Survive, Grow and Thrive

Mature industries still have a lot to give

22.10.2021

Marvin **Chedid**
Victor **Blach Petersen**
Filippo **Schieratti**
Alison **Ah-Moo**

Lumiphase

Focus on ONR for survival, grow within LiDAR and thrive in Quantum Computing

Lumiphase

On the short term, affirm presence in the **optical network reconfiguration** market

- Significant market size and clear value chain
- **Market fit**
- **Product match**

On the medium term, start working with LiDAR to set an industry standard

- Immature market but with high potential
- Too competitive with various technologies

On the long term, collaborate with QC leaders to continue testing and producing results

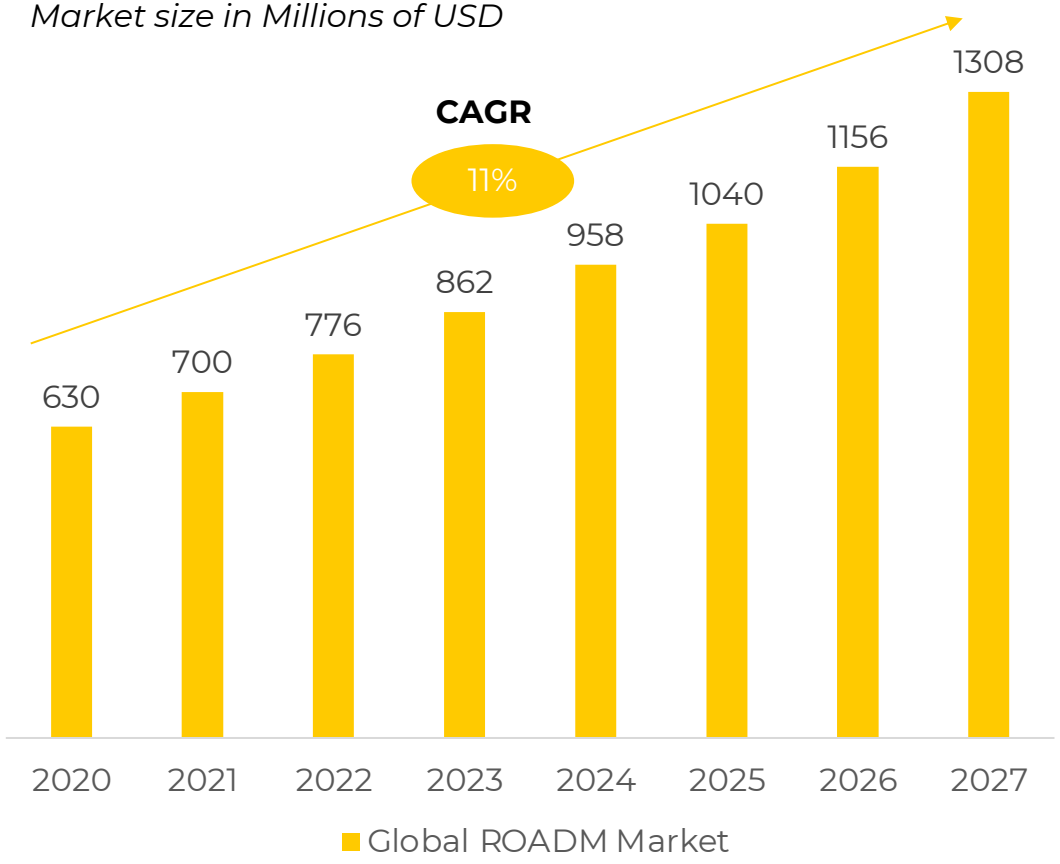
- High potential market still in its very early stages
- Very far time horizon

Source: Team Analysis

The ROADM market forecasted to reach $1.2B by 2026 is one with a clearly defined supply chain

