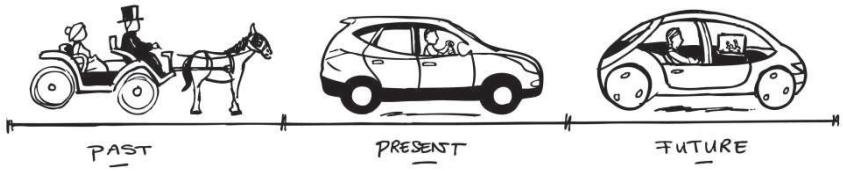
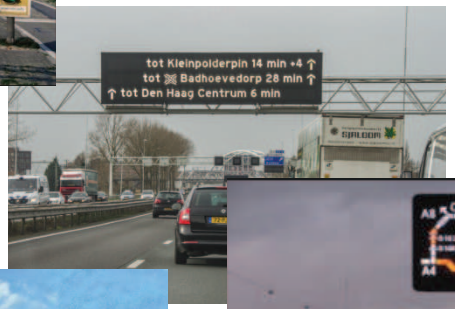
Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

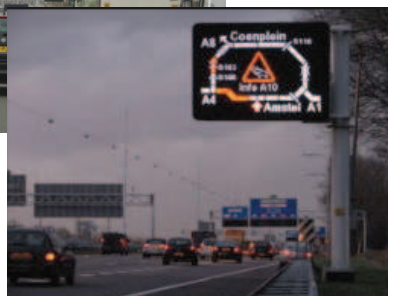


Past, Present & Future

Frans op de Beek
Principal advisor trafficmanagement
Rijkswaterstaat

First traffic jam in NL 29-05-1955

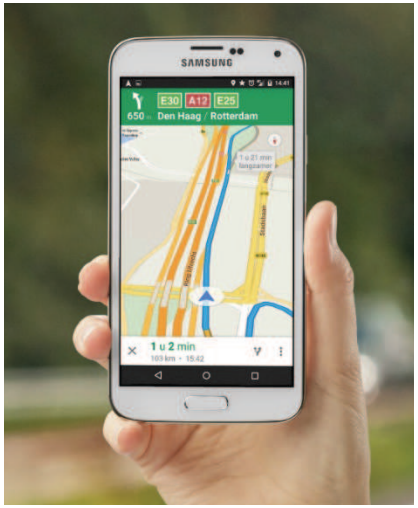




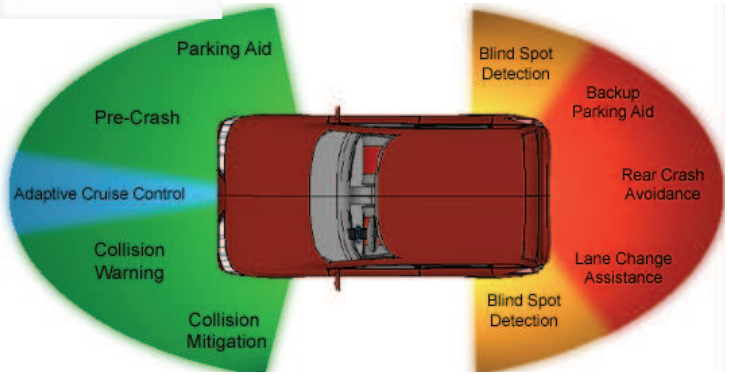
1987

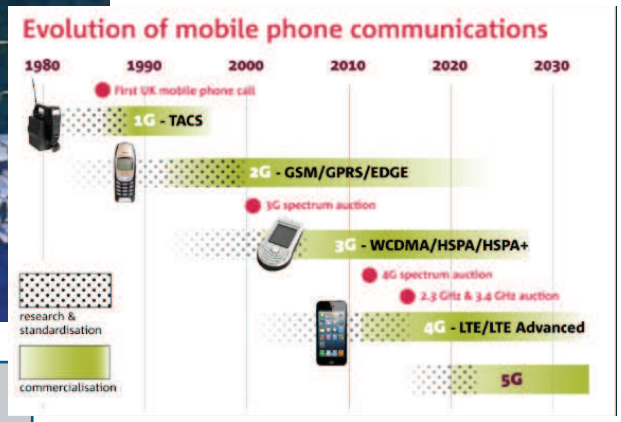

100 m
carin
PHILIPS

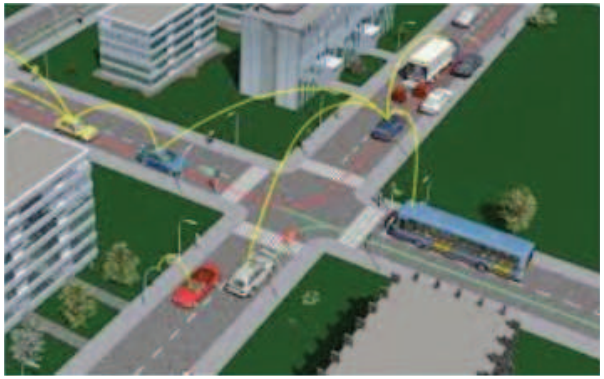

160

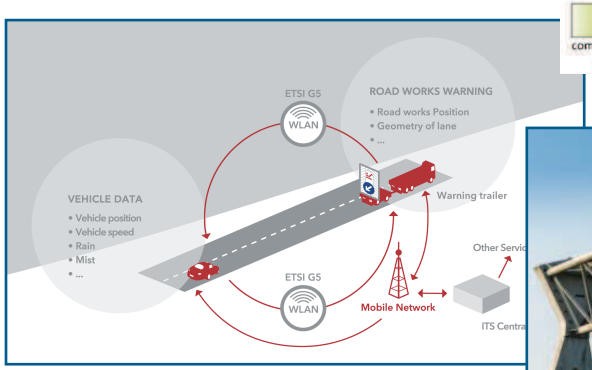

SAMSUNG
E30
A12
E25
Den Haag / Rotterdam
1 u 2 min


451
HF-74-NF


Parking Aid
Pre-Crash
Adaptive Cruise Control
Collision Warning
Collision Mitigation
Blind Spot Detection
Backup Parking Aid
Rear Crash Avoidance
Lane Change Assistance
Blind Spot Detection


