



The Future of Transportation and Public Safety



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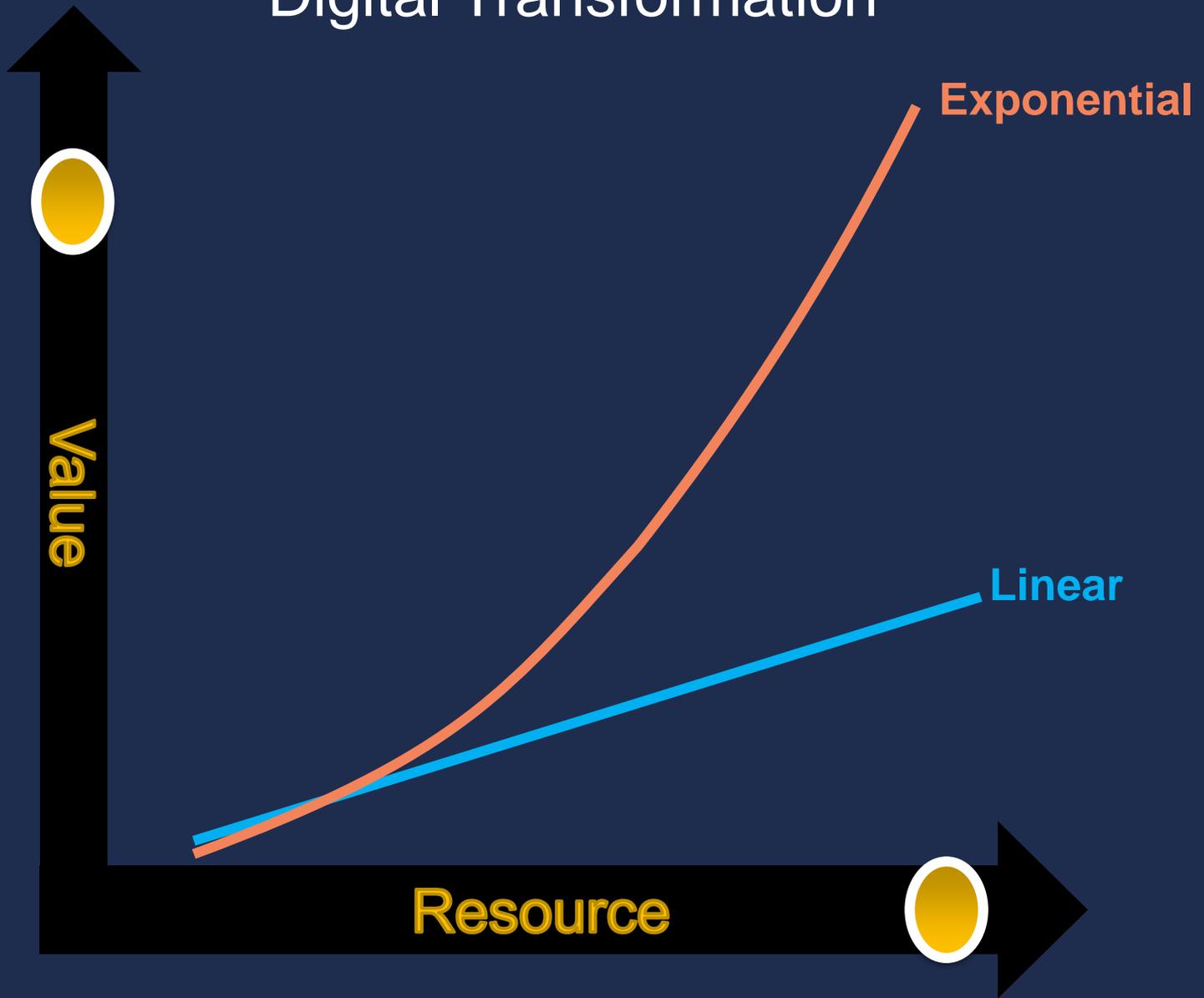
Smart Living Building Blocks



We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don't let yourself be lulled into inaction.

- Bill Gates

Digital Transformation



Digital Transformation

Internet of Things Low-cost sensors are becoming increasingly powerful. They use apps in the cloud and big data.



Cloud

Cloud allows access to content on any device in any location.

Mobility

Mobility drives the emergence of apps that can be used on any IP-enabled device.

Big Data/AI

Big data enables value to be extracted out of an exponential increase in data. Data from IoT needs to be analysed. Robotics, drones, cognitive computing/AI.