The ROADM market is growing worldwide at a CAGR of 11%

Market size in Millions of USD



The ROADM value chain is clear with a defined place for Lumiphase

ROADM value chain

Semiconductor manufacturers creating the wafers

Producing the chips with a proprietary signature

Responsible for the distribution of the products

Use ROADM for dynamic network reconfiguration

A clear value chain is an opportunity to provide at low cost, at high scale and at low power consumption

Source: Yahoo Finance

Superior results on several performance metrics affirm clear market fit for Lumiphase in the ONR

Lumiphase is beating the market on the several metrics

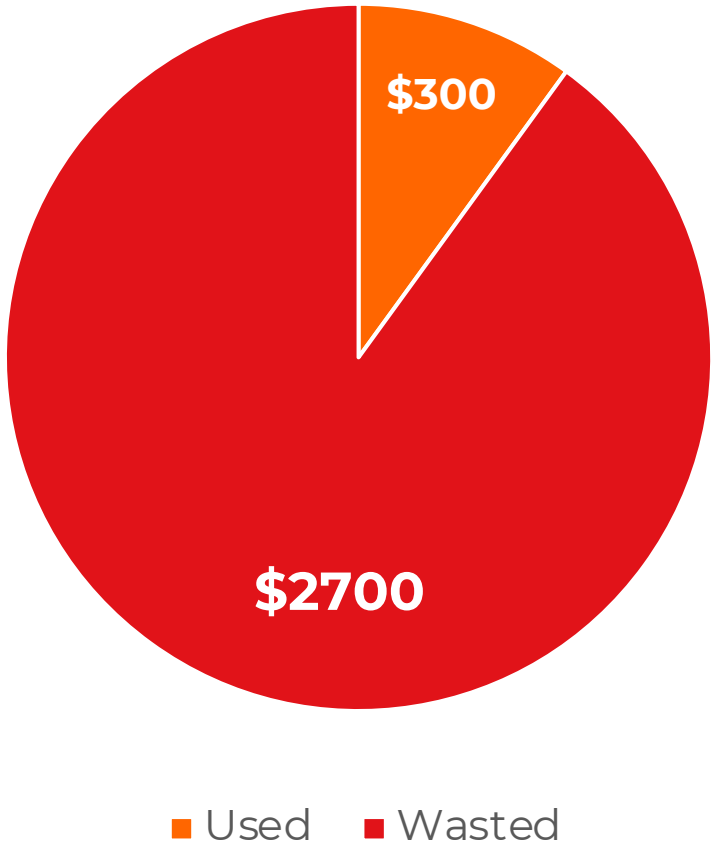
=Disruptive
=Advanced
=Incremental

Performance	• 2X higher speed	• ROADM market is constantly looking for higher speeds for cost saving on performance
Power consumption	• 10X lower optical loss • 1000X lower static power	• Power consumption is a main metric for semi-conductor chips
Footprint	• 10X better on electro-optic effect	• Higher efficiency means lower optical loss and higher directivity
Scalability	• Millions of BTO chips produced yearly	• Scalability and replicability are necessary requirements within the industry

Source: DataCenterDynamics, Nikkei Asia Business, Case

Optimizing wafer usage by designing a standardized product decreasing waste percentage

Up to $2.7K are wasted per wafer that could be put to use



Particularities of the ROADM market

Product

- Optical reconfiguration technologies are defined and a standardized product has been developed

Volume

- Most data centers are of considerable size and require a high number of transceivers and hence chips