Evolution of mobile phone communications
1980
1990
2000
2010
2020
2030
First UK mobile phone call
1G - TACS
2G - GSM/GPRS/EDGE
3G spectrum auction
3G - WCDMA/HSPA/HSPA+
4G spectrum auction
2.3 GHz & 3.4 GHz auction
4G - LTE/LTE Advanced
5G
research & standardisation
commercialisation

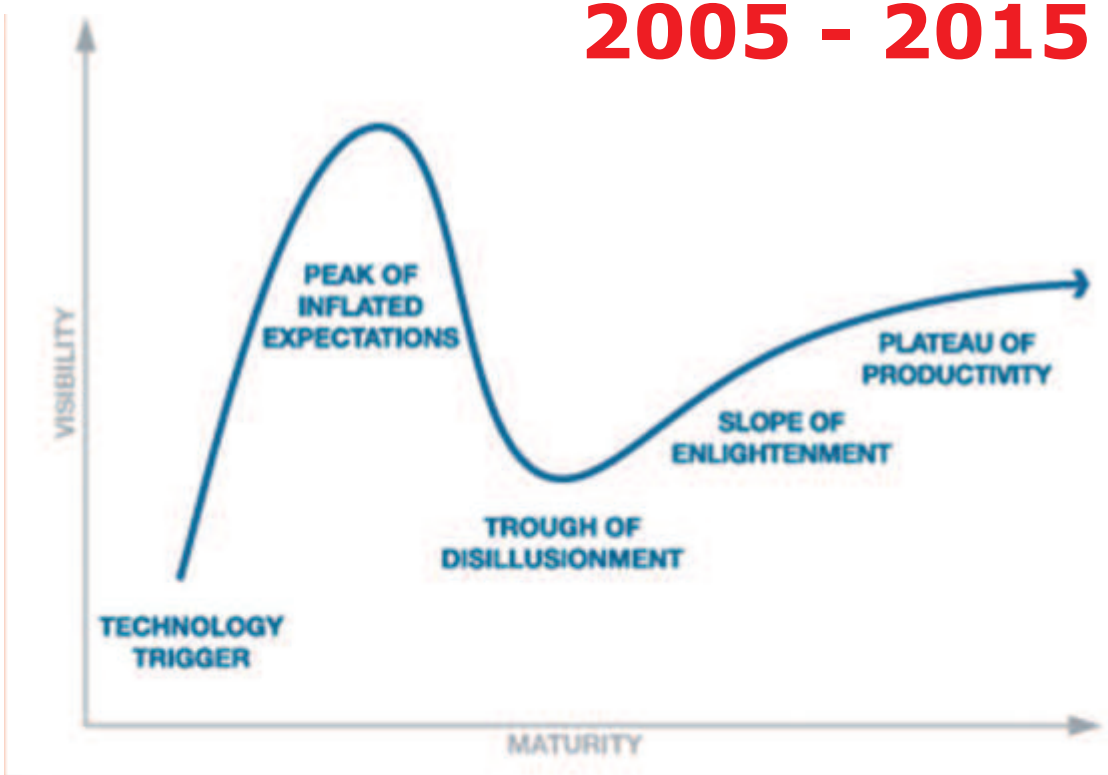


