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Advanced Models for Smart Mobility in Cities. The Role of Bike Transport

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Agenda

- Introduction
- Context: The Changing Mobility Landscape
- Principles in Action – Ten Recommended Deep Dives
 - VeloCity Project
 - Conclusion



Who Is This Talk for?

- It primarily targets the key decision-makers and opinion leaders of cities, established enterprises and start-ups, and representatives of civil society
- It aims to inform ideas and actions for future influencers, such as concerned or inspired citizens, professionals and students.

The goal of the talk

Is to bring together researchers and practitioners, who are interested in

- Setting of general principles to improve urban mobility, developed based on the collective wisdom, research and experience of the group
- Specifying selected concrete recommended deep dives with related best practices and resources
- Calling to further action and knowledge development in the area of urban mobility

Context

The Changing Mobility Landscape

1 Trends and Challenges

- The global population has tripled in the last 100 years, bringing the current count to over 7 billion people
- Some forecasts suggest there will be 9 billion people by 2050, while other estimates go as high as 11 billion. In this context, natural resource constraints will become more prominent.

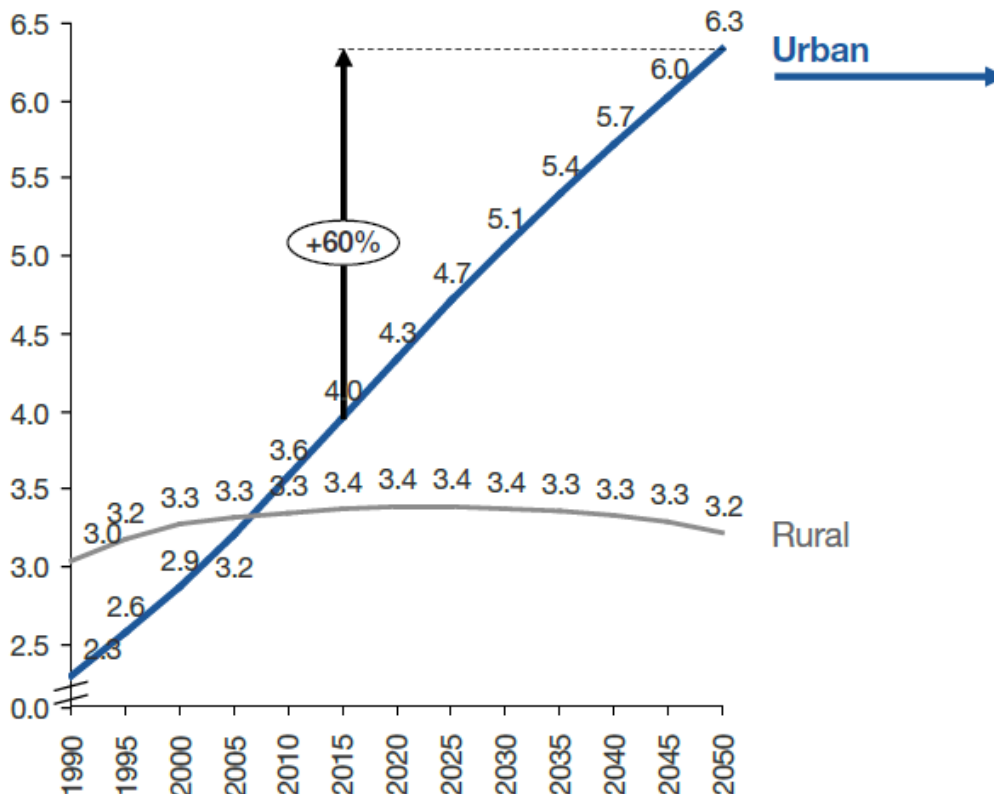
Context

- A continuing trend towards urbanization, coupled with strong population growth, suggests that by 2050 an additional 2.5 billion people will be added to cities around the world, by which point, two-thirds of the world's population will be based in urban areas. And 90% of the urban growth is predicted to take place in the developing world.

Growing urban population leading to an explosion in demand for urban mobility

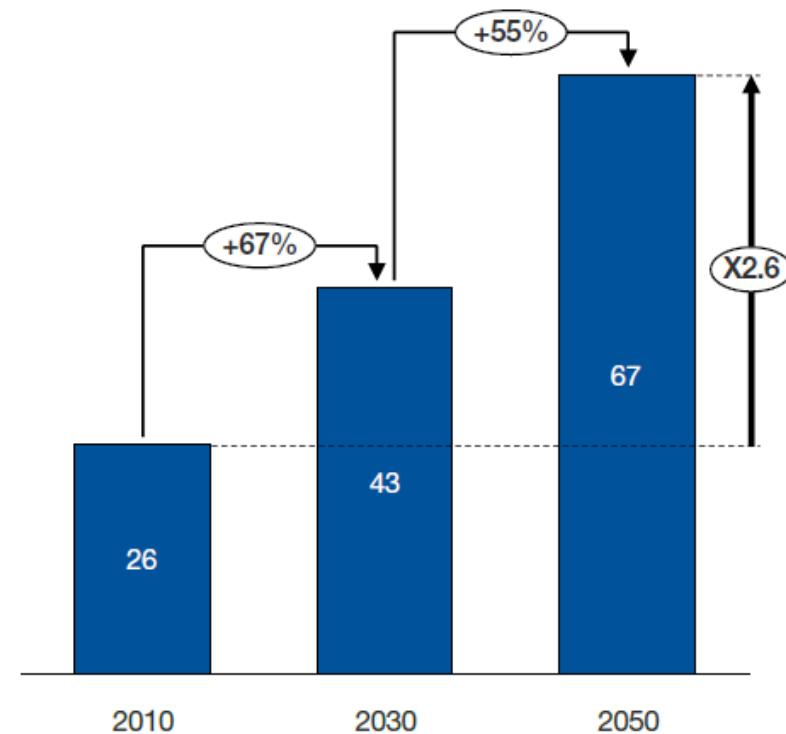
Growing urban population leading to...