The Future of Rail

Drivers of Rail Infrastructure Investment

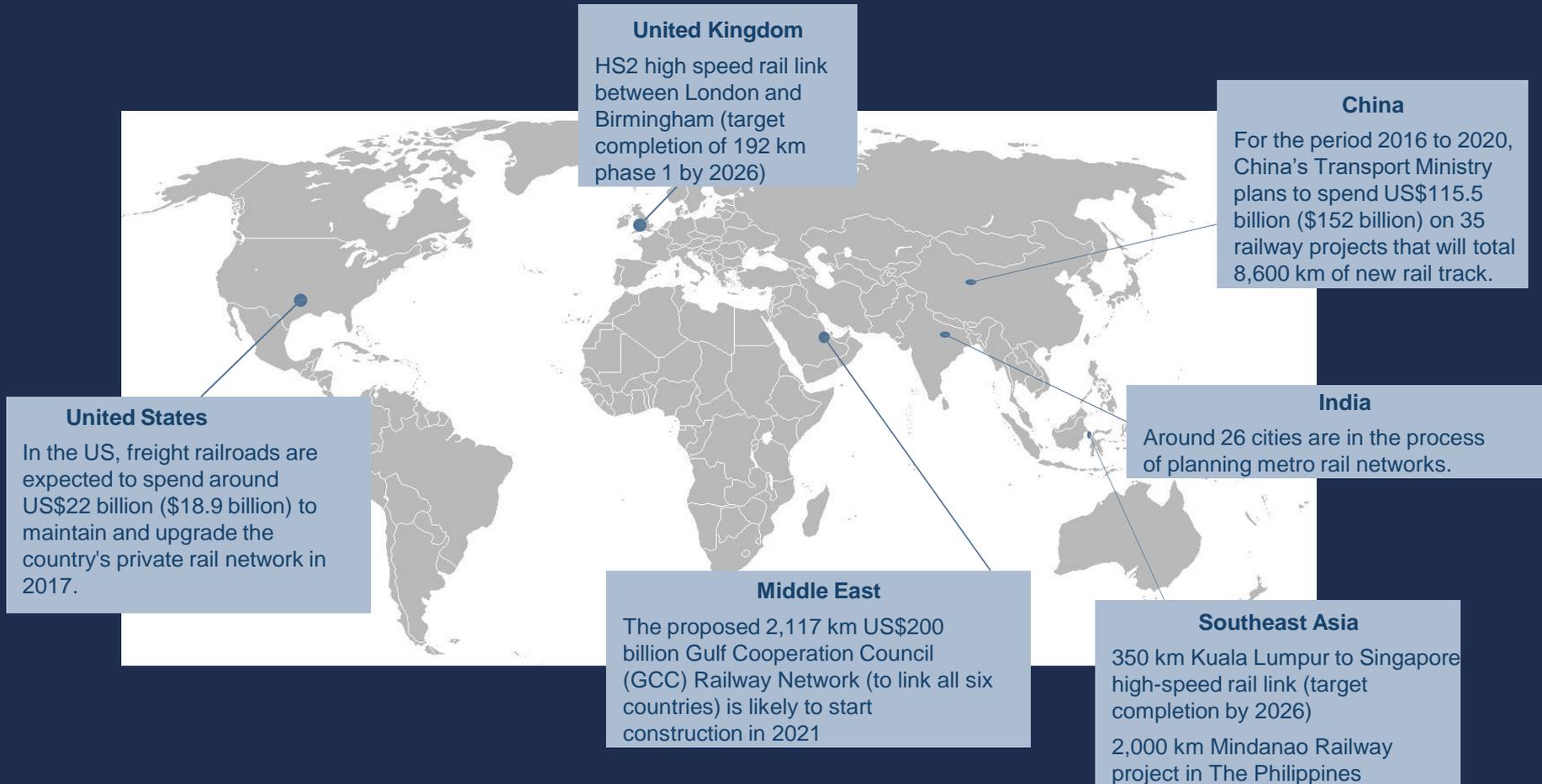


Rail Infrastructure Forecast

Global Mainline Rail Track Length (Million kms)