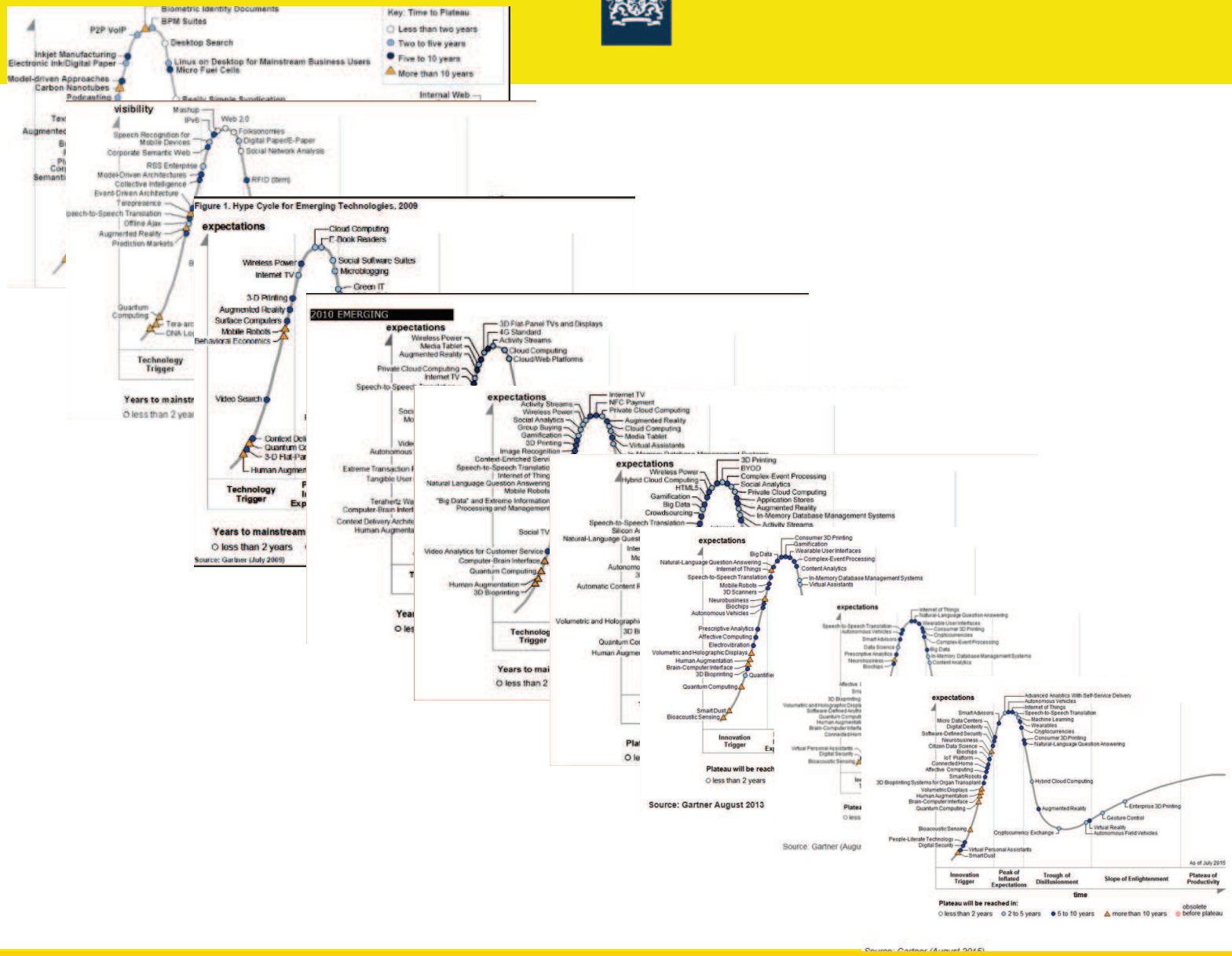

ETSI G5
WLAN
ROAD WORKS WARNING
• Road works Position
• Geometry of lane
• ...
VEHICLE DATA
• Vehicle position
• Vehicle speed
• Rain
• Mist
• ...
Warning trailer
ETSI G5
WLAN
Mobile Network
Other Servic
ITS Centra


70
70
70
23:28

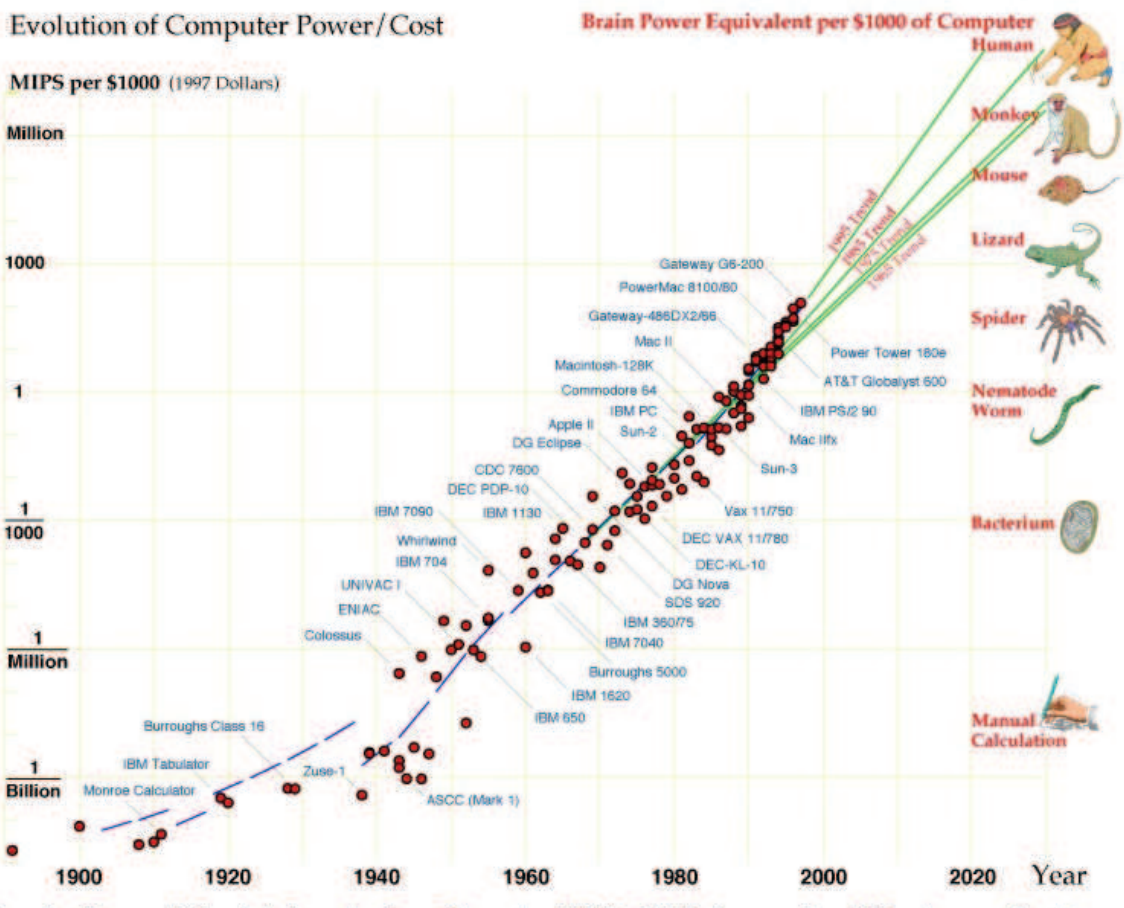
Gartner's hype cycle for emerging technologies

