

# Vertical Aspects of Network Slicing

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# The World is being disrupted by Digital Transformation

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- Today, most vertical industries use dedicated ICT physical infrastructure (network + computing + storage);
- “Everything” is becoming connected and providing data;
- Being updated (newbie) is the new default for every asset;
- The new wave of innovation and personalization requires very high-degree of flexibility;
- The world as we know it is being disrupted – at unprecedented rate of change!

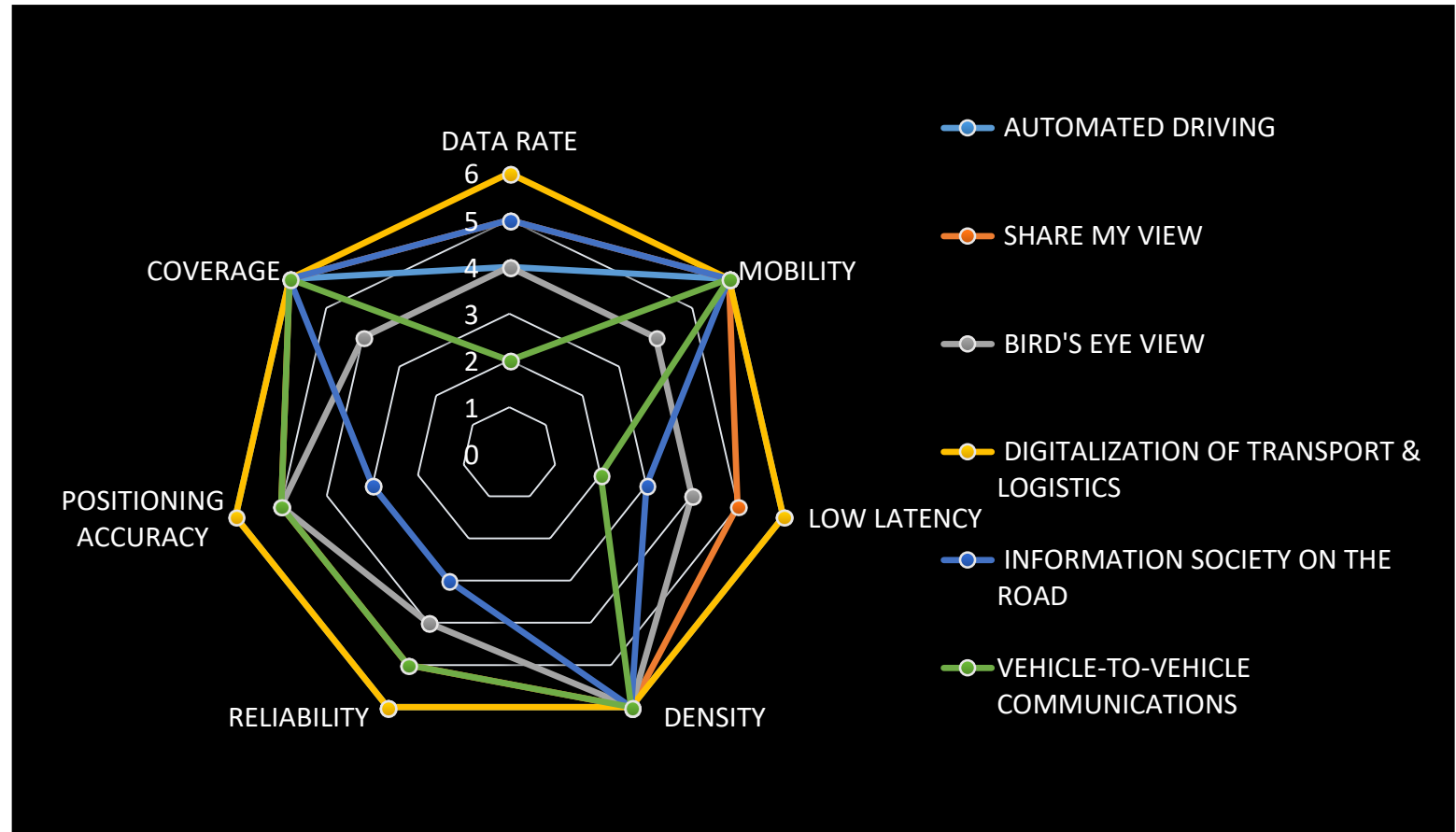
*This new digital data-driven businesses economy requires automated plug&play, on-demand, secure and scalable ICT capabilities, at a competitive cost.*

- ✓ 5G Network Slicing answers to these challenges through enlarged virtualization.