Global urban and rural population in billions of people

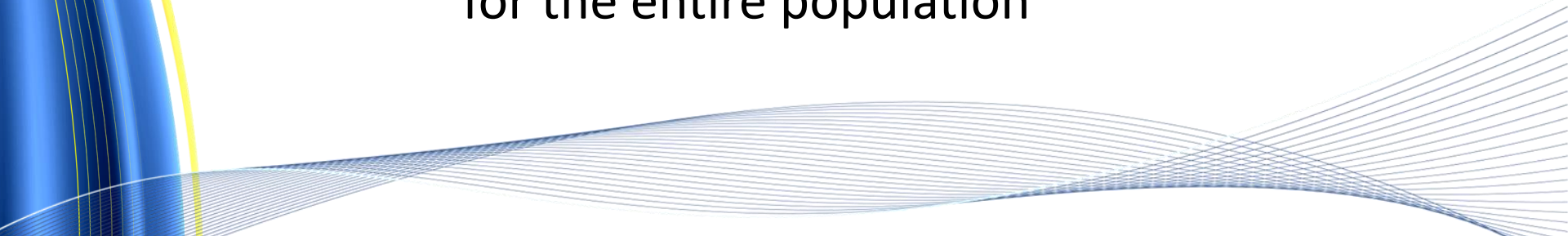


..an explosion in demand for urban mobility

Urban mobility demand, in trillions of personal km travelled



2. Societal Changes

- Aging population
 - In the 1900s, the average global life expectancy was around 40 years of age. Thanks to advances in medical science, nutrition and healthcare, the average global life expectancy is currently close to 80.
 - Longer life expectancy will create questions surrounding quality of life for the elderly and severe social and economic challenges for the entire population
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2. Societal Changes

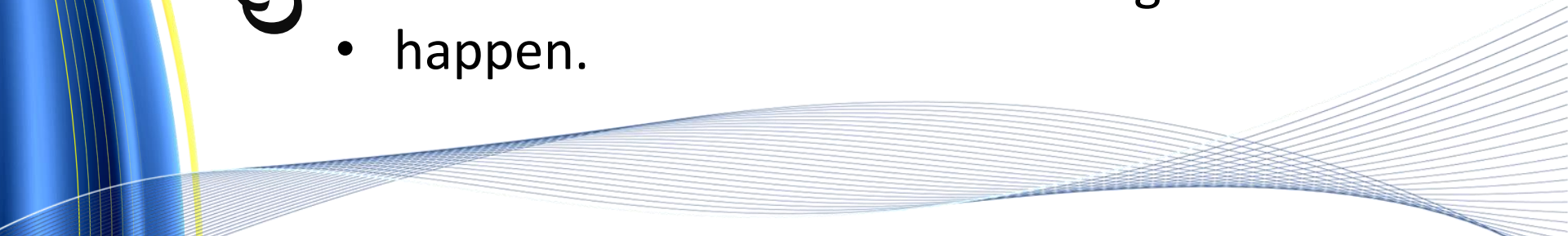
- Dependency ratio
 - As the global population ages, so does the workforce. The United Nations has declared that the ageing of the world's population will be one of the greatest challenges mankind faces.
 - The economic index known as the *dependency ratio* highlights the issue by measuring how many workers are supporting a non-working population.

2. Societal Changes

- Digital is the new normal
 - With ubiquitous digitalization and connectivity, consumers are becoming increasingly digitally enabled and empowered.
 - Generation Z, roughly defined as those born after 1993 (over 2 billion globally), will define the consumption patterns of tomorrow.



Emerging Opportunities

- There is no single solution to the increasing urban mobility challenges. Instead, new and emerging technologies and business models, combined with evolving public policy and culture, are paving the way for many solutions. In addition, there is a growing variety of practical and affordable ways to combine these into integrated “systems of systems”, which can simultaneously address the needs of people, communities, economies and the planet. This makes it possible for a larger and more diverse group of people, business sectors and public leaders to be involved in making it
 - happen.
- 

Emerging Opportunities

1. Narrative catalysts and shifting culture

- There is some erosion of status and identity related to single occupancy vehicles in some demographics (especially millennials as they become a poster generation for on-demand, real time, door-to-door systems). Narratives are moving away from sacrifice, scarcity and commitment to only one type of vehicle and style of mobility towards a more inclusive picture of increased options and convenience through connectivity and sharing. “New mobility” is desirable, not a sacrifice.
- New decision models are moving away from decisions between modes (bike versus car) towards decisions among modes (i.e. on-demand multimodal options as an integrated service).
- There is a new culture of bike-sharing among professionals, especially in Europe and the United States, highlighting it as an appealing commuting option across all income levels and social classes.

Emerging Opportunities

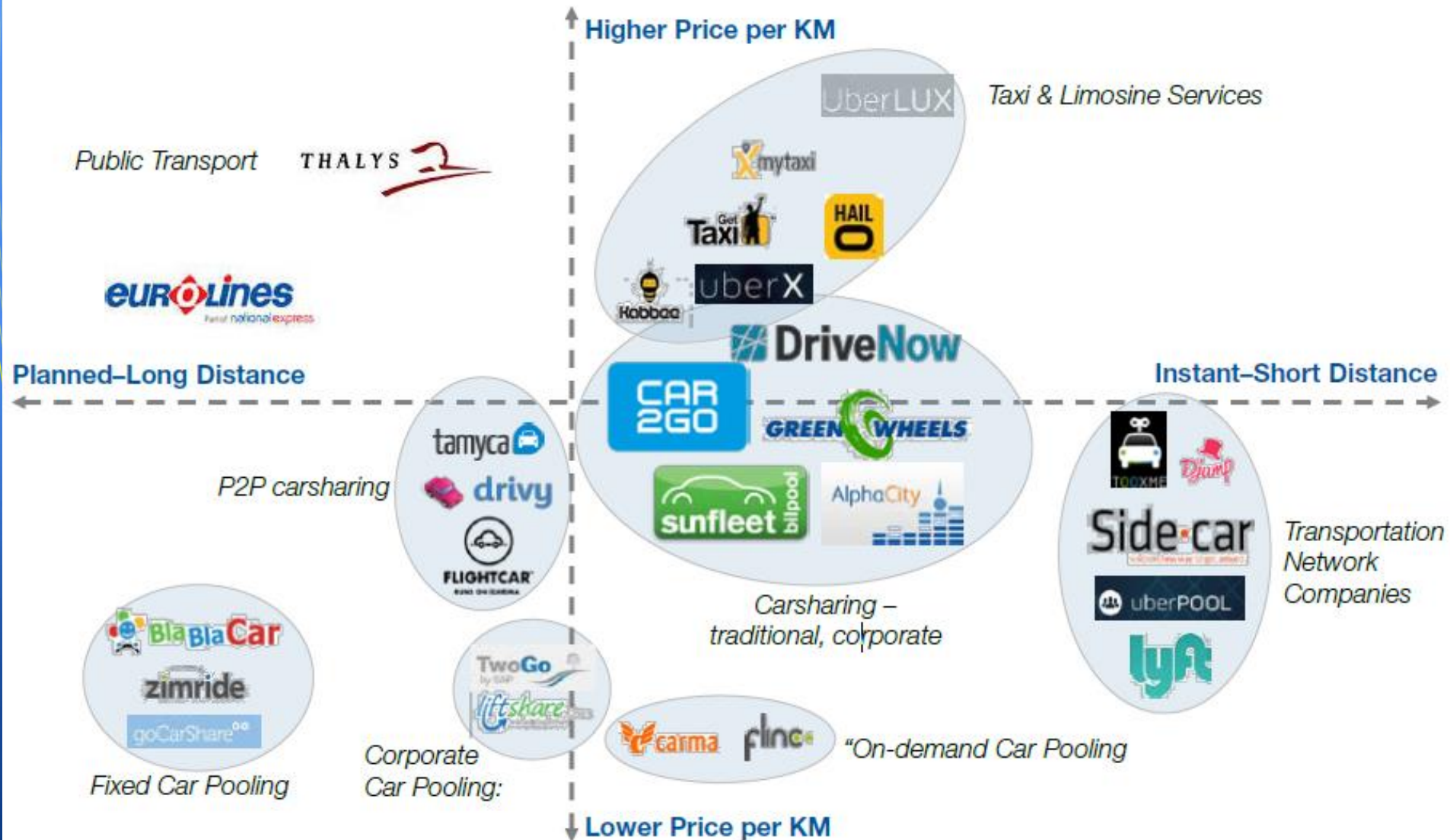
2. Technology and big data – enabling forces