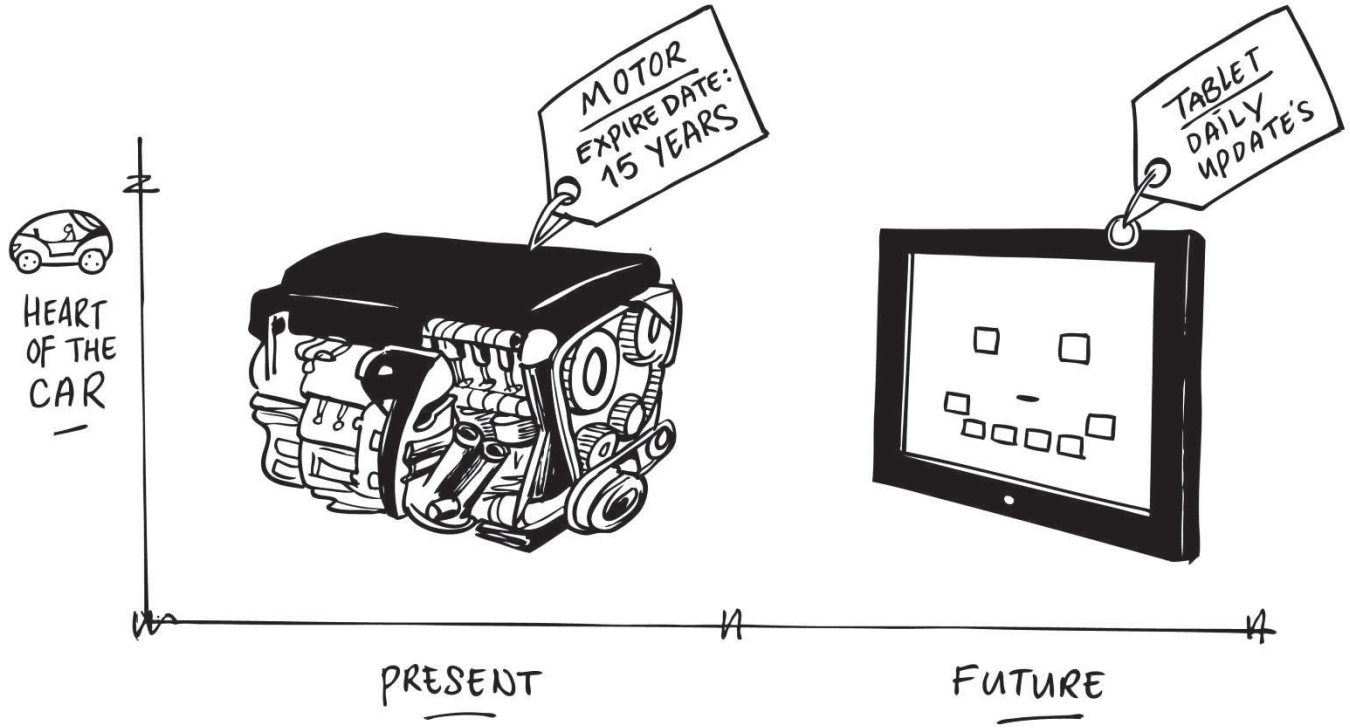
2005 - 2015




Biometric Identity Documents
BPM Suites
P2P VoIP
Desktop Search
Inkjet Manufacturing
Electronic Ink/Digital Paper
Linux on Desktop for Mainstream Business Users
Micro Fuel Cells
Model-driven Approaches
Carbon Nanotubes
Podcasting
Key: Time to Plateau
Less than two years
Two to five years
Five to 10 years
More than 10 years
Internal Web
visibility
Mashup
IPv6
Web 2.0
Folksonomies
Speech Recognition for Mobile Devices
Digital Paper/E-Paper
Corporate Semantic Web
Social Network Analysis
RSS Enterprise
Model-Driven Architectures
RFID (Item)
Collective Intelligence
Event-Driven Architecture
Telepresence
Offline Ajax
Augmented Reality
Prediction Markets
Quantum Computing
Technology Trigger
Years to mainstr
less than 2 yea
Figure 1. Hype Cycle for Emerging Technologies, 2009
expectations
Cloud Computing
E-Book Readers
Wireless Power
Social Software Suites
Internet TV
Microblogging
Green IT
3-D Printing
Augmented Reality
Surface Computers
Mobile Robots
Behavioral Economics
Video Search
Technology Trigger
Years to mainstream
less than 2 years
Source: Gartner (July 2009)
2010 EMERGING
expectations
3D Flat Panel TVs and Displays
Wireless Power
4G Standard
Media Tablet
Activity Streams
Augmented Reality
Cloud Computing
Private Cloud Computing
Cloud/Web Platforms
Internet TV
Video Analytics for Customer Service
Computer-Brain Interface
Quantum Computing
Human Augmentation
3D Bioprinting
Years to mai
less than 2
NFC Payment
Social Analytics
Group Buying
Gamification
3D Printing
Image Recognition
Virtual Assistants
Hybrid Cloud Computing
HTML5
Big Data
Crowdsourcing
Application Stores
In-Memory Database Management Systems
Activity Streams
Natural-Language Question Answering
Internet of Things
Speech-to-Speech Translation
Mobile Robots
3D Scanners
Neurobusiness
Biochips
Autonomous Vehicles
Prescriptive Analytics
Affective Computing
Electrovibration
Volumetric and Holographic Displays
Human Augmentation
Brain-Computer Interface
3D Bioprinting
Quantum Computing
Smart Dust
Bioacoustic Sensing
Innovation Trigger
Plateau will be reach
less than 2 years
Source: Gartner August 2013
Consumer 3D Printing
Gamification
Wearable User Interfaces
Complex-Event Processing
Content Analytics
Advanced Analytics With Self-Service Delivery
Autonomous Vehicles
Machine Learning
Wearables
Cryptocurrencies
Digital Dexterity
Software-Defined Security
Citizen Data Science
IoT Platform
Connected Home
Affective Computing
Smart Robots
3D Bioprinting Systems for Organ Transplant
Volumetric Displays
People-Literate Technology
Digital Security
Virtual Personal Assistants
Smart Dust
Cryptocurrency Exchange
Enterprise 3D Printing
Gesture Control
Virtual Reality
Autonomous Field Vehicles
As of July 2015
Innovation Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity
time
Plateau will be reached in:
less than 2 years
2 to 5 years
5 to 10 years
more than 10 years
obsolete before plateau

