Urban Transport Disruption

Opportunities for Spanish Companies, Entrepreneurs and Smart Cities

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Zaragoza tramway

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"La investigación no solo se centrará en la tecnología, sino en lo social;
estamos ante un sin fin de oportunidades."

Julio Dolado [1]

Abstract

Researchers and consulting firms throughout the world write about major changes in the global transport industry — and in particular urban transport disruption.

In the media and literature, disruptive changes are described under various headings and concepts, including intelligent transport systems (ITS), integrated mobility systems and intelligent mobility. Each of these concepts contains elements of urban transport innovation and its role in smart city development.

This paper presents the concept of a disruptive paradigm shift known as smart urban mobility (SUM) - which brings together under one heading the urban transport elements from other concepts.

Given that Spain has proven strengths in smart public transport, intelligent traffic management systems, urban mobility, logistics, and smart city integration, the paper goes further by identifying ten of the most important urban transport opportunities for Spanish companies, entrepreneurs and urban planners.

Key words: transport, urban, smart city, autonomous, electric, mobility, digital, infrastructure, logistics, innovation, disruption

[1]Delegado nacional del programa de la Unión Europea Horizonte 2020: Transporte Inteligente, Ecológico e Integrado

Introduction

It might be called the *golden age of transport innovation*. Starting from the late-17th to the mid-19th century, the world experienced a surge in urban growth and a radical transformation in transport technology and infrastructure like it had never seen—including construction of turnpike roads, improvements in inland waterways, design of canal and rail networks, and invention of steam-powered vehicles.

During this period, numerous industrialists, engineers and inventors transformed and revolutionized transportation. Although many of these visionaries were from different generations and different countries, they shared distinguishing characteristics. They were creative thinkers who trusted their instincts, knew how to build things, and understood how to inspire others. However, they could not have imagined how the world of transportation would be disrupted in the 20th century by new waves of radical change, i.e., the invention and adoption of the automobile and airplane; new types of ships and submarines; advances in public transport; growth of international freight and logistics; and high-speed trains for intercity travel.

And in the early 20th century, there were few transport visionaries or planners who understood how growing dependence on privately owned cars and other motorized vehicles would lead to urban sprawl, congestion, high accident levels, unhealthy carbon emissions and noise pollution, and lack of affordable transport for some segments of society.

Today, the global transport industry, in particular the market for urban transport solutions, is on the cusp of another stage of disruption. In contrast to the golden age—when disruption occurred over a period of more than 150 years—forecasts suggest the next stage of transport disruption (which has already begun) will happen within a much shorter timeframe, perhaps less than 10 to 20 years. Visionaries believe this stage represents a paradigm shift in transport markets and involves deployment and mass market adoption of autonomous vehicles, electric vehicles, on-demand public transit, ride-sharing and e-hailing services, mobility as a service (MaaS) and other changes in how we commute, travel and transport goods. In parallel with these changes, transport companies, governments and regulatory entities must prepare for a kaleidoscope of smart city innovations and global megatrends.

Although a disruptive urban transport paradigm entails uncertainties and risks, it also offers significant global opportunities for Spanish transport, logistics and infrastructure companies, technologists, entrepreneurs and urban planners.

The Big Picture: Megatrends* Impacting Urban Transportation

Like many other industries, the global transport industry is affected by megatrends in societies, government policies, demographics, markets, digital technology, and political instability:

- **Urbanization**: More than 50 percent of the world's population—an estimated 3.8 billion people—live in cities, growing to more than 5 billion by 2030, causing massive social, economic and environmental transformation. (Note: Many countries such as Belgium, Brazil, Canada, Chile, Denmark, Finland, Japan, New Zealand, South Korea, Sweden, UK, US, Uruguay, Venezuela and others are already more than 80 percent urbanized.)
- **Smart cities and things:** Governments, cities, businesses and consumers increase their adoption of smart services and products with wireless connectivity and the ability to sense

and process vast amounts of data. (The smart city market is predicted to reach $1.5 trillion by 2020.)