Rail Infrastructure Projects



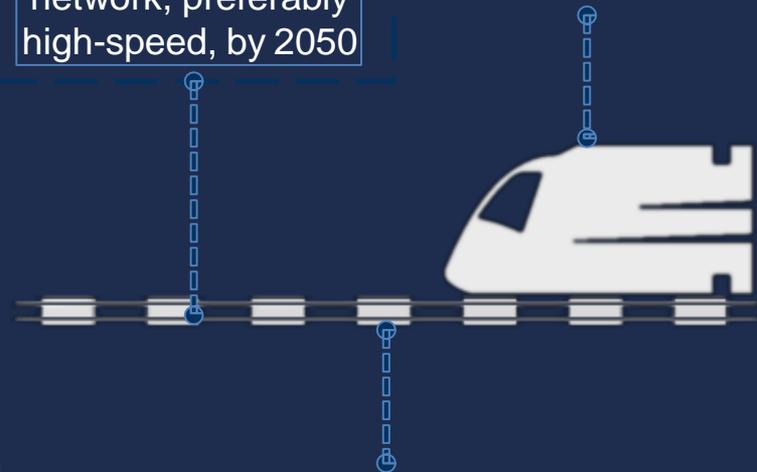
High-Speed Rail: The Example of Europe

High-speed Railway Network, EU, 2020



Connect all network airports to the rail network, preferably high-speed, by 2050

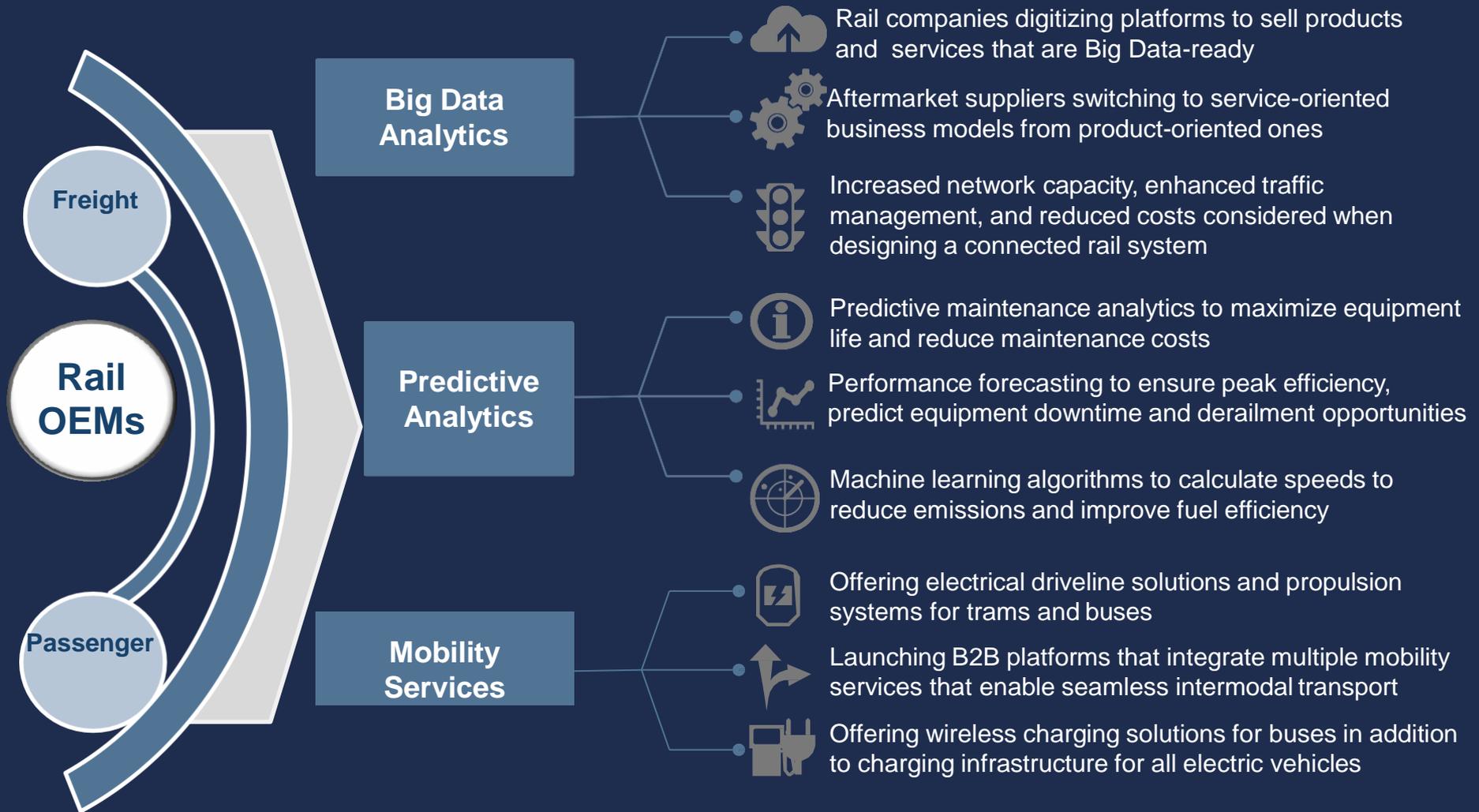
Triple the length of the existing high-speed network by 2030