- ICT and related big and small data has transformed all aspects of life, including the ways people move around and meet their personal and economic needs
- ICT makes the shared economy not only feasible, but powerful and transformative. Without technology and the data it generates, information and service models like Uber, Lyft, Didi, OlaCabs, Autolib, crowdsourced real-time transit planner moovit and the various parking apps would never have been possible
- Transportation leaders and operators now have access to sophisticated, real-time, multimodal cloud and mobile-based traffic management systems that can help them better meet customer needs across the full range of transportation options

3. Business models – moving the economy

- a new understanding of urban mobility as an economic benefit, and even further as a major economic driver, has begun to inspire a new approach to mobility as an investment
- New mobility business models range from individual on-demand mobility to peer-to-peer sharing models and on-demand transit

Snapshot of the growing range of emerging business models for transportation



4. Integration models – connecting the dots

- Urban transportation comprises a complex and growing range of services, technologies and products. Infrastructures, information, revenue systems and design need to be better geared to users.
- Linking existing and new modes of road, rail and ferry travel with walking, cycling, automobile driving and public transit can increase the convenience, efficiency, safety, security and sustainability of personal mobility.

Emerging Opportunities

5. Policy models – innovative leadership

- As transportation becomes more complex, policy needs to address a much wider range of issues and opportunities
- Mobility is increasingly addressing or being asked to address the full range of user needs, via a variety of modes door to door
- Transportation policy is increasingly being oriented towards an overarching goal of accessibility versus mobility. Mobility is a means to access
- As more players become involved, there is an emerging tendency towards platforms, frameworks and system architectures guiding action in addition to specified regulations, rules and official plans



Ten Recommended Deep Dives

- 1. Improve physical integration and connectivity between transport modes**
 - 2. Establish industry standards on data/digital infrastructure across device types**
 - 3. Enhance day-to-day transport management through data-based approach**
 - 4. Promote demand-responsive shared transport**
 - 5. Streamline regulation and management of demand-responsive solutions**
 - 6. Introduce policies to accelerate adoption of alternative fuel vehicles**
- 



Ten Recommended Deep Dives

- 7. Develop and apply open infrastructure standards to reduce costs and ensure cross-border interoperability**
 - 8. Consider possible technological and business model (r)evolutions when making long-term or capital intensive investments**
 - 9. Leverage corporate/institutional environments to test and showcase business model and technology innovation**
 - 10. Apply smart and competitive public-private financing models to fund new mobility ecosystems**
- 

1. Improve physical integration and connectivity between transport modes



Industry



Entrepreneurs



National government



City leaders



NGOs

Benefits: Increased quality and convenience of travel (seamless journey combination), reduced commuting time, reduced congestion and environmental footprint, reduced cost of mobility leading to increased accessibility



Recommendations:



Improve physical integration and connectivity between transport modes to allow “seamless” journey combinations



Offer support and incentives for industry initiatives, including MaaS, and create an enabling regulatory framework



Create an open data platform for sharing real-time data on transit and passenger information and for enabling interoperability across modes, services, products and technologies

MaaS: Mobility as a Service

2. Establish industry standards on data/digital infrastructure across device types



Industry



Entrepreneurs



National government



City leaders



NGOs

Benefits: Interoperability and seamless transition between device types, accelerated consumer adoption of new technologies and services, improvement of transport safety and environmental footprint



Recommendations:



Establish industry standards across device types



Leverage existing technologies, such as 3G/4G cellular data, smartphones, embedded vehicle wireless connections, vehicle sensor data, cloud solutions and analytics, to provide efficient safety, environmental sustainability and infotainment communications

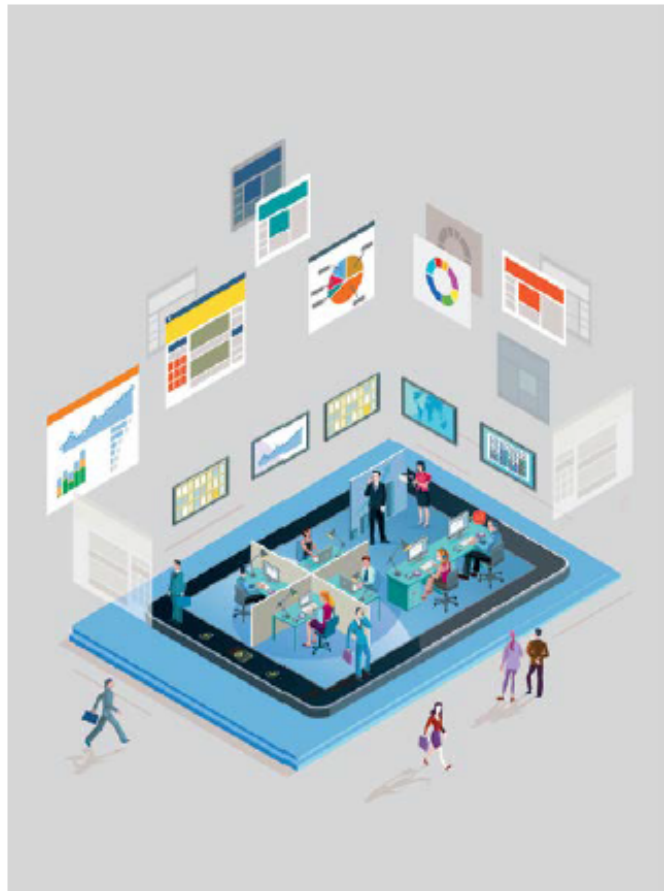


Incorporate current in-vehicle active crash avoidance capabilities

3. Enhance day-to-day transport management through data-based approach



Benefits: Increased speed and effectiveness of problem-solving, reduced congestion and environmental footprint, improved road safety, increased transparency to the public



Recommendations:



Implement performance-based multimodal transportation management leveraging real-time data analytics in an actionable overview of city metrics



Apply a smart pyramid principle aggregating data into relevant indices with the required granularity of information on different levels (e.g. department, commission, mayor)



