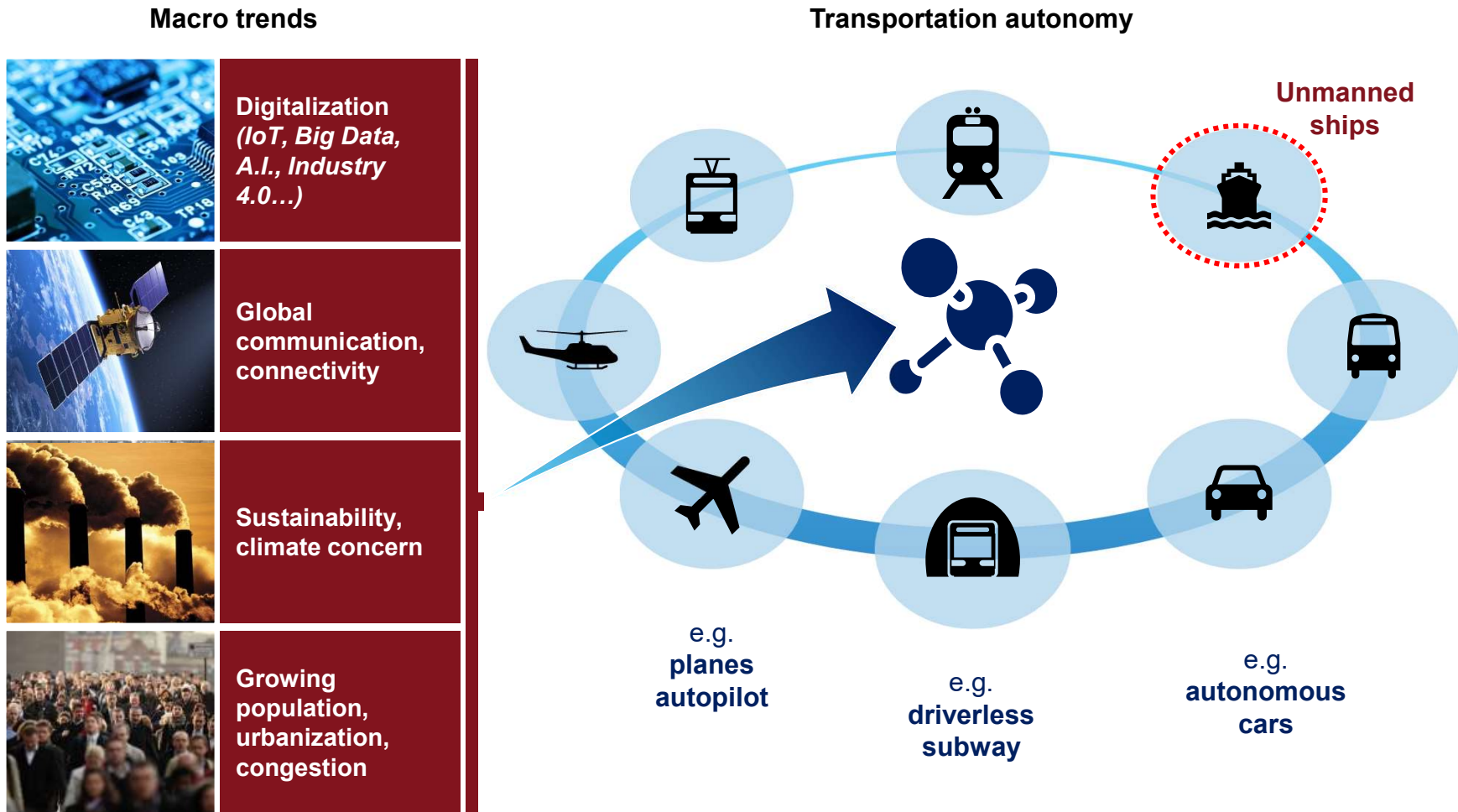


Toward autonomous ships

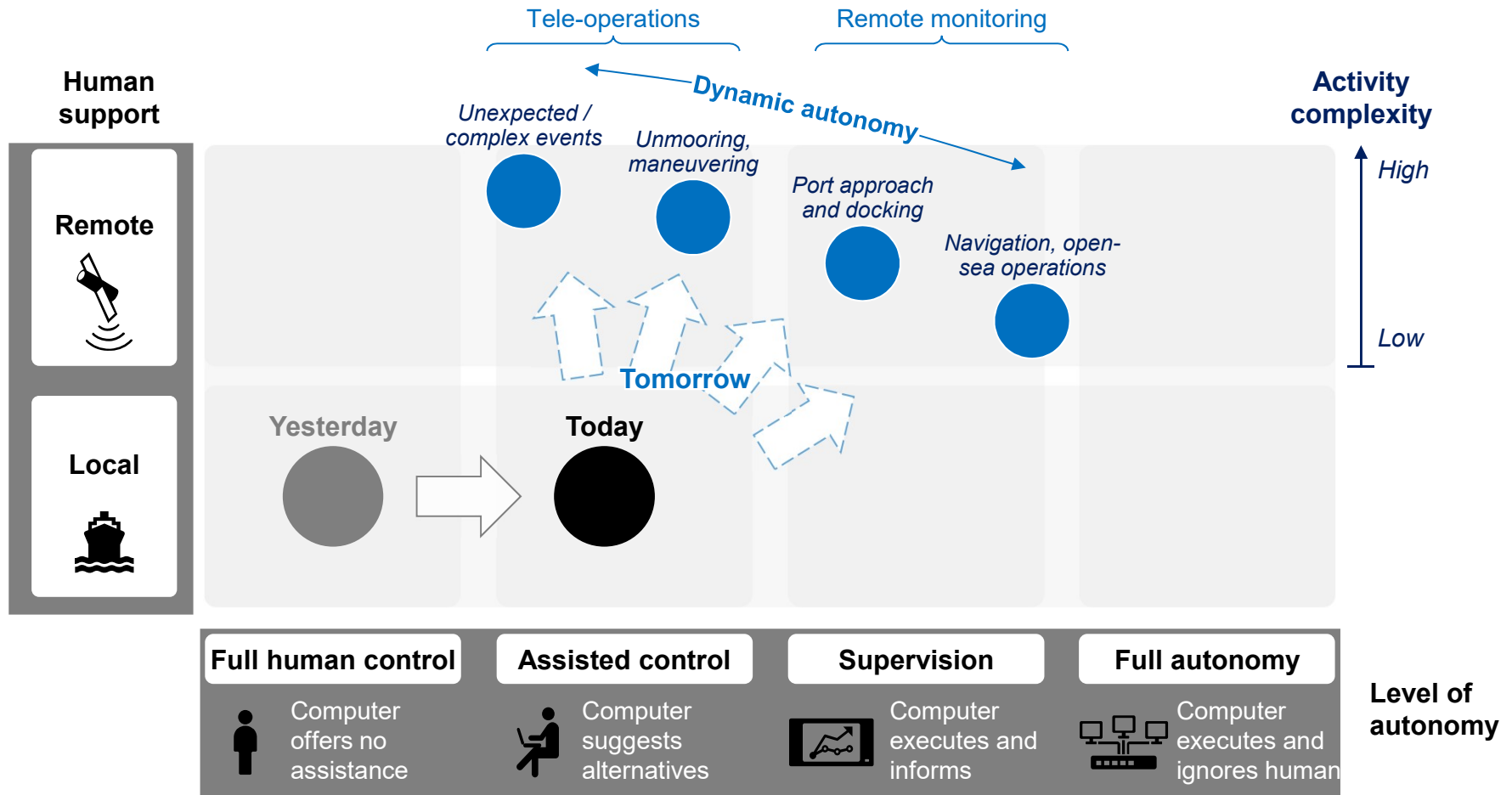
&

How they will change the shipping industry