# Vertical Aspects of 5G Network Slicing

## Mobility & Transportation Use Case

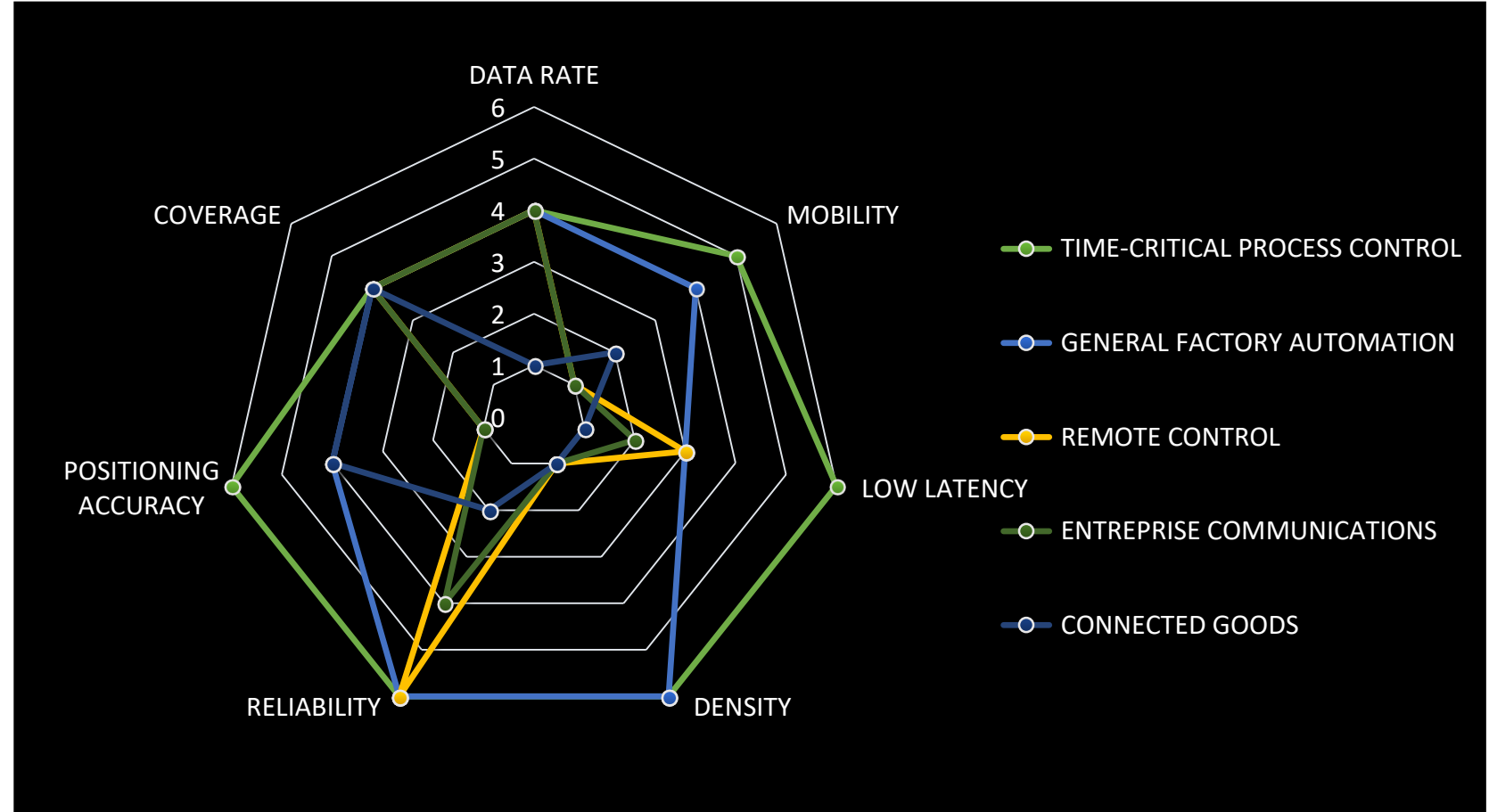
- Automated and connected driving;
- Cooperative intelligent transport systems;
- e-Mobility;
- Autonomous self-driving vehicles;
- Mobility-as-a-service.



