Tendances, technologies et impacts sur les infrastructures

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In an infamous article published in 2003 by the Harvard Business Review, Nicholas Carr asserted that information technology serves a similar purpose in industry as any other major technology has, such as railroads, the assembly line, or combustible engines. At first these innovations are proprietary and offer a substantial advantage in the market for those who possess this technology. But over time the technology becomes more common and standardized, providers more plentiful, competition rises, and consequently, the value of that technology becomes insignificant from a competitive perspective.


**“Technology is commodity in the making”**
Patrick Lauzière

"... de plus en plus de villes plus denses"

http://www.economist.com/node/9070726
https://en.wikipedia.org/wiki/List_of_cities_by_population_density
Pull factors
• more and better jobs
• better hospitals and health care
• better living standards
• cities are social and financial centres
• better education—schools and universities

http://www.english-online.at/geography/world-population/urban-areas.htm
“2015 Worst city to drive on Earth”


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Geoffrey West (2011)

https://www.ted.com/talks/geoffrey_west_the_surprising_math_of_cities_and_corporations

https://www.flickr.com/photos/jurvetson/4873904711
https://www.google.ca/search?q=industrial+revolutions&source=lnms&tbm=isch&sa=X&ved=0ahUKEwi7u5_b7bfQAhUM3IMKHbEKCc4Q_AUICCgB&biw=1569&bih=768#imgrc=dZNizQ7zLL80EM%3A
Quelques technologies qui auront bientôt un impact sur nos infrastructures routières.
Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other cars on the road (vehicle-to-vehicle [V2V]), roadside infrastructure (vehicle-to-infrastructure [V2I]), and the “Cloud.”

[http://autocaat.org/Technologies/Automated_and_Connected_Vehicles/](http://autocaat.org/Technologies/Automated_and_Connected_Vehicles/)
An **electric car** is an **automobile** that is **propelled** by one or more **electric motors**, using **electrical energy** stored in **rechargeable batteries** or another **energy storage device**.

https://en.wikipedia.org/wiki/Electric_car
An **autonomous car** (driverless car, self-driving car, robotic car) is a **vehicle** that is capable of sensing its environment and navigating without human input. **Autonomous cars** can detect surroundings using a variety of techniques such as radar, lidar, GPS, odometry, and computer vision.

https://en.wikipedia.org/wiki/Autonomous_car
A sharing economy is an economic model in which individuals are able to borrow or rent assets owned by someone else. The sharing economy model is most likely to be used when the price of a particular asset is high and the asset is not fully utilized all the time.

https://twitter.com/techbikers/status/631868573737201664
In logistics, the Physical Internet is an open global logistics system founded on physical, digital, and operational interconnectivity, through encapsulation, interfaces and protocols.\[1\] The Physical Internet is intended to replace current logistical models.\[2,3\] The project currently has funding from the National Science Foundation as well as contributions from MHIA and CICMHE.\[4\] The Physical Internet Initiative's manifesto is “Transforming the way physical objects are handled, moved, stored, realized, supplied and used, aiming towards global logistics efficiency and sustainability.”\[1\] It attempts to achieve this by applying concepts from internet data transfer to real-world shipping processes.\[2,5\]

https://en.wikipedia.org/wiki/Physical_Internet
The Internet of things (stylised Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity—that enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society." The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities.

Problème A
Prix nul demande infinie

- Congestion
- Défis de sécurité
- Fluidité réduite
- Temps de parcours incertain

Solution A1 : Péages physiques ou virtuels

https://www.flickr.com/photos/archivesmontreal/22726427423
Gestion dynamique des voies
Source : Orange Traffic  www.orangetraffic.com
Capteurs Bluetooth de temps de parcours

Images : Orange Traffic et Pixabay libre de droits
Source : Orange Traffic www.orangetraffic.com
Signalisation active
Problème B
Usage différent même espace physique
Solution B1 : Séparation temporelle des modes de transport
Solution B2 : Contrôle physique / separation des modes de transport incompatibles
Problème C
Destinations différentes sur un même chemin, avec un horaire non planifié
Solution C1 : Véhicule connecté informe l’infrastructure de son itinéraire. L’infrastructure analyse, attribue et reserve l’accès pour préserver sa fluidité et sa sécurité.
Solution C2 : Internet Physique et communautés vertes “Compact Urban Cells”
MERCI!

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CRÉDITS / SOURCES ADDITIONNELLES

- Présentations éclairantes / sources d’informations :
  - Wanis Kabbaj What a driverless world could look like (TED, 2016)
  - Geoffrey West The surprising math of cities and corporations (TED, 2011)
  - Kent Larson Brilliant designs to fit more people in every city (TED, 2012)
  - Jennifer Healey If cars could talk, accidents might be avoidable (TED, 2013)