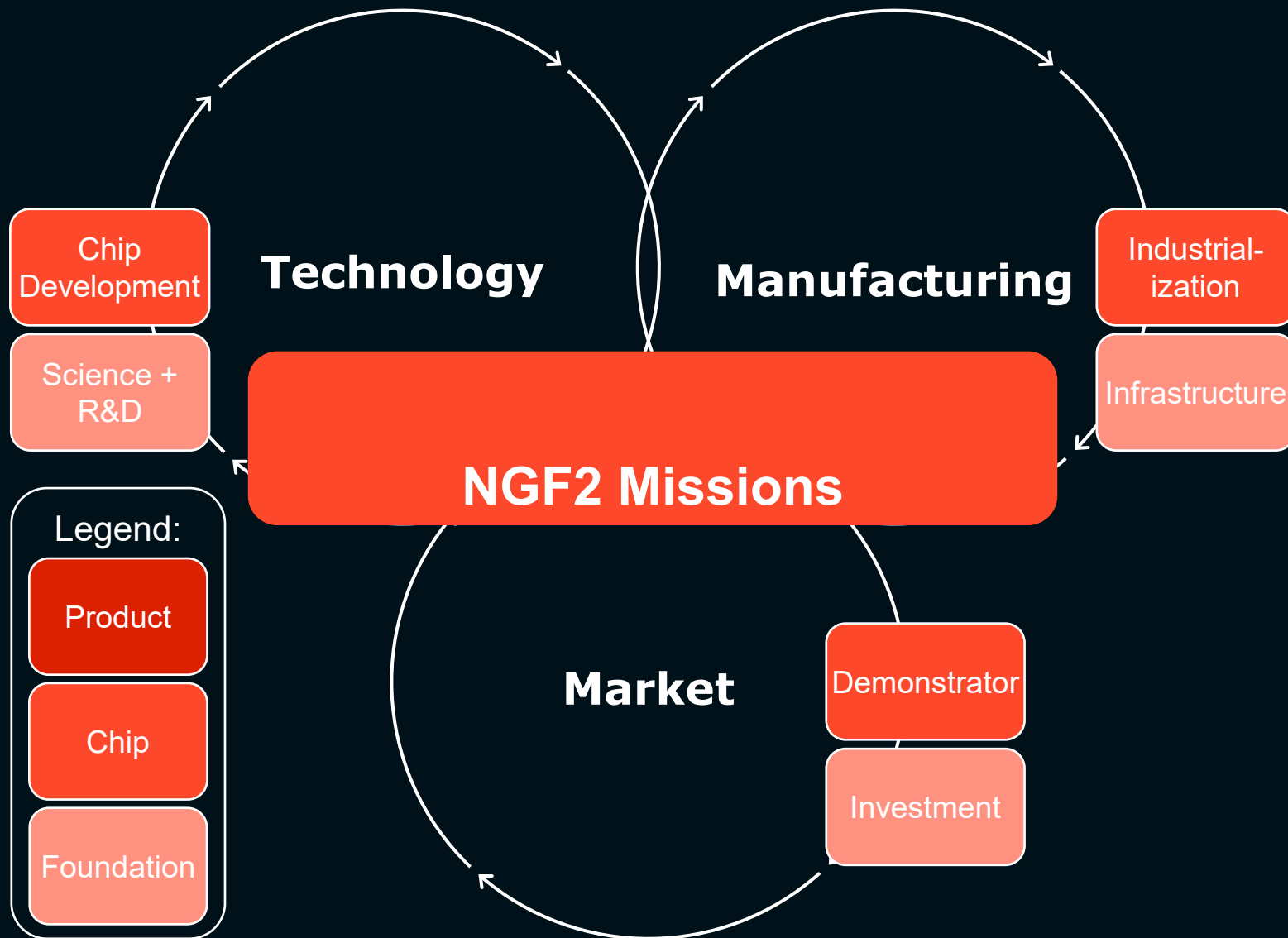
Scaling



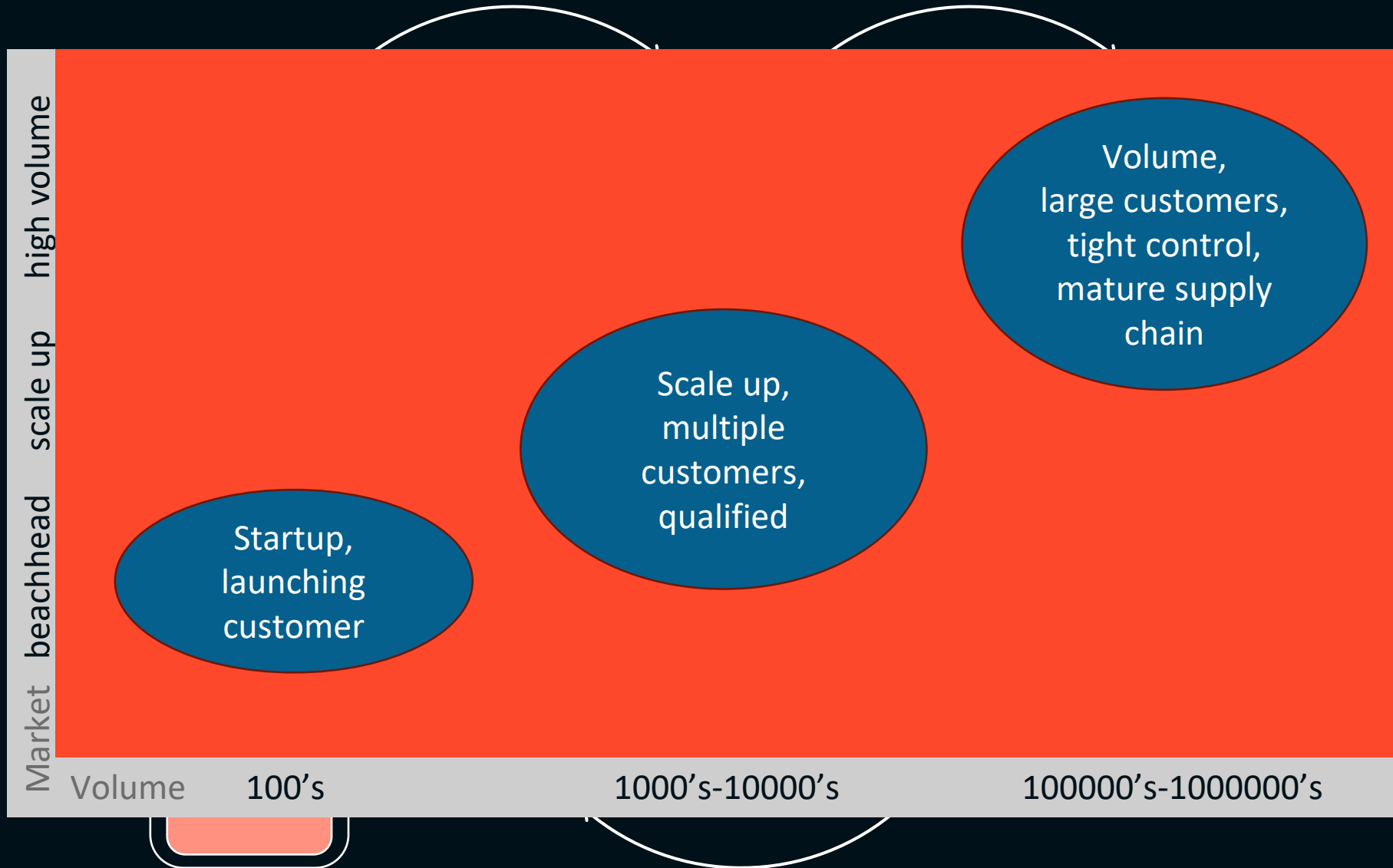
Unlocking flywheel: Continuous feeding



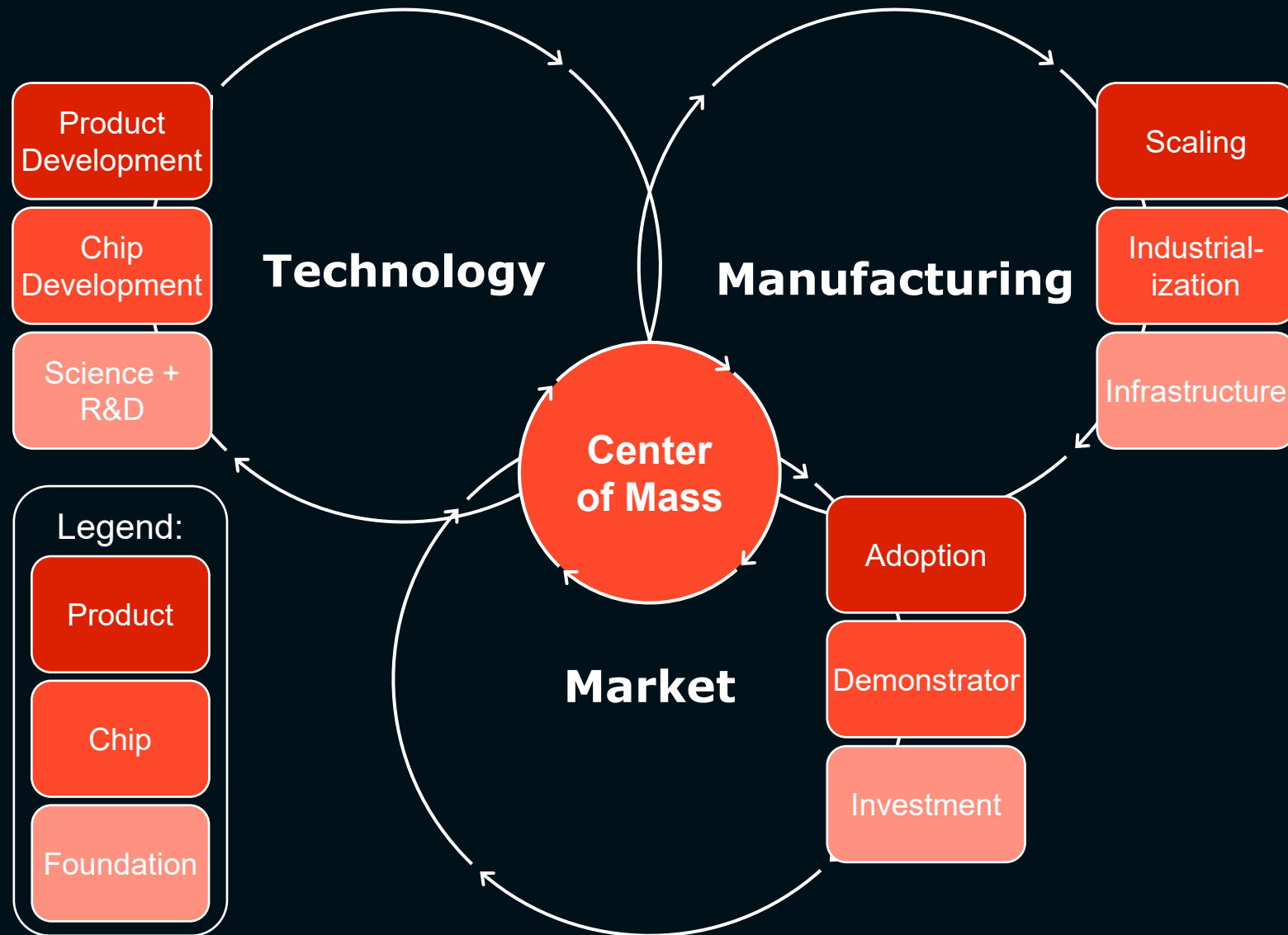
Unlocking flywheel: From Lab to Fab



Unlocking flywheel: Serving markets



Unlocking flywheel: Co-evolution of technology, manufacturing, and markets



The logo consists of a red square with a white diagonal line from the top-left to the bottom-right, forming a stylized 'P' shape.

PhotonDelta