# Vertical Aspects of 5G Network Slicing

## Smart Industry Use Case

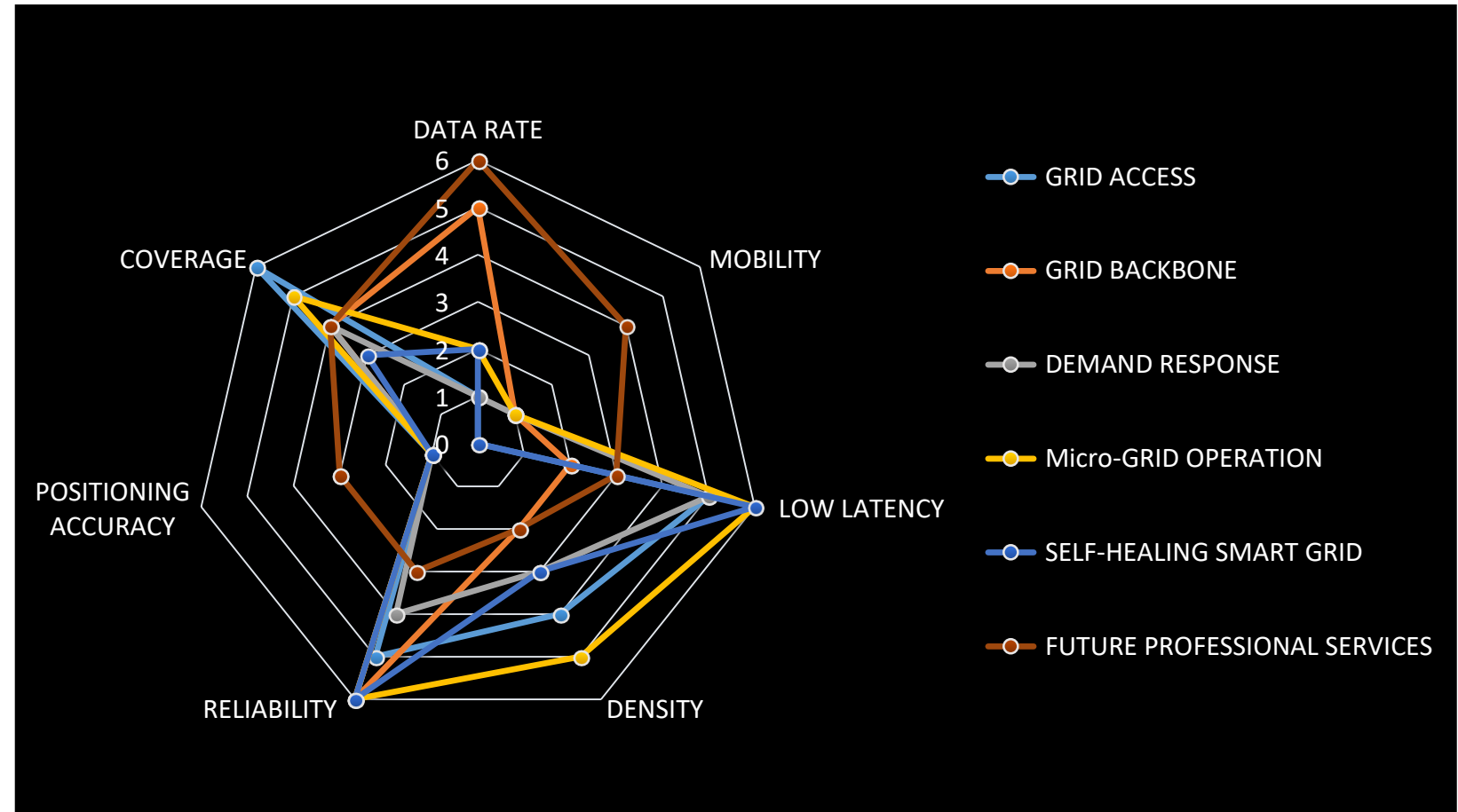
- Additive manufacturing;
- Smart manufacturing;
- Industry 4.0;
- Collaborative robots;
- Distributed production;
- Integrated manufacturing and logistics.