Emphasize data-driven governance – leverage data-driven decisions to identify and address problems as they happen or even to prevent them arising



Build strategic partnerships across the public and private sectors for reliable data provision



Use data/indices to inform the public and create transparency

4. Promote demand-responsive shared transport



Industry



Entrepreneurs



National government



City leaders



NGOs

Benefits: Reduced cost of mobility leading to increased accessibility, higher quality of mobility (reduced commuting time, availability of seats, etc.), reduced congestion and environmental footprint



Recommendations:



Make it legally possible: force this form of supply in the regulations for on-demand transport services



Additional measures would be desirable, e.g. an adaptation of vehicles to demand-responsive requirements



The much higher efficiency of these services should also lead to a much lower need for public subsidy of this new form of public transport



Favour adaptable routes over fixed routes to increase the flexibility, accessibility and convenience of the service

5. Streamline regulation and management of demand-responsive solutions



National government



City leaders







NGOs

Benefits: Accelerated consumer acceptance, “healthy” competitive environment, reduced congestion and environmental footprint, increased safety



Recommendations:

-  Single regional authority to set directions and oversee all aspects of transport, including parking, on-demand services such as car-sharing and bike-sharing, and potentially goods movement and trip reduction as well
-  Create a regulatory framework to address taxation, insurance liability and other policy issues related to emerging innovations
-  Provide specific incentive payments and/or direct relief from transport charges for MaaS users, e.g. parking privileges, guaranteed ride home, frequent rider miles, location-efficient mortgages
-  Engage leaders (public and private) region-wide to promote regional sharing and MaaS programmes

6. Introduce policies to accelerate adoption of alternative fuel vehicles

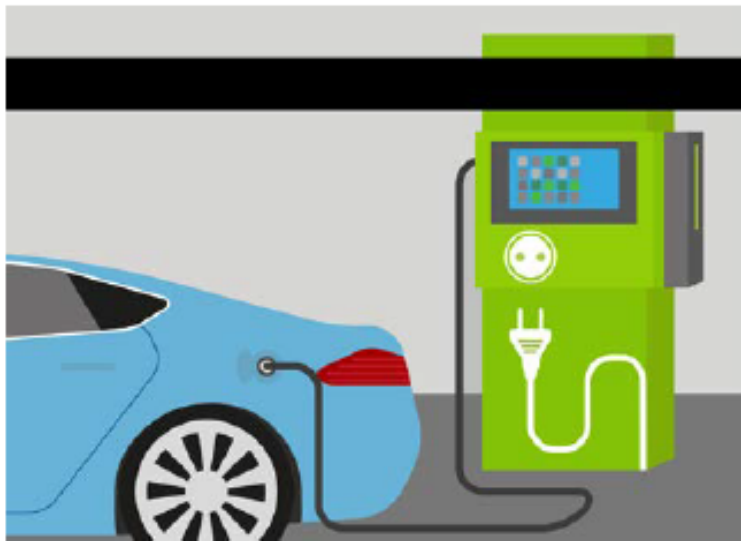


National government

City leaders

NGOs

Benefits: Improved environmental footprint (CO₂, NO_x and particulates), reduced noise levels from transportation



Recommendations:



Consider providing incentives relating to running costs (total cost of ownership) as a complement to one-off incentives on purchase price (e.g. VAT reduction)



Consider providing incentives to use alternative drivetrain vehicles over internal combustion engine vehicles (e.g. congestion-charge benefits, parking incentives/dedicated parking spaces)

7. Develop and apply open infrastructure standards to reduce costs and ensure cross-border interoperability



Industry



Entrepreneurs



National government



City leaders



NGOs

Benefits: Interoperability and seamless transition between device types, accelerated consumer adoption of new technologies and services, improved transport safety, reduced environmental footprint

Recommendations:



Establish global industry standards for plug type/fuelling



Establish cross-border standards for billing and payment, point-of-interest (POI) data, charging station access:

- ▶ Provide drivers with easy access to participating charging/fuelling stations using common authentication credentials
- ▶ Enable one bill for all charging usage
- ▶ Provide accurate aggregated charging/fuelling station location data
- ▶ Utilize open national interoperability standards



Ensure interoperability of charging stations (AC and DC) for various available electric vehicles



8. Consider possible technological and business model (r)evolutions when making long-term or capital intensive investments



City leaders

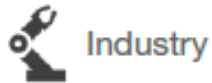
Benefits: Increased sustainability of long-term and capital-intensive investments, increased flexibility in city design and public asset allocation.



Recommendations:

-  Keep options open to embrace new innovations (e.g. zero-emission technologies, automation, intelligent transport systems, new service models), including anticipated as well as unknown innovations – incorporate them into cities as seamlessly and affordably as possible
-  Consider technologies and new operating models currently being developed when engaging in future city design
-  Plan for convergence of personal and freight (city logistics) transportation, e.g. in autonomous and/or shared vehicles

9. Leverage corporate/institutional environments to test and showcase business model and technology innovation



Industry



Entrepreneurs



National government

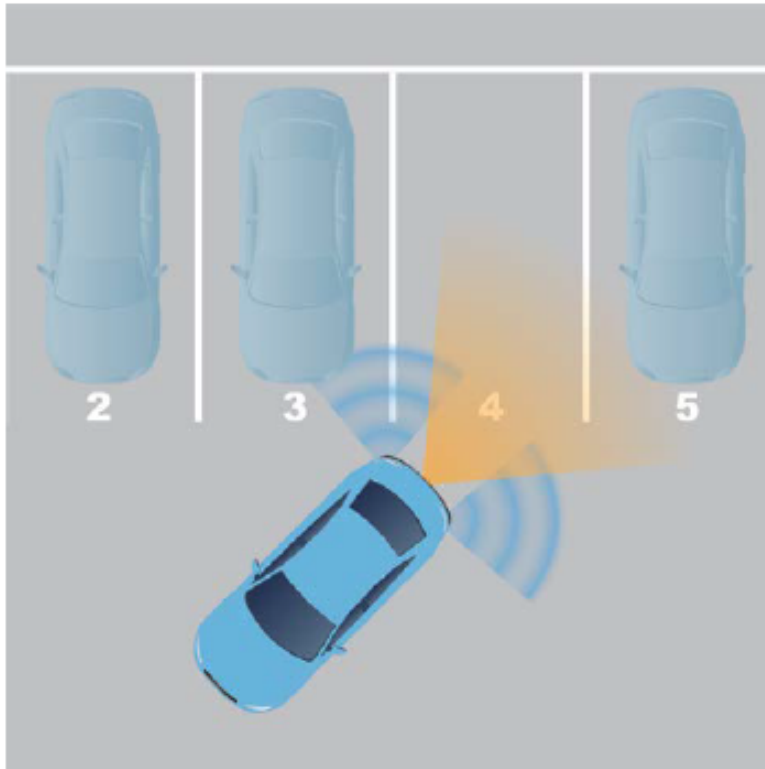


City leaders



NGOs

Benefits: Accelerated consumer acceptance, continuous learning and improvement from field experiences



