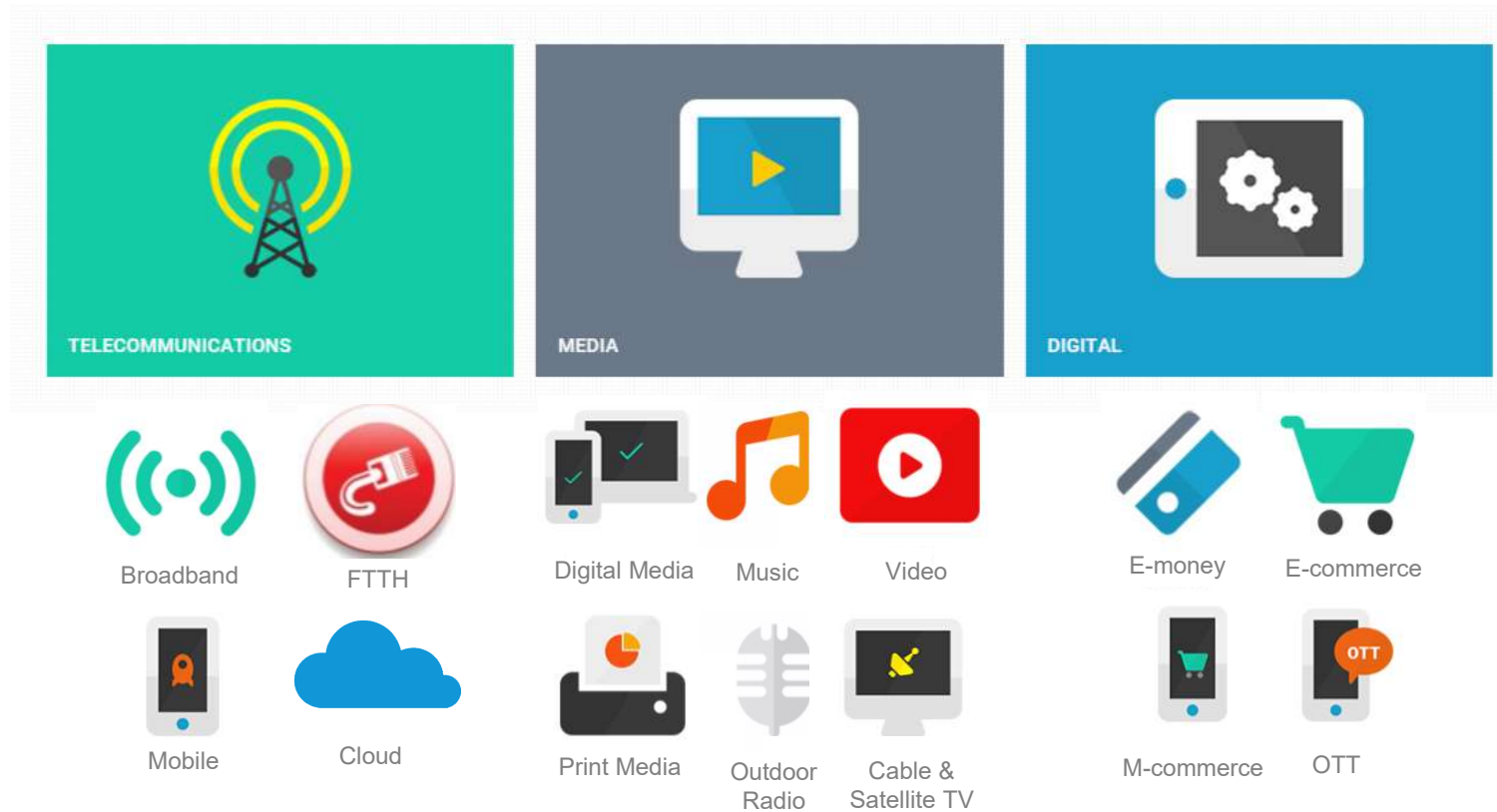


Introduction

Pioneer Consulting Asia provides end-to-end consulting services across telecoms, media and digital



We combine research and analytical expertise with industry experience to develop pragmatic strategies and performance improvement plans for our clients

Volume of IoT devices: PCA's output identifies key sectors driving device demand and a range for overall device growth

Key drivers of connectivity demand from Smart City services:



Consumer Wearables



Smart Homes



Shipping Containers



Smart Meters

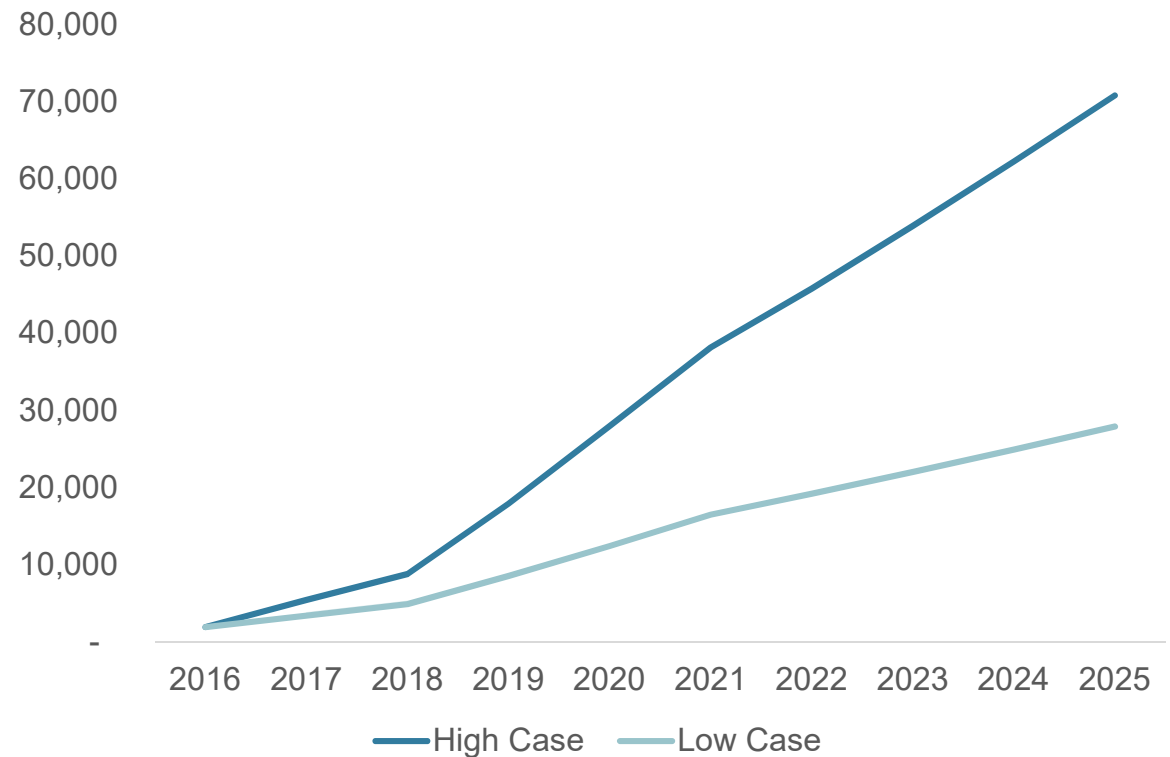


Smart Buildings



Smart Signage

Estimated IoT Devices in the market (000s)



Note: These estimates count multiple sensors linked to a single device as only one IoT device. For example, a connected car may have several hundred sensors, but PCA has assumed this as a single IoT device. It also does not include cellular mobile devices such as phones or tablets or connected computers.

Fibre demand from Smart Cities: PCA's output identifies key applications driving fibre demand and a range of fibre access point growth

Key drivers of connectivity demand from Smart City services :