# Vertical Aspects of 5G Network Slicing

## Energy Systems Use Case

- Distributed renewable energy;
- Phase out of traditional power stations;
- Smart grids;
- Grid and local energy storage;
- Electrification of transports, heat, ...;
- Consumers are becoming prosumers;



# Vertical Aspects of 5G Network Slicing

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To be the enabler ecosystem for Verticals transformation, 5G slicing has to generate confidence:

- **User Centricity** – to allow customization and **co-creation/co-design** of innovative solutions;
- **Cybersecurity/slice isolation/data privacy/integrity** – essential for user confidence & GDPR conformity;
- **Reliability & Resilience** – in particular for critical systems operation scenarios;
- **Orchestration** – multi-domain orchestration and service aggregation are key for virtualization of actual and future services;
- **End-to-end global reach** – to support seamless international services (trains, cars, VR/AR field services, etc.);
- **Scalability & Adaptivity** - to serve for a wide range of applications in a flexible way, to allow for rapid upscaling with regards to device numbers per square meter but also to increase in granularity;

# Vertical Aspects of 5G Network Slicing (cont.)

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To be the enabler ecosystem for Verticals transformation, 5G slicing has to generate confidence:

- **Seamless Integration** – into existing ecosystem and to cope with fast technology evolution and increasing innovation pace;
- **Dynamic configuration & self-management** – providing simplicity, flexibility and ease-of-use during the whole lifecycle;
- **Energy efficiency** – critical for many remote IoT applications;
- **Slice QoS/QoE Performance Monitoring/Optimization** – SLA monitoring and in-time action are key aspects for confidence of verticals (predict network congestion/failure, immediate attack detection, latency monitoring, video quality monitoring, packet losses, ...);
- **Close collaboration** – between different stakeholders (Verticals + Network providers + Digital service providers + ...).

# 5G Network Slicing – final notes

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- 5G network slicing will have a strong impact on vertical industries, but it has to be fully service oriented, ease-of-use automated plug & play and provide seamless integration;
- Cybersecurity (privacy, authentication and data integrity) is fundamental to build verticals confidence;
- 5G ability to provide a one-stop service with global connectivity, including roaming, billing and other higher layer capabilities would be a strong value proposition;
- Reliability and QoS/QoE monitoring are very important;
- Besides connectivity, verticals would welcome aggregated end-to-end service offers with value, *i.e.* including big data collection and analytics;
- Many verticals have long life-cycles of equipment refresh, therefore frequent technology migrations will not be trivial and must be carefully minimized;
- Standardization will be crucial for future success;
- Close collaboration between vertical industries & telecom industry is required to leverage full potential of 5G Slicing.



# Why 5G is relevant for a Vertical like Efacec?

**Efacec** is a technology driven company with 70 years, that provides technology, solutions and services for 3 main sectors, which are being disrupted by digital transformation:

## - Energy

- Smart grids & energy automation systems;
- Storage & micro-grid solutions;
- Power systems (transformers, substations, switchgear systems, ...);
- Turnkey solutions for solar, thermal and hydro power plants;
- Asset condition monitoring & specialized services.

## - Mobility & Transportation

- Electric vehicles charging solutions;
- Turnkey solutions for Light Rail Trams;
- Railway signaling & telecom systems;
- Operational fleet & depot management systems.

## - Environment & Industry

- Water & waste treatment systems;

Efacec is preparing its portfolio for the new digital world seeing 5G as an enabler of future solutions. ***Cooperation is part of Efacec's strategy!***



Thank you very much for your attention!

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