Recommendations:



Leverage available environments in the corporate (industry, entrepreneurs) or institutional (governments, universities, cities, NGOs) context to showcase technology and business models and learn from corporate pilots



Specifically, on-demand sharing models and parking (corporate/institutional parking garages) offer no-regret opportunities to showcase the benefits of new mobility models



Leverage data from corporate pilots and actively communicate the success and the impact on employee productivity and ecology

10. Apply smart and competitive public-private financing models to fund new mobility ecosystems



Industry



Entrepreneurs



National government

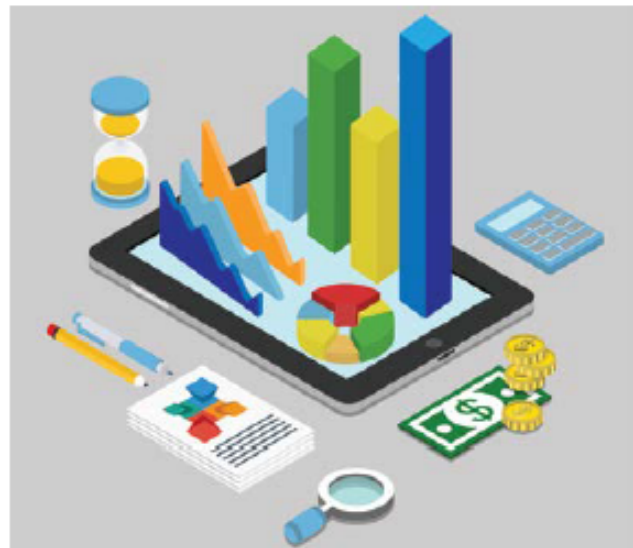


City leaders



NGOs

Benefits: Reduced public debt, monetization of public assets, increased speed of mobility transformation



Recommendations:



Leverage taxes and payments for building permission to create infrastructure for public parking lots connected to public and personal transport



Create road tolls with private investment



Introduce public companies to promote public-private investment and give legal certainty to potential investors

VeloCity project

Система за управление на интелигентни велосипеди

Договор за финансиране на научноизследователски и развоен проект № 7ИФ-02-45/01.08.2014 г., Финансова схема за подкрепа на иновативни предприятия от Националния иновационен фонд

 VirTech

THE VIRTUAL TECHNOLOGIES COMPANY



БУЛАРХ ЕООД

idein

change world. we help.

VeloCity context

The connected city

The smart city



VeloCity

The goal:

To develop a model and experimental model of smart bicycle and intelligent management system based on Future Internet technologies



VeloCity Specific objectives:

1

Анализ на състоянието в областта на системите за интелигентни велосипеди в България, ЕС и в световен мащаб.

2

Анализ на **нуждите на потребителите** и определяне на **изискванията** към системите за интелигентни велосипеди; дефиниране на **потребителски сценарии**

3

Анализ, проектиране и разработка на: **модел и опитен образец** на система за интелигентен и **софтуер** за мониторинг и управление на интелигентни велосипеди

VeloCity Specific objectives:

4

Експериментално тестване и анализ на опитния образец на система за управление на интелигентни велосипеди с участието на потенциални потребители,

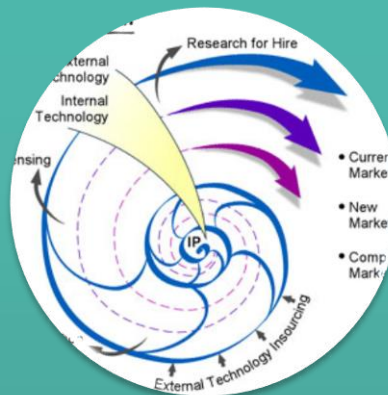
5

Разпространение на резултатите в България, ЕС и в глобален мащаб

VeloCity approach



Прилагане на най-добрите европейски практики, научни резултати и иновации в областта на интелигентните сензори, интернет на нещата, облачни мобилни технологии, обработка на големи масиви от данни, системи с отворен код



Използват се и методите и средствата на отворените иновации и живите лаборатории



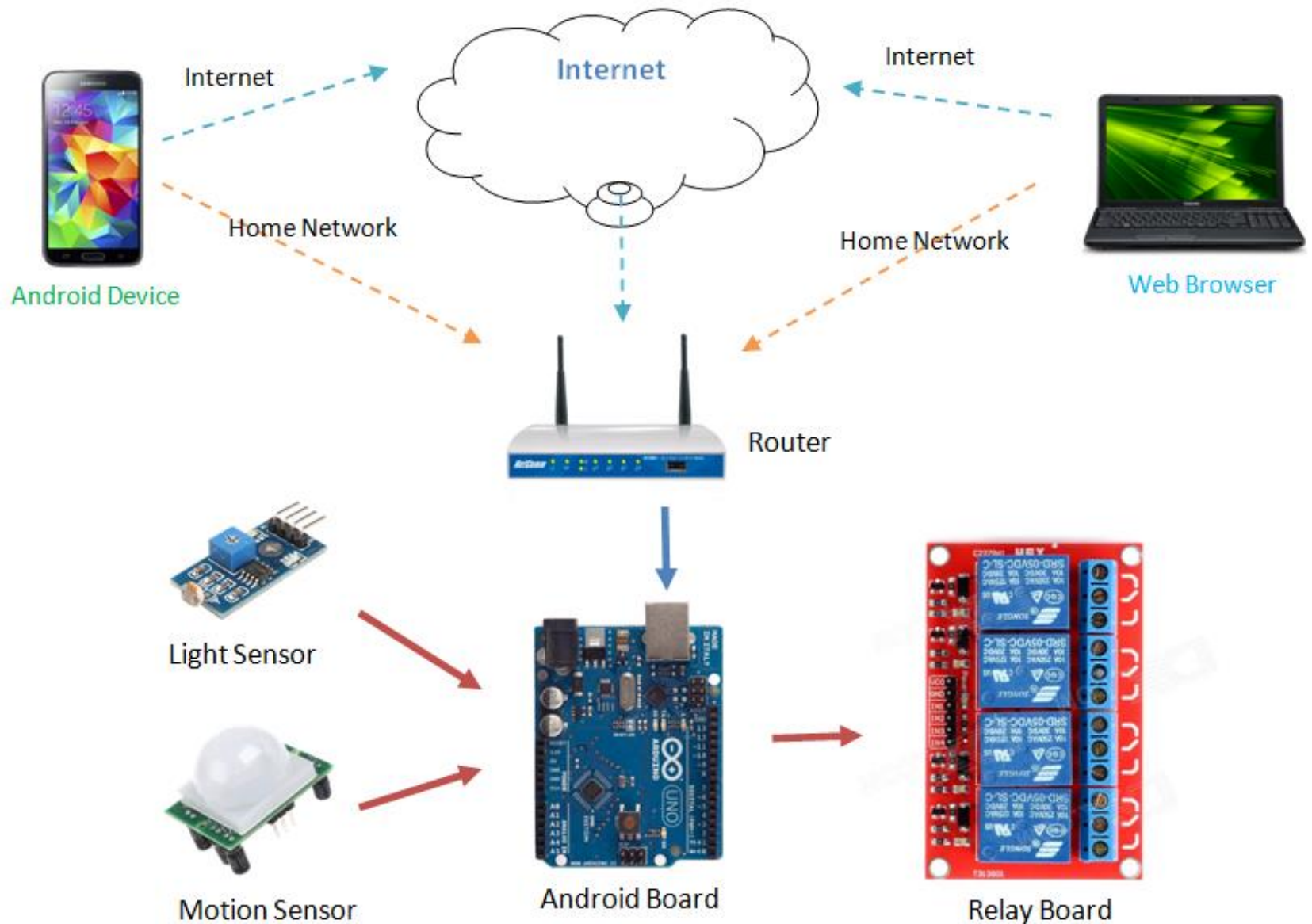
Проектът разчита на огромния опит и научно-приложен капацитет на участниците в консорциума, както и на изградената международна мрежа от партньорства