Automated vehicles



Surveillance Cameras

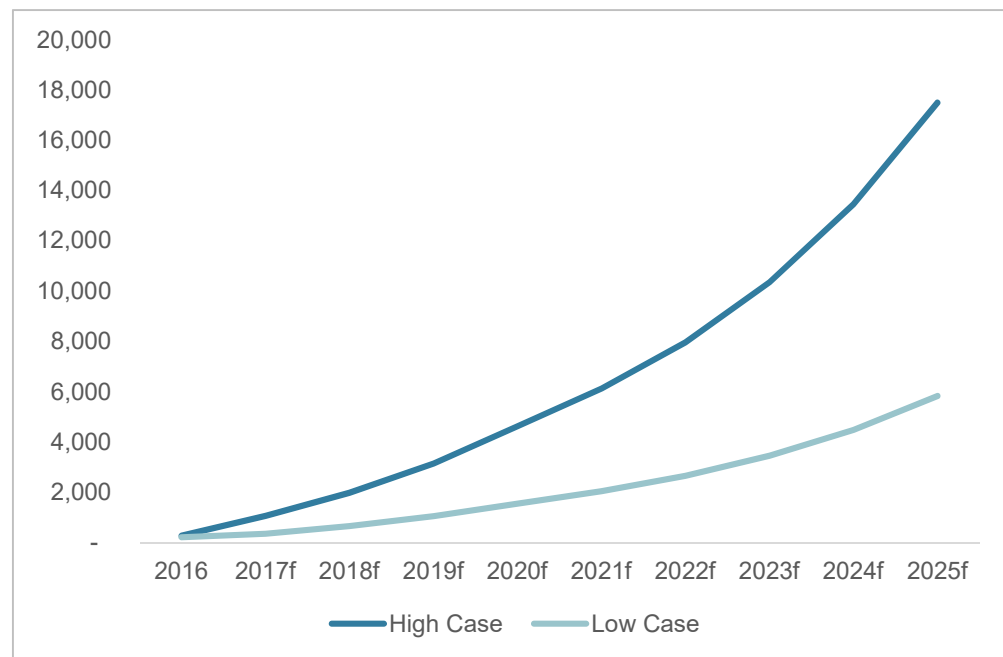


Hetnet

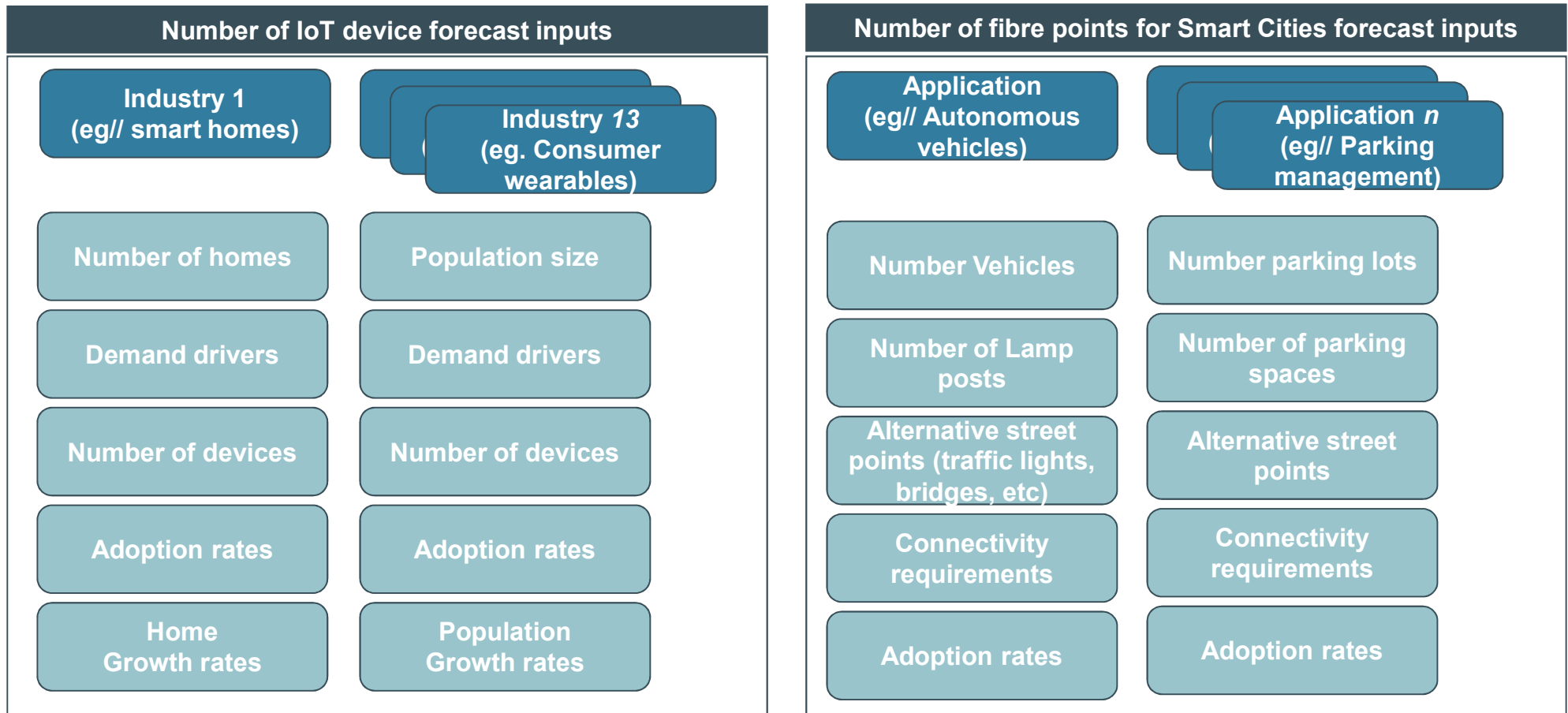


Data aggregation platform

Estimated fibre access points in the market (000s)



PCA analyses an extensive range of data to develop forecasts for volume of IoT devices and fibre demand from Smart Cities



PCA develops forecasts through a combination of secondary and primary research following our structured approach to ensure the validity of the findings