- **New mobility paradigms**: Demand for more personalized transport services should result in passenger journeys made easier and less costly by innovative, multimode, multi-operator technologies and analytics.
- **Connected citizens**: Five billion Internet users by 2020 | More than 50 percent will have access to the Internet using smart devices. Technology innovation will raise the transport standards and quality that customers demand.
- **Trust issues**: Customer experience and public awareness of misleading information (e.g., concerning products, services, pricing and quality); outages and delays; fraud and security incidents; threats to data privacy; neglect of customer safety; operator negligence and suicidal acts affect efforts to maintain trust.
- **Digital transformation:** Cloud computing, ubiquitous sensing, IoT, big data analytics, 5G communications, cloud computing, hyperscaling, virtual and augmented reality will disrupt commerce, government, urban life, style of life, and the nature of work.
- **Seismic changes in society:** Increasing heterogeneity (and demand for personalization), generational political change, an aging population, and network economies alter the nature and fabric of society.
- **Geopolitical tensions:** Regional conflicts, acts of extremism and violence, political instability, and increased migration add to the complexity, risk and cost of transport safety, security and resilience.

* Adapted from BCG (Evans and Forth, 2016), EY (2015), UN (2009)

Some of the most significant trends affecting the transportation sector in the next few decades will stem from growth in the world's urban population; smart city deployment of innovative mobility solutions; declining use of petrol, diesel, and privately owned vehicles; and smarter investments in public transit and other mobility services.

These trends—which drive the demand for user-centric solutions, autonomous vehicles, electric vehicles, transport telematics, fleet management, digital logistics, transport network integration, infrastructure resilience, and many other aspects of urban transport—represent massive opportunities for Spanish transport companies and entrepreneurs.

The question is how to create a strategy to pursue the opportunities and capture the value. Answering this question depends on your insight and vision of potential scenarios—and whether you intend to lead as a disruptor or follow in the steps of other innovators or business partners. As shown in Table 1, my view is that at least four urban transport scenarios should be contemplated.

Table 1. Four scenarios for disruption of the urban transport market

Scenario	Outcome	Disruption?
I - Tech Takes Control	High-tech giants (Google, Apple, others) invade traditional markets of established companies through innovation in autonomous vehicles, electric cars and disruptive platforms.	▪ Significant ▪ Game-changing tech increases customer expectations.
II - Megadeals Dominate	Established companies (e.g., auto manufacturers) form ventures and alliances with tech giants and maintain control of the industry.	▪ Moderate ▪ Targeted disruptive actions over longer time frame ▪ High barriers to entry for new entrants
III - Entrepreneurs Focus	Startup firms and their ecosystems create totally new markets, products and services (e.g., mobility as a service) and challenge industry structure.	▪ Significant ▪ New entrants serve increasingly diverse market segments.
IV - Smart Cities Prevail	Cities increase control of infrastructure while regulatory authorities dictate how/where smart transport and autonomous vehicles are implemented.	▪ Varies by city ▪ Radical innovation constrained by regulations, standards and perceived risks

Smart Urban Mobility: A Disruptive 21st Century Paradigm

Intelligent mobility

According to a leading innovation center in the UK, the transportation concept known as *intelligent mobility* is defined as "encompassing everything from autonomous vehicles to seamless journey systems and multi-modal modelling software . . . and using emerging technologies to enable the smarter, greener and more efficient movement of people and goods around the world. Intelligent mobility is all about taking a different approach to the challenges that have traditionally beset the transport sector, whether it be congestion, pollution or the lack of “joined up” thinking between different means of transport." The global market for intelligent mobility is predicted to reach GBP 900 billion by 2025. (Transport Systems Catapult, 2016)

Intelligent transport systems

Meanwhile, the European Telecommunications Standards Institute (ETSI) defines the concept of *intelligent transport systems* (ITS) as a group of innovative information and communication technologies designed or adapted for "transport infrastructures and vehicles in an effort to improve their safety, reliability, efficiency and quality. ITS services are also designed to optimize transport times and fuel consumption thus providing greener and safer transportation" (ETSI, 2015). ITS therefore includes telematics and communications in vehicles, between vehicles (V2V), and between vehicles and fixed infrastructure (V2I).

Integrated mobility systems

According to a McKinsey study, *integrated mobility systems* could produce benefits worth up to $600 billion in 50 metropolitan areas. "Because each city is unique, the transition to integrated mobility will also play out differently, and produce different results, from one city to the next. The pace and extent of change will depend on factors such as population density, household income, public investment, the state of roads and public-transit infrastructure, pollution and congestion levels, and local governance capabilities." (Bouton et al, 2017)