Индустриални изследвания и експериментални разработки

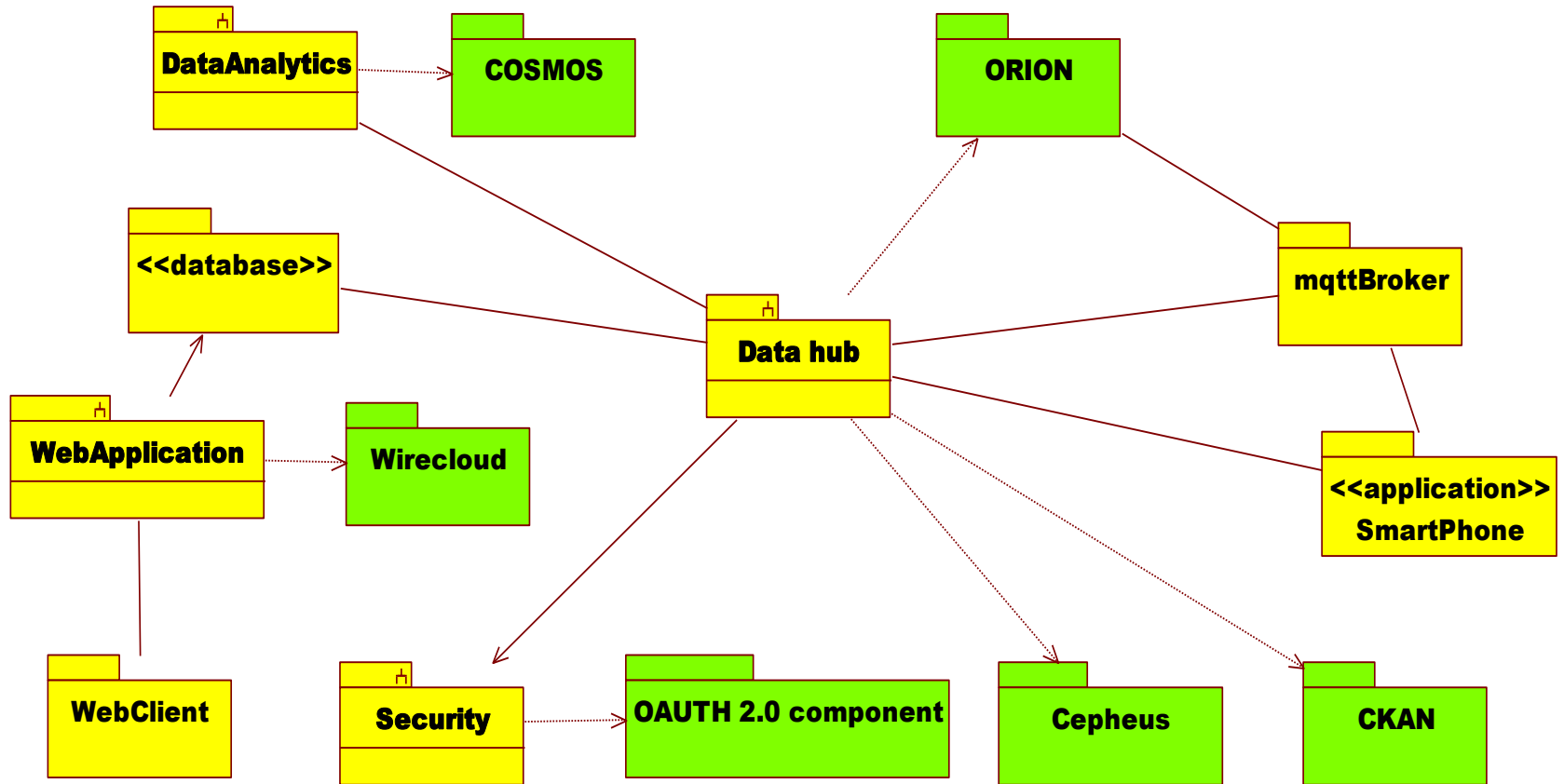
VeloCity results



VeloCity results



Velocity High level Architecture



VeloCity

results

The screenshot shows a web browser window displaying the VeloCity website. The browser's address bar shows the URL `dev.elliott.virttech-bg.com/velocity/`. The website header features the 'VELOCITY' logo in yellow and 'Velo of City' in white, with a silhouette of a cyclist. A navigation menu includes links for 'НАЧАЛО', 'НОВИНИ', 'ВЪПРОСИ', 'КОНТАКТИ', and 'СЪБИТИЯ'. A 'Регистрация / Вход' button is visible. The main banner is blue with white text: 'Velo-city ARNHEM 2017 NIJMEGEN' and an orange ribbon with 'The freedom of cycling!'. Below the banner are four columns of links: 'Информация' (За нас, Поверителност, Общи условия), 'Обслужване на клиенти' (Контакти, Карта на сайта), 'Полезни' (Събития, Новини, Въпроси и отговори), and 'Моят профил' (Моят профил, Информационен Бюлетин). The footer contains copyright information: 'VeloCity © 2015 - 2016 Съвместен проект на: УИИИИ и СУ'.

dev.elliott.virttech-bg.com/velocity/

Apps Мрежата Pclclu Dual VNI-50... Home Automation ... Other bookmarks

VELOCITY Velo of City

Регистрация / Вход

НАЧАЛО НОВИНИ ВЪПРОСИ КОНТАКТИ СЪБИТИЯ

Velo-city

ARNHEM 2017 NIJMEGEN

The freedom of cycling!