Secondary Research Approach

Capability

- Dedicated team of analysts
- Access to paid research reports
- Available corporate data
- Subject matter expertise
- Team of industry experts

Methodology

- Identifying relevant industries and sectors
- Analyze drivers of demand across industries
- Assess growth based on industry forecasts and economic indicators

Reporting

- Data triangulation across data sources
- Sensitivity analysis to determine forecast scenarios
- Data representation:
 - Charts
 - Infographics



Primary Research Approach

Capability

- Access to subject matter technical expertise
- Team of industry experts
- Access to equipment and solution vendors

Methodology

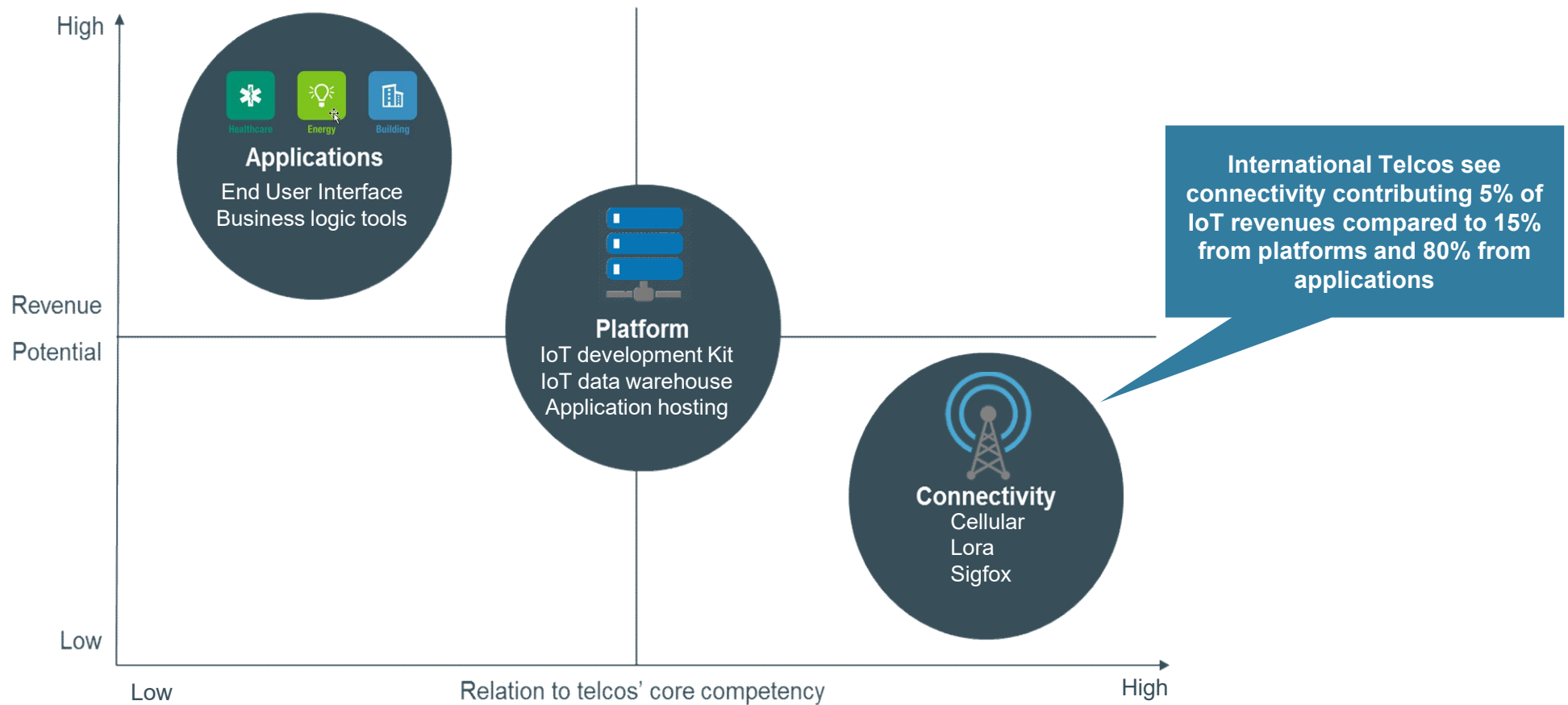
- Develop Interview questionnaire
- Interview 50-100 panelists via survey
- Interview 10-20 panelists face to face

Reporting

- Data aggregation
- Data analysis
- Data validation against secondary research
- Data representation:
 - Charts
 - Infographics

Smart cities will require connectivity from telcos but there are also opportunities for telcos to capture additional revenues from platforms and applications

DIRECTIONAL



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