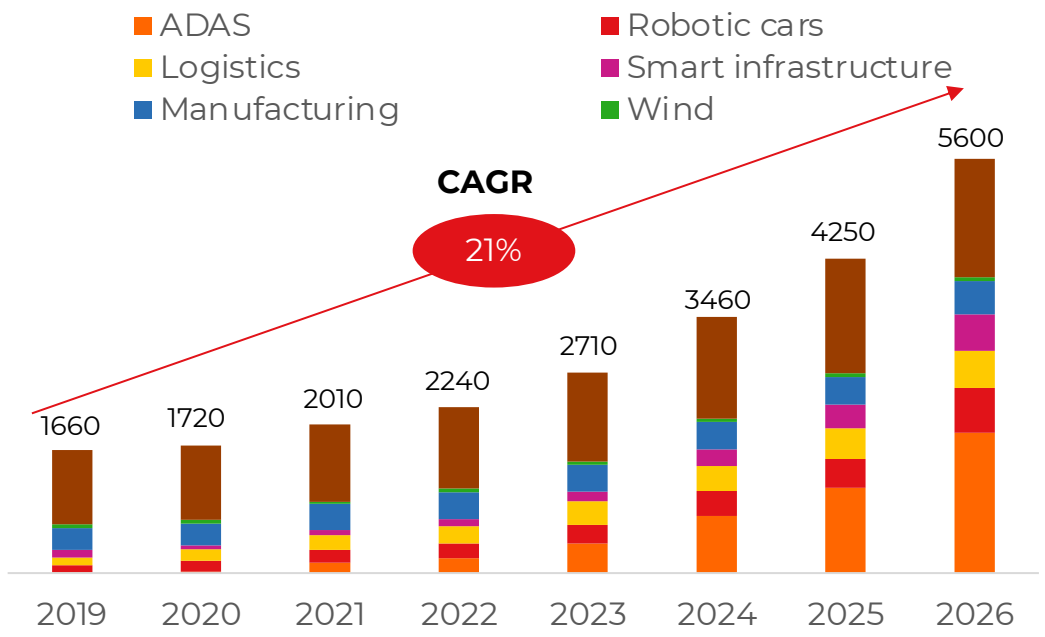
Risk

- As the industry is mature, adoption rate is low

The LiDAR market is forecasted to reach $5.6B but with an intense competitive space

The LiDAR is growing across all its segments with an overall CAGR of 21%

Market size in Millions of USD



There are many competitors and different technologies in the LiDAR sphere

Competitors

- **A direct competitor** might be NeoPhotonics, developing the same product
- **Other key players** in the LiDAR industry are Trimble (20% market share) Molex, Acacia Communications, Lumentum and Excelitas Technologies.

Different Technologies

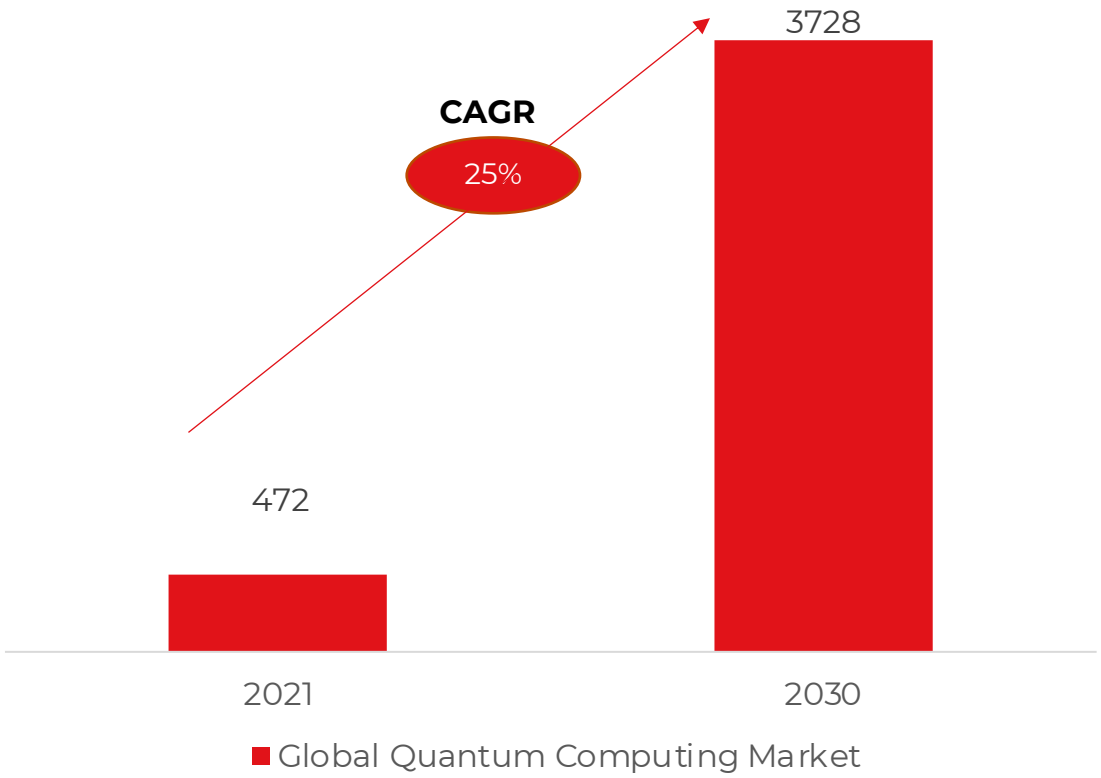
- **Mechanical LiDAR** uses high-grade optics and a rotating assembly to create a wide (typically 360-degree) FOV
- **Solid-state LiDAR** has no spinning mechanical components and a reduced FOV; thus, it is cheaper