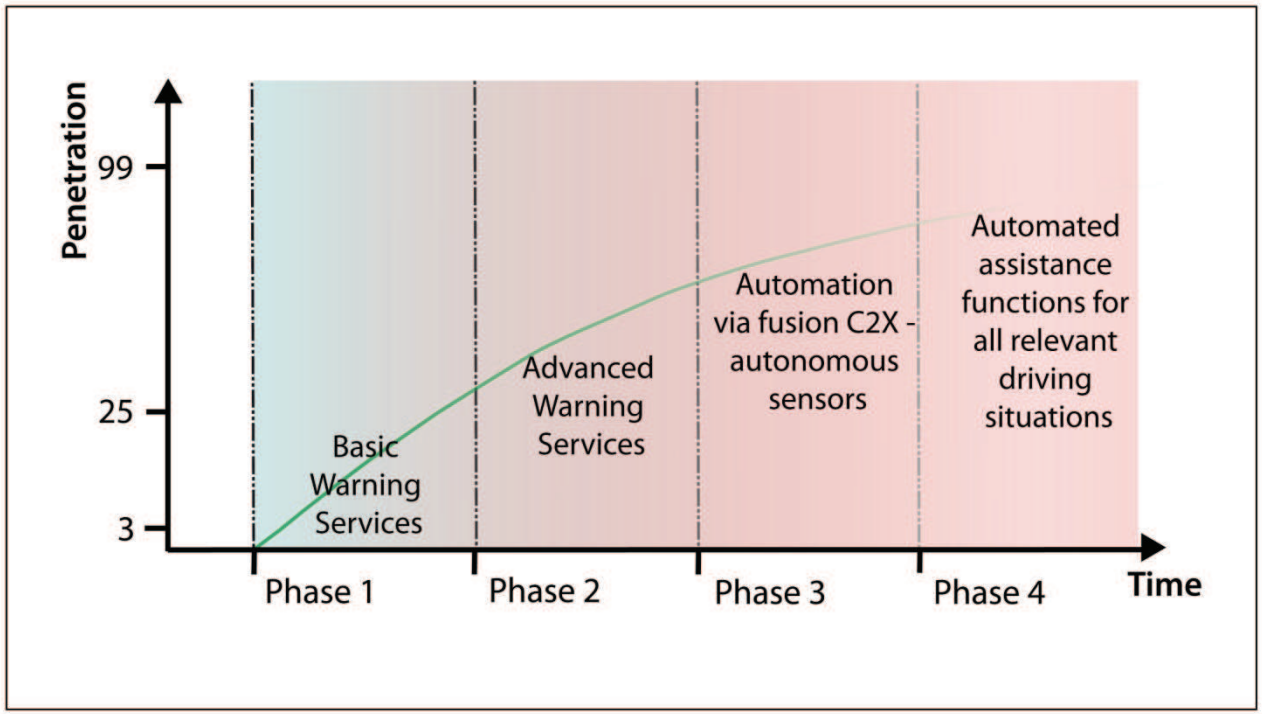
Source: Gartner (August 2015)