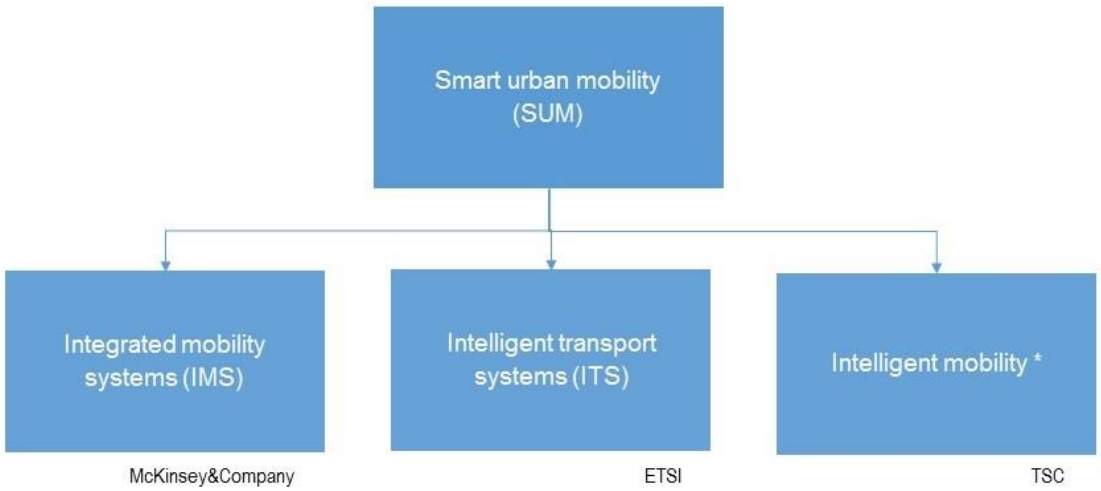
Smart urban mobility

Each of the preceding conceptual views of transport innovation discusses various innovations that apply to urban transport challenges. By drawing together the urban and smart city

components of these concepts, Figure 1 presents an all-embracing paradigm of *smart urban mobility* for the urban transport sector (i.e., a higher level view in the urban transport taxonomy).

Spanish transport entities—including established companies such as Indra, Sice, Grupo CAF, Seat and Ferrovial, and new entrants such as OnTruck, Shotl, Teycars, Cabify and Camina Lab— are involved in one or more aspects of this new paradigm.

Figure 1. Smart Urban Mobility: A Disruptive Paradigm



* Note: In this taxonomy, SUM includes the aspects of intelligent mobility that apply to intra-urban transport (i.e., not to air travel, maritime transport and logistics, intercity rail and road, etc.)

Recognizing versus resisting a new paradigm

Pursuing new opportunities during a disruptive era depends on the ability and willingness to recognize paradigm shifts. Consider an example from the telecommunications industry. It was only a few decades ago when many established telecommunication companies resisted the notion that their industry was on the edge of major disruption. Numerous signals from market research, thought leaders, customers, technology innovators, and competitors served as obvious clues that disruptive opportunities (and threats) were on the horizon. However, the established companies were not known as innovators and were ill-prepared and unwilling to recognize rapid adoption of mobile technologies and services, broadband networks, Internet and digital services. As a result, they've spent decades in the role of innovation followers, trying to re-define themselves in the shadow of high-tech giants.

Today, in the midst of many signals of disruption in the urban transport market, it is up to the world's established transport companies (and entrepreneurs and new entrants) to decide what role they intend to play—and how to compete and innovate. Based on secondary research (in the trade press; social and professional media; company websites and annual reports; and industry events), it appears that many startup firms and innovators have already made these decisions.

Opportunities and Challenges for Spanish Innovators

Spanish companies in the transport sector have proven strengths—in smart public transport, intelligent traffic management, sustainable transport infrastructure, urban mobility innovation, logistics and smart city integration with high-speed lines—which can be applied to opportunities in the global market for smart urban mobility (SUM).

Here are ten of the most important opportunities and challenges to consider in the SUM market:

- Last-mile delivery solutions (including drones, digital logistics, fleet management, e-delivery services, autonomous vehicle platoons, green systems integration)
- Electric vehicles and infrastructure (including automobiles, trucks, buses, cycles, trams)
- Autonomous transport services and vehicles (including electric and connected AVs, vehicle design, testing, safety certification, operational design domain (ODD))
- Smart urban mobility innovation lab (e.g., design of scalable mobility platforms)
- Segmentation analytics and user-centric mobility solutions
- Smart infrastructure and communications for autonomous transport
- Smart transport interchanges and multimodal integration
- Collaborative, digital logistics platforms
- Resilient network management services and control systems
- Mobility as a Service (e.g., integration of public transit with private sector mobility options, services and mobile payments)

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Jon Glasco is a freelance writer and journalist. Since the 1990s, Jon has held key roles as a writer, innovation management consultant and bid manager for clients in Austria, Canada, Czech Republic, Germany, Spain, Switzerland, the UK and US.

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