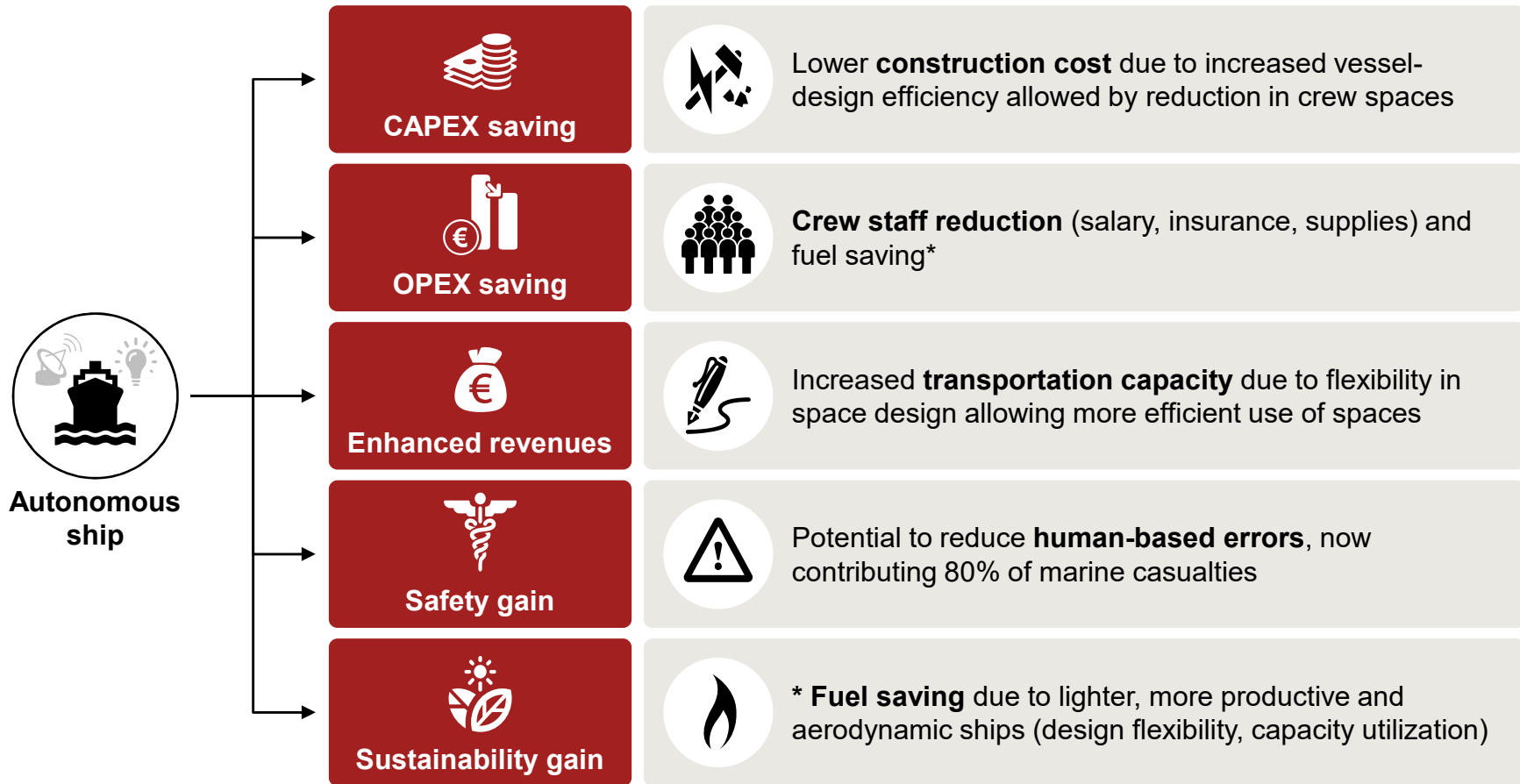
Macro trends are enabling and pushing the shift towards transportation autonomy in all the industries