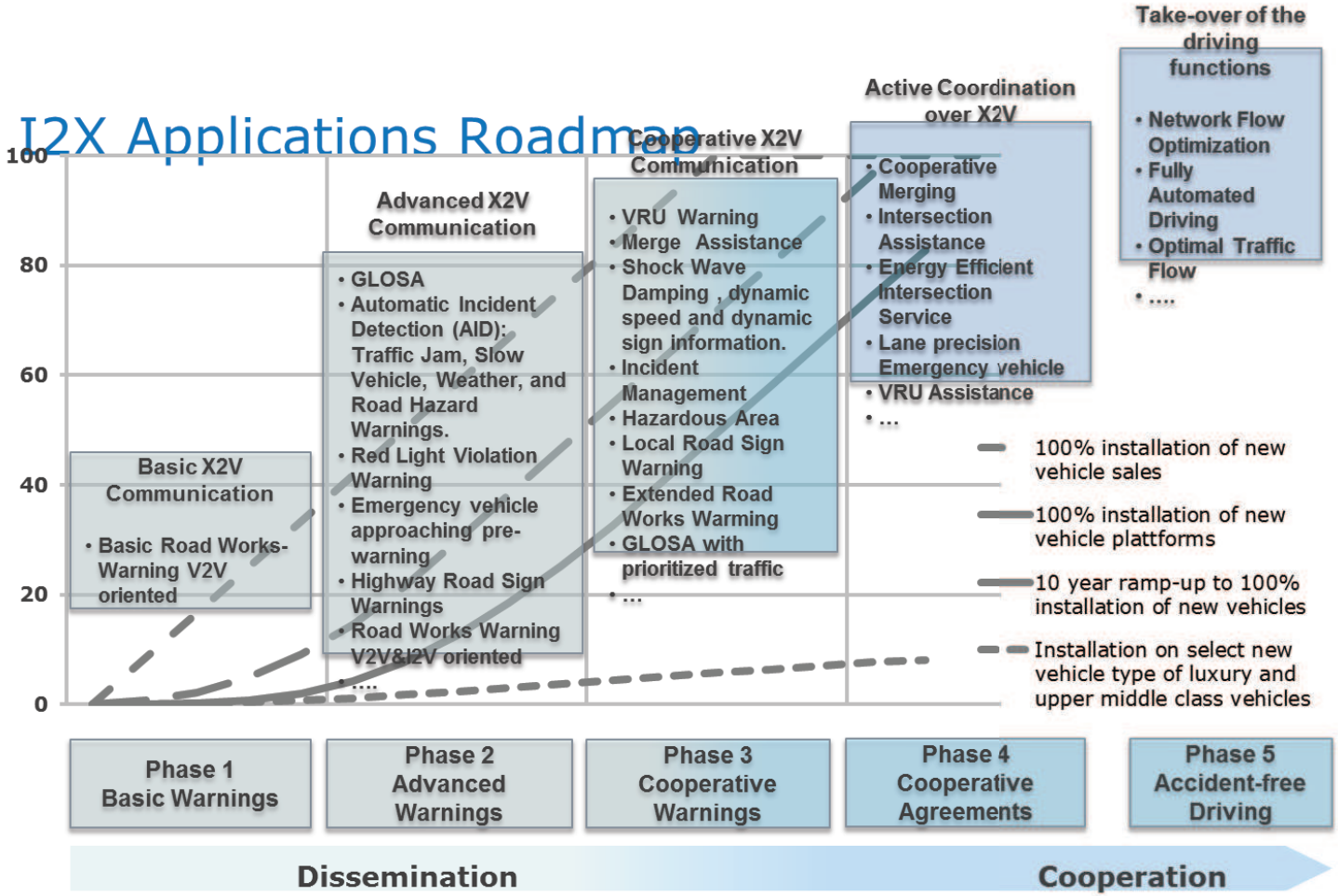

MOTOR
EXPIRE DATE:
15 YEARS
TABLET
DAILY
UPDATE'S
HEART
OF THE
CAR
PRESENT
FUTURE

Automotive industry development cycles

Introduction of automotive systems is linked to platform developments of 5..7 years



Current discussions with Car2Car in AmsterdamGroup



Tesla: This Is Our Most Significant Step Towards Safe Self-Driving Cars

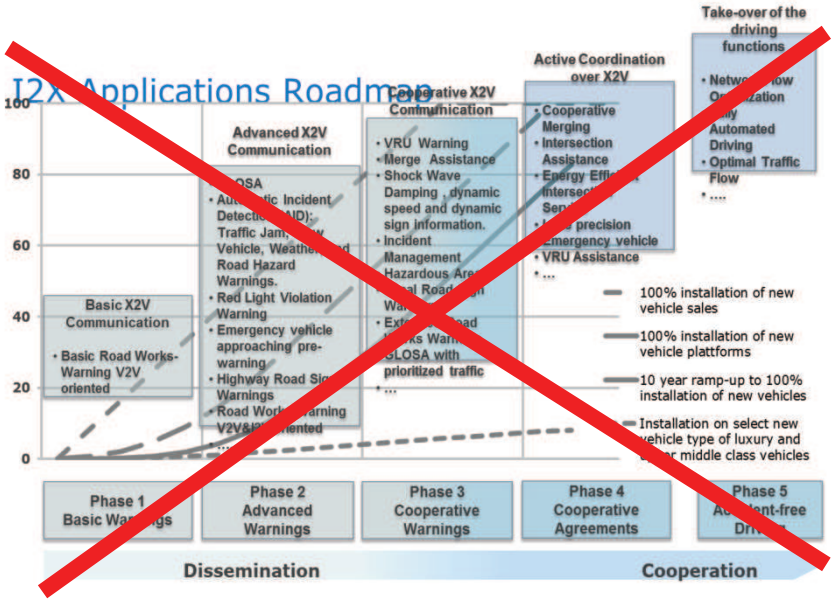
First it tackled highways, now it's driverless parking.

Tesla's most significant step towards safe autonomous cars is driverless parking technology it introduced last month.

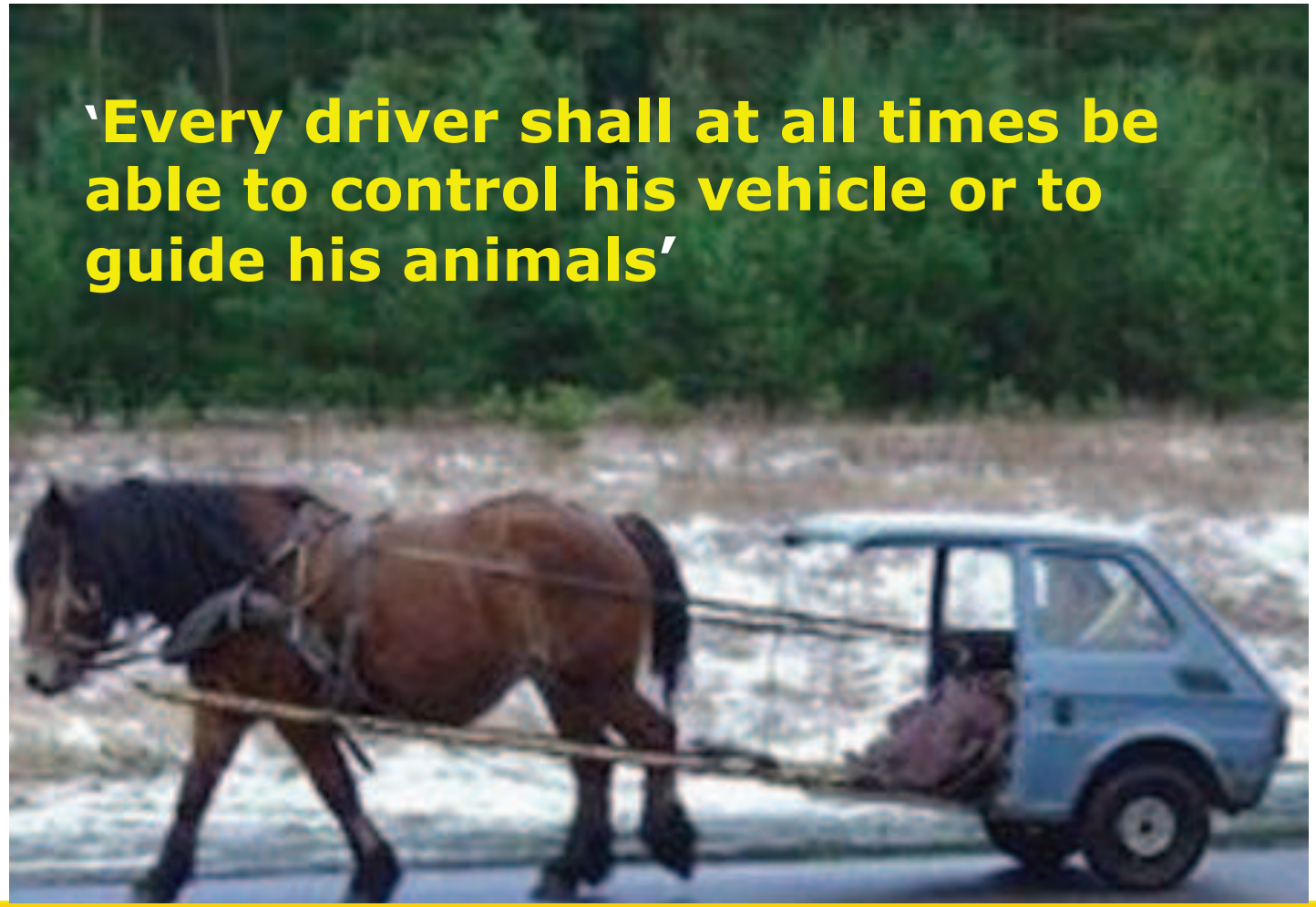
.....