Информация

- За нас
- Поверителност
- Общи условия

Обслужване на клиенти

- Контакти
- Карта на сайта

Полезни

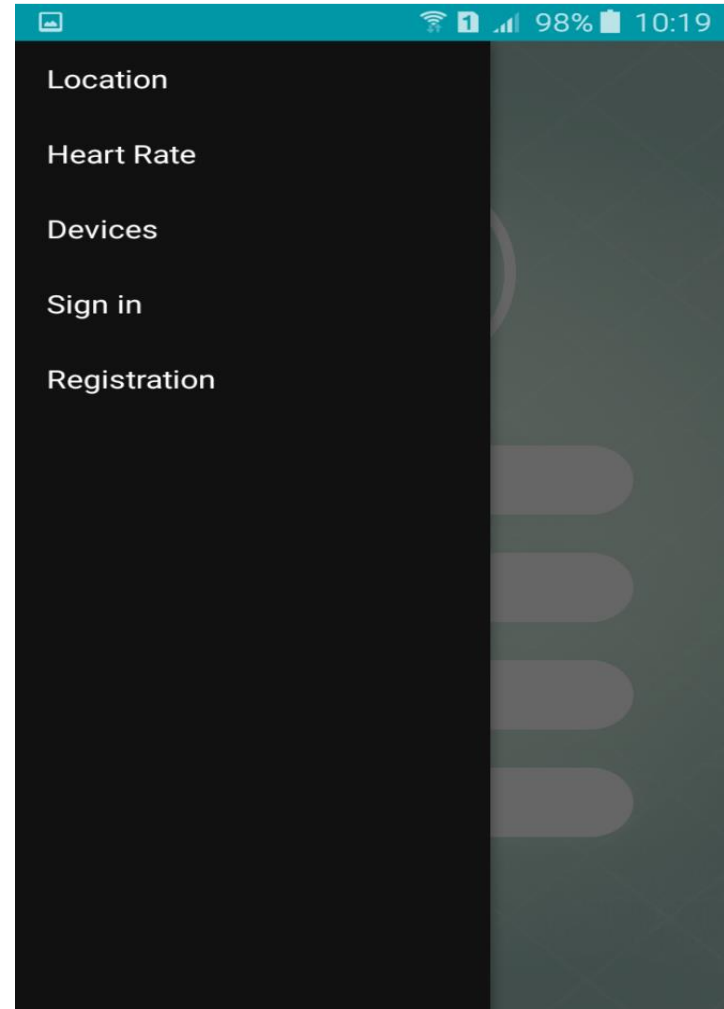
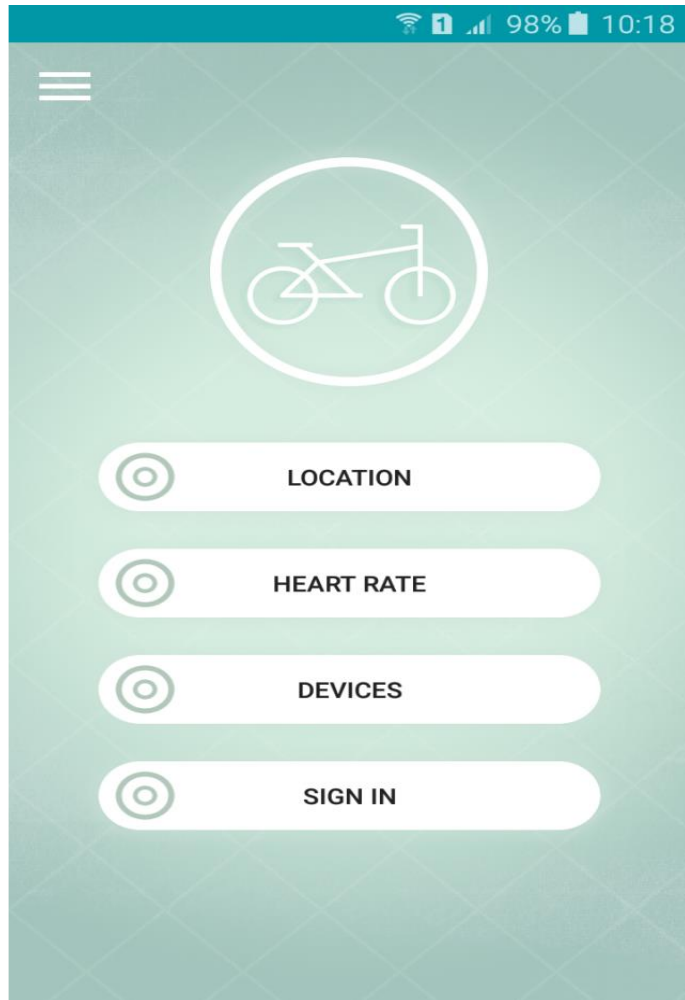
- Събития
- Новини
- Въпроси и отговори