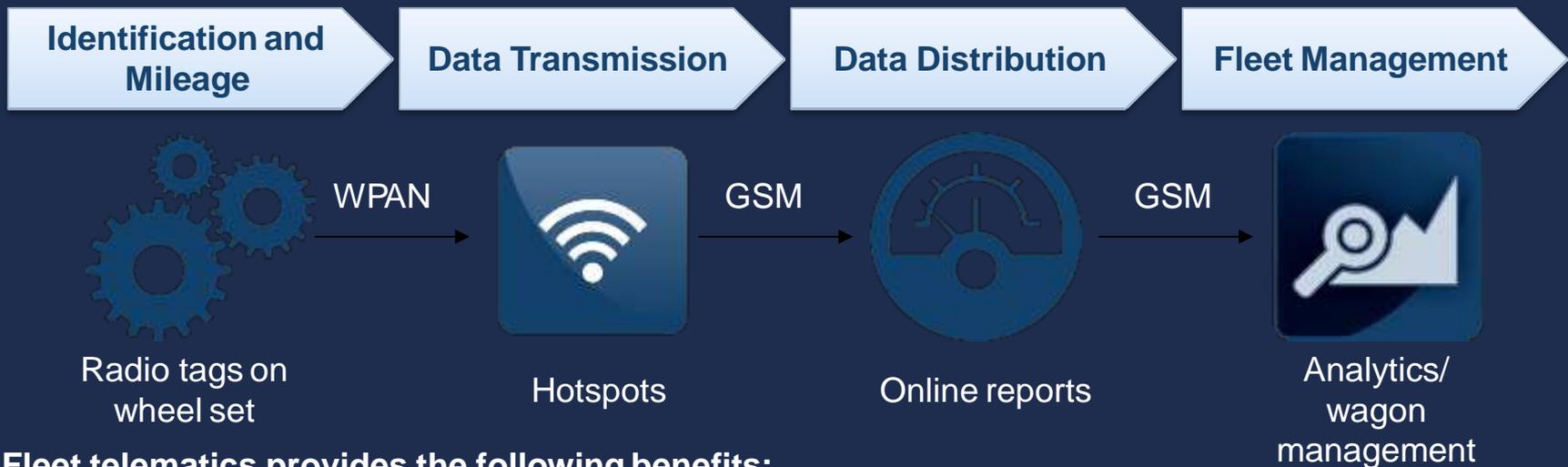
Investment of \$300 - \$500 billion is required annually, till 2020, to complete approximately 800–1,000 kms of lines with design speeds of 250 km/h or higher

Source: European Commission; Frost & Sullivan

Digital Transformation Focus Areas for Rail



Rail Telematics for Intermodal Freight



Fleet telematics provides the following benefits:

- Analysis and documentation of long-term rolling stock performance
- Significant reduction in service and repair costs
- Pay-per-use billing models
- Automatic identification of rolling stock and shipment

Event-based information is automatically processed into enterprise resource planning (ERP) systems. Data is handled securely, and the estimated time of arrival is calculated in real time.

Key: WPAN = Wireless Personal Area Network

Performance Improvement through Predictive Analytics

Sales and Marketing

- Marketing mix modelling
- Merchandising
- Packaging
- Pricing optimization
- Product/offering bundling
- Promotion optimization
- Sales territory optimization
- Sales/demand forecasting

Operations and Workforce

- Benefits optimization
- Compensation plan design
- Logistics optimization
- Performance forecasting
- Staff forecasting

Customer and Channel

- Customer acquisition
- Customer loyalty
- Customer retention
- Customer spend
- Market channel optimization
- Location-based service modelling

Finance and Risk

- Asset valuation
- Fraud detection
- Inventory optimization
- Portfolio risk assessment
- Project assessment
- Litigation outcome modelling