Tesla introduced Summon in January in its **7.1 software update**.

Summon is a new feature in Tesla's hands-free driving technology called autopilot.



Legislation is hampering development and deployment



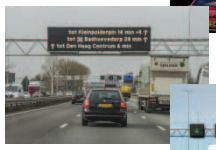
Declaration on connected and automated driving

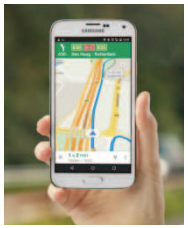
- Coherent international, European and national rules
- Use of data
- Ensure privacy, data protection and Security
- Public awareness and acceptance
- Vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication (hybrid comm.)
- Common definitions of connected and automated driving
- International cooperation

Truck platooning Challenge

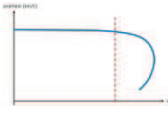
Traffic management and Influencing factors

Future Traffic management





Transition in Trafficmanagement



network capacity management

IM Services

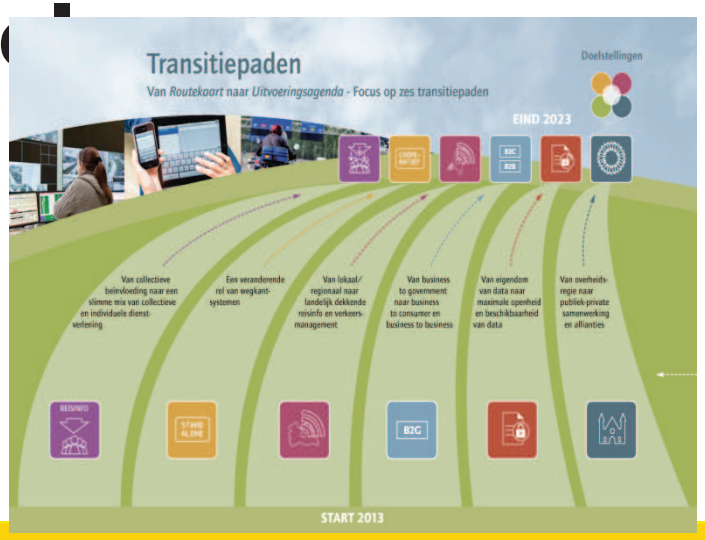
Evolution

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
***Human driver* monitors the driving environment**						
0	**No Automation**	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	**Driver Assistance**	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	**Partial Automation**	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	**System**	Human driver	Human driver	Some driving modes
***Automated driving system* ("system") monitors the driving environment**						
3	**Conditional Automation**	the *driving mode*-specific performance by an *automated driving system* of all aspects of the dynamic driving task with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	**System**	Human driver	Some driving modes
4	**High Automation**	the *driving mode*-specific performance by an automated driving system of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	**System**	Some driving modes
5	**Full Automation**	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	**All driving modes**