Моят профил

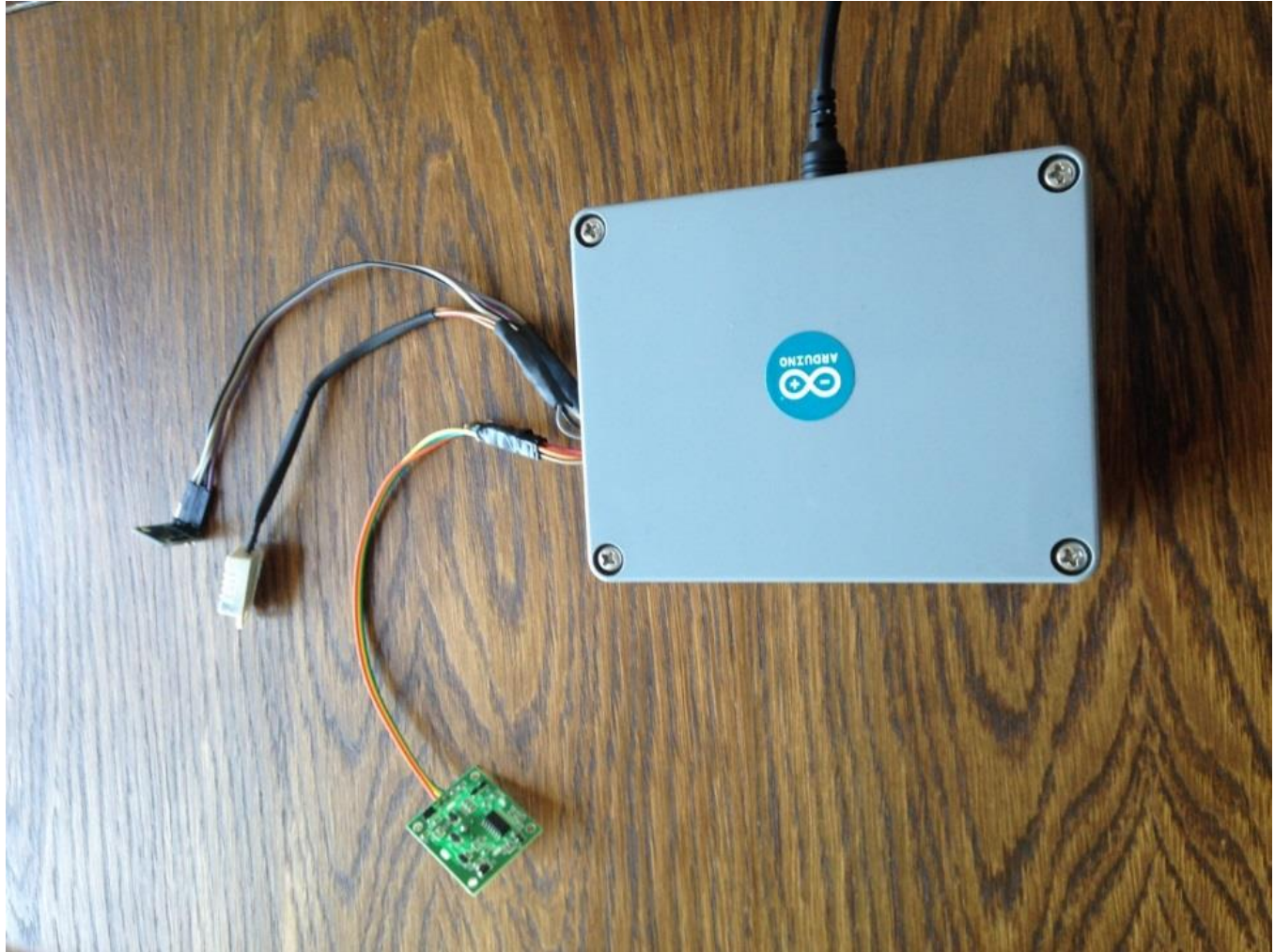
- Моят профил
- Информационен Бюлетин

VeloCity © 2015 - 2016
Съвместен проект на: УИИИИ и СУ

Mobile application



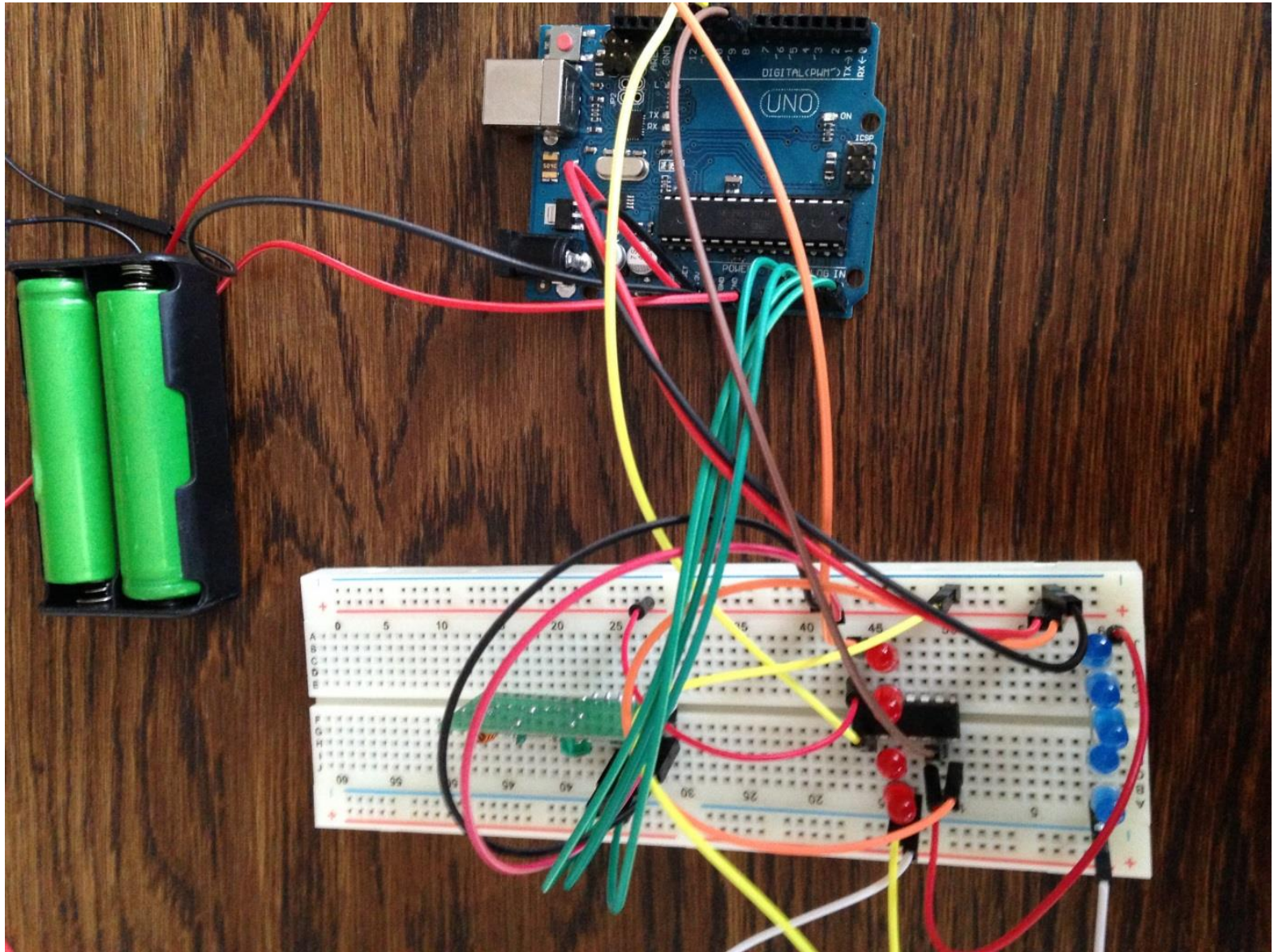
VeloCity results



VeloCity results



VeloCity results



VeloCity results



Conclusion

- As the number of people and volume of information in the mobility ecosystems across the globe increase and life moves at a faster pace, new approaches will be required to manage the growing complexity with limited resources. Luckily, technology, changing consumer behaviour and new approaches to business offer tremendous opportunities to tackle evolving challenges.
- This new world, where new ideas spread fast and can be iterated instantly, also completely changes the game for competition, innovation, regulation and planning when it comes to mobility. Collaboration between governments, businesses, civil society and academia is crucial to cope with the new reality and come up with solutions which will provide growing access and liveability in cities in an economically attractive and sustainable way.
- Leaders in public and private organizations will need to adapt to a culture of collaboration and experimentation and to focus their attention on agility, transparency and integration. By doing so, instead of simply developing individual successful mobility solutions, it will be possible to create an integrated mobility ecosystem which continuously evolves through a range of new, successful solutions.

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Thank you for your attention!

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