New Business Models in Rail

Freight Service Aggregators

Network of freight forwarders that provide automated freight quotes and contract management system

Crowd / End-to-End Shipping

App-based logistics service network that connects people to ship goods; end-to-end shipping operators use their own employees to ship goods

Third-party Logistics

Platforms that offer all logistics needs in the cloud – warehousing, processing, shipping, and sales channels, among others

Local Network Developers

Mobile applications that offer local on-demand delivery and storage

Transportation Systems

Transportation systems with unmanned aerial vehicles (Matternet, for example)

Fleet Management

Fleet management companies enhance the monitoring and management of fleets through on-board modules

Mobility Service Providers

Shared mobility services, such as e-hailing, carsharing, and ridesharing, offering both long-distance and short-distance passenger transportation

Example



Hitachi's 'Trains as a Service' in the UK

Outlook

Rail systems will become arterial transportation modes that transport payloads not only within regions but also form an integral part of intra-urban mobility. Market consolidation, with OEMs and operators playing an important role, along with the launch of new business models, are expected to boost rail transport usage

The growth of services in the rail market, such as crowd shipping and local delivery and storage, will be fuelled by urban demand for same-day delivery and artificial intelligence-based fulfillment models.

The expansion of rail market participants into key markets, along with the automation and digitalization of processes through smart algorithms, will see the Internet of Things (IoT) positively impact rail transportation and improve efficiency, information, safety, and security.

A tall metal pole with multiple security cameras mounted on it against a clear blue sky. The cameras are arranged in a cluster, with some pointing in different directions. The pole is made of metal and has various wires and components attached to it.

The Future of Public Safety

Drivers of Public Safety Investment



Drivers of Public Safety Investment



City Surveillance

Total City Surveillance Market: Key Case Studies, Global, 2016

Republic of Ireland

- \$220 million investment by law enforcement to deploy advanced surveillance systems
- Key Technologies: ANPR, Facial, and Body-in-Crowd biometric technologies
- Project duration: 2016–2021

Astana–Kazakhstan

- 12,000 cameras to be installed as part of a Safe City Project
- Expected year of completion: 2017

Mumbai–India

- 4619 24x7 CCTV cameras in key areas in south Mumbai
- Key Technologies: ANPR and Facial Recognition software
- Expected year of completion: 2016

Myrtle Beach–United States

- 800 cameras to be installed across various intersections in Myrtle Beach, South Carolina
- Cost of Project: \$2.1 million
- Expected year of completion: 2016

Lahore–Pakistan

- 10,000 cameras to be installed in the city of Lahore across 2,000 locations as part of the Safe City Project
- Contract value: \$114.48 million
- Expected year of completion: 2017

Casablanca–Morocco

- Project value: \$46.6 million
- Includes deploying 760 CCTV cameras, 220 km of optical fibers, 2 central stations, and 22 mobile stations
- Key technology: Facial recognition database
- Expected period: 2016–2020

Montevideo–Uruguay

- 850 CCTV cameras and 20 ANPR cameras
- Integrator: SONDA; ANPR Software supplier: PlateSmart; VMS: OnSSI
- Project duration: 2015–2016

Sharjah–United Arab Emirates

- Project to install 5,000 advanced cameras in the city (90% complete)
- Key technologies: ANPR; Police patrols equipped with surveillance cameras
- Expected year of completion: 2017

Public Safety Solutions – Growth Opportunities



Need to Curtail the Crime Rate

- The need to control the crime rate at a global, regional and city level is an absolute necessity.
- This calls for greater investments in public safety solutions.



Smart City Initiatives

- Smart city initiatives are being adopted by major cities at a global level.
- These seek to ensure supreme standards of safety using the most advanced technologies.
- This generates opportunities for surveillance system providers.



IoT and Smart Analytics

- Analytic solutions that are being deployed for surveillance systems are becoming smarter and moving towards the IoT.
- With predictive and behavioural analytics expected to evolve in future, analytic solution suppliers can find a plethora of growth opportunities.



Modernisation of Legacy Cameras

- Drawbacks of analogue cameras such as poor image quality and poor resilience have led to smarter and more robust digital cameras in the market.
- Decreasing IP cameras prices are expected to create opportunities for suppliers.



Efficient Storage Management

- The increasing adoption of surveillance systems creates the need for efficient storage management.
- Storage suppliers with smart multi-layered hybrid storage capabilities will find plenty of opportunities in the market.

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Thank You