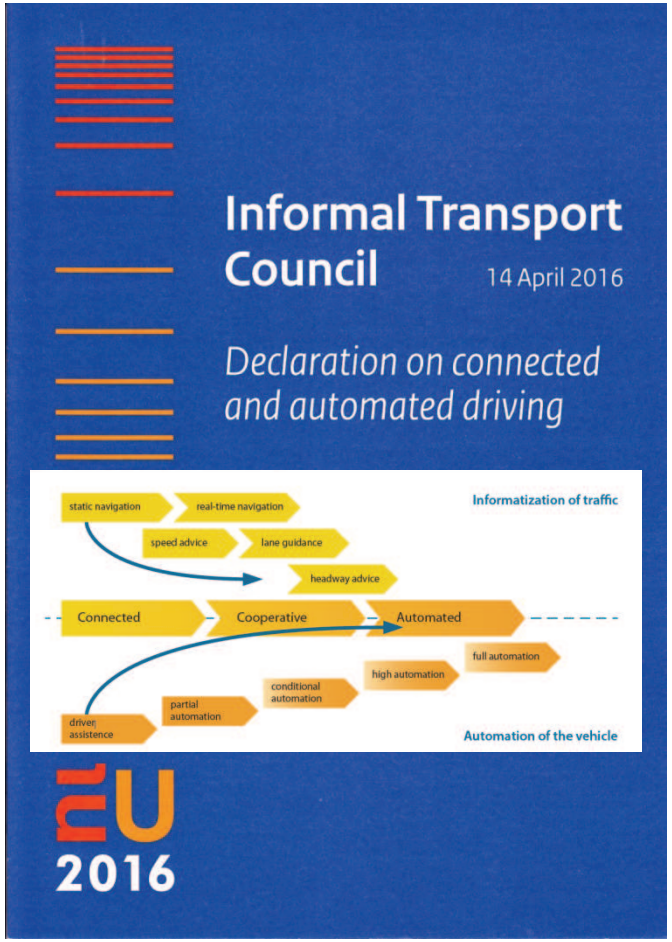
Automated Driving

Cooperative Vehi

Connected Vehicles



Declaration on connected and automated driving



- a <u>coherent European framework</u> for the deployment of interoperable connected and automated driving, which should be available, if possible, by 2019;
- <u>bring together developments</u> of connected and automated driving;
- adopt a <u>"learning by experience"</u> approach, including, where possible, cross-border cooperation, sharing and expanding knowledge and to develop practical guidelines to ensure interoperability of systems and services;

Learning by Experience:
Netherlands Testland – coherence of things

Projects

CIC | Testbed Brabant (BBV) | InterCor | PPA | Many others

CHARM

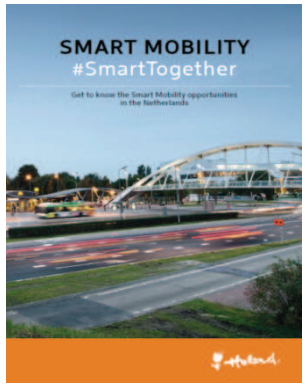
National
Strategy & Harmonisation

Living Lab NL

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

RDW

Provincie Noord-Brabant



Ambition minister/NL testland

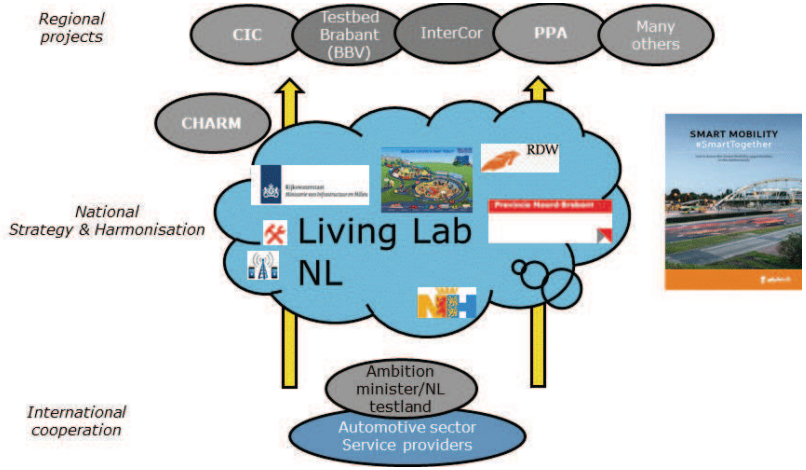
International
cooperation

Automotive sector
Service providers
Telecom industry

C-ITS Corridor & INTERCOR

Conclude:

- Learning by doing



Conclude:

- Learning by doing
- Smart cooperation
  - (inter)national

Conclude:

- Learning by doing
- Smart cooperation
  - (inter)national
- Adaptive & speed

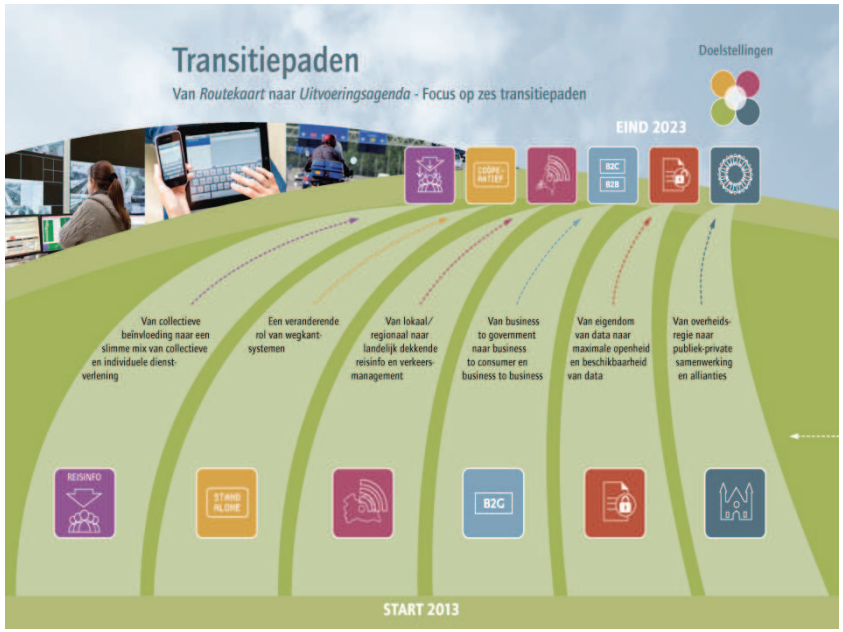
Source: Gartner (August 2015)

Conclude:

- Learning by doing
- Smart cooperation
  - (inter)national
- Adaptive & speed
- Transition TM

Conclude:

- Learning by doing
- Smart cooperation
  - (inter)national
- Adaptive & speed
- Transition TM
- Transition paths



Transitiepaden

Van *Werken* naar *Pensionering* - Focus op zes transitiepaden

Doelstellingen

Van MTM (makkelijk te managen) naar OBU (opa bij uitstek)

Van klushuis naar droomwoning

Van werktijd naar vrije tijd

Van dienstreizen naar vakantiereizen

Van werkbureau naar keukentafel

Van netwerkmanagement naar pretwerkmanagement

START 2016