Enter the LiDAR market though a Technology Access Program and partner with key actors in the industry to define an industry standard

Quantum computing market has a clear potential but it is too early to seize it

The LiDAR is growing across all its segments with an overall CAGR of 21%

Market size in Millions of USD



Key facts

Competitors

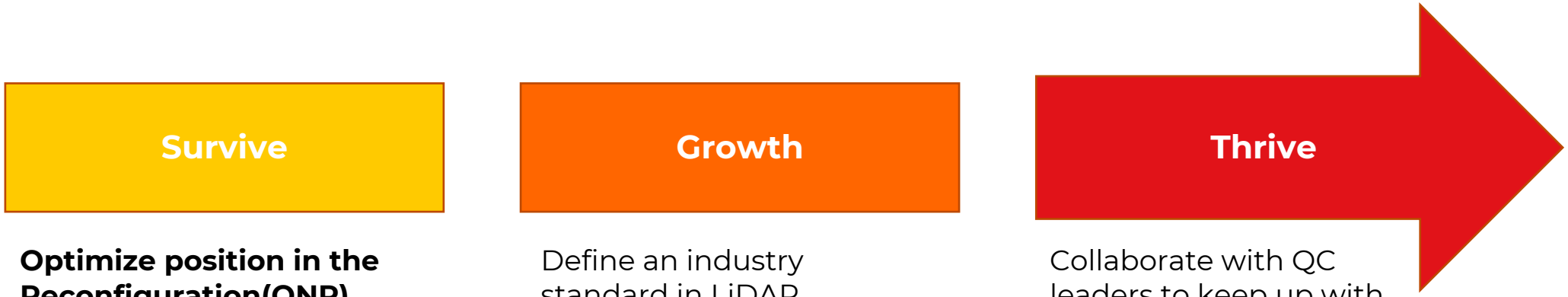
- Quantum Computing is **unlikely to happen before 2030** or beyond!
- Most companies are in the earliest stage of development
- Quantum is a very complex, expensive technology so slow mass adoption.

Product fit

- No other chip has been with designed for quantum computers
- Lumiphase's adapted to the temperature requirement

Continue testing and defining a chip adapted to the Quantum sphere

Summary



Optimize position in the Reconfiguration(ONR) market

- The ONR market is mature but the need for the increased speeds is prominent
- **Lumiphase should explore a standardized product in order to improve efficiency**

Define an industry standard in LiDAR

- The LiDAR market has tremendous potential but the several constraints incur too great a cost
- **Lumiphase should collaborate using a technology access program to set an industry standard**

Collaborate with QC leaders to keep up with their needs

- Lumiphase offers a unique product that is perfectly suited, however, the market is still in its very early stage
- **Lumiphase should continue exploring their chip's fit inside the Quantum sphere and keep testing**

Source: Team Analysis

www.lumiphase.com