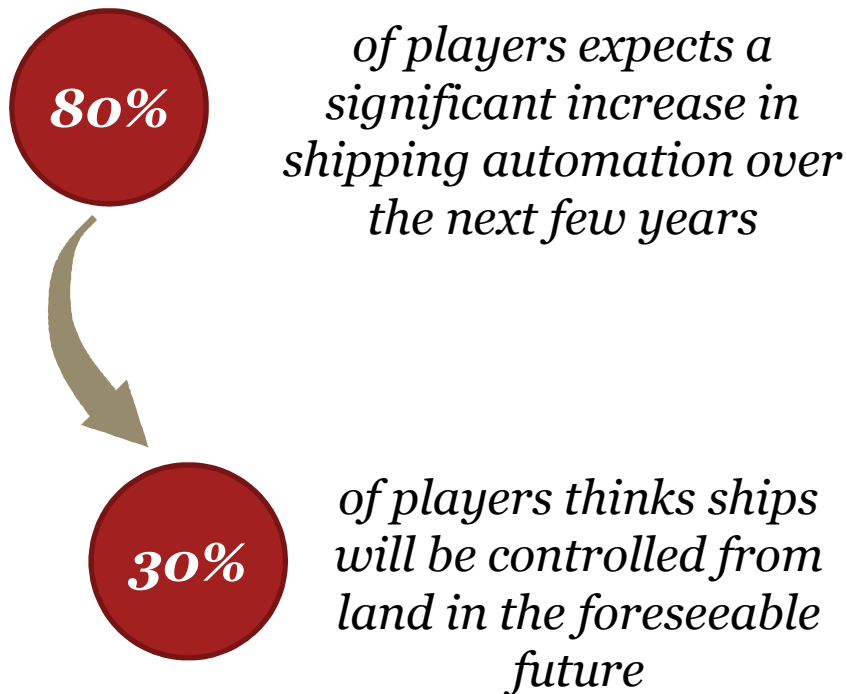
Ships are expected to be managed remotely under a concept of dynamic autonomy



Strong industrial rationales behind autonomous ships



PWC Strategy& Survey highlights European players' perception of technological opportunities



Main benefit from autonomous ships

- 1st** Monitoring of temperature and conditions of cargos
- 2nd** Lower staff costs
- 3rd** Less human error

Main risks of autonomous ships

- 1st** Crew on board can immediately manage emergencies
- 2nd** Need for Cybersecurity to prevent pirates attacks
- 3rd** Crew on board can perform directly maintenance during trips

Players need to think a sustainable and profitable strategic approach to face coming disruptive innovation

Source: PWC Industry Survey – European selected countries

Industry 4.0 deployment as key lever to generate long term value in Shipping industry

Industry 4.0

Distinct from Industry 3.0, which involved the automation of single machines and processes, Industry 4.0 encompasses end-to-end digitization and data integration of the value chain: offering digital products and services, operating connected physical and virtual assets, transforming and integrating all operations and internal activities, building partnerships, and optimizing customer-facing activities



Business ecosystem

- Generate profitability with **new and more complex business models**
- Develop **new revenues streams** based on data and real time services



Operations & Capabilities

- **Pace of technology development vs capex discipline**
- **Efficiency** as a necessary competitive factor
- Transform core **competences and capabilities**



Stakeholder acceptance

- Facilitate **regulatory framework update**
- Implement a **“sustainability oriented”** strategy

Strategy &