Panel on Citizen-Centric Systems
Panel theme: Bringing Smart City Vision to Life:
Getting Citizens Involved

Picture source: Wikimedia, Tobi87, https://commons.wikimedia.org/wiki/File:Hafen_von_Nizza.jpg

Panelists

Moderator

Stephan Böhm,
RheinMain University of Applied Sciences, Germany

Panelists

Przemyslaw Pochec,
University of New Brunswick, Canada

George Vassilacopoulos,
University of Piraeus, Greece

Panelists: Stephan Böhm

Dr. Böhm is a **Professor of Telecommunications and Mobile Media** at the Faculty of Media Management at the RheinMain University.

Co-founder of the Center for Advanced E-Business Studies (CAEBUS) in Wiesbaden and of the Mobile Media Forum.

Teaches media technology and media management topics in bachelor and master programs

Visiting professor at the International College of the NIDA in Bangkok, Thailand.

Research Interests:

- Innovation Management and Marketing,
- Technology Acceptance for Mobile Applications and Services,
- Up-front User Research for Mobile Applications,
- Mobile Prototyping,
- Mobile HCI

RheinMain University of Applied Sciences

easypark

#	CITY	COUNTRY	TRANSPORT AND MOBILITY				SUSTAINABILITY				GOVERNANCE				INNOVATION ECONOMY	DIGITALIZATION				LIVING STANDARD	EXPERT PERCEPTION	RANK/SCORE
1	Copenhagen	Denmark	9.81	8.62	8.18	6.82	7.92	9.83	8.24	6.11	9.38	8.53	7.09	5.85	9.13	8.63	7.66	4.12	9.74	8.70	9.12	8.24
2	Singapore	Singapore	7.30	6.63	4.20	10.00	2.26	8.44	7.62	7.15	10.00	5.47	7.82	5.12	8.62	8.71	7.75	6.63	7.55	8.18	9.30	7.83
3	Stockholm	Sweden	7.49	5.93	6.71	6.54	8.44	6.88	8.94	8.79	9.29	10.00	7.62	7.66	9.57	8.37	9.22	6.28	8.69	7.32	8.20	7.82
4	Zurich	Switzerland	7.80	7.75	4.98	9.83	8.62	10.00	10.00	8.70	2.07	8.10	9.03	9.02	9.74	4.69	4.38	5.59	7.55	10.00	9.00	7.75
5	Boston	United States	8.01	8.70	7.71	7.21	3.60	5.15	4.26	6.56	5.30	6.97	5.12	10.00	10.00	6.06	9.39	6.80	9.17	8.22	9.30	7.70
6	Tokyo	Japan	9.57	7.13	7.66	8.79	3.86	8.36	8.24	4.25	6.60	6.28	3.59	7.71	7.19	6.37	6.50	9.57	8.61	7.21	8.60	7.59
7	San Francisco	United States	9.05	9.05	5.08	3.43	3.60	5.15	4.26	6.38	6.23	6.59	5.44	5.67	9.91	7.91	10.00	9.05	9.17	9.01	9.10	7.55
8	Amsterdam	Netherlands	7.95	7.06	8.36	7.06	2.47	7.32	7.79	3.86	9.02	9.83	5.94	7.84	8.82	8.40	6.63	5.33	6.85	9.01	8.20	7.54
9	Geneva	Switzerland	8.06	4.98	6.11	6.97	8.62	10.00	10.00	9.13	1.80	8.36	8.59	9.14	8.96	8.11	8.79	3.94	7.55	9.80	8.10	7.53
10	Melbourne	Australia	7.97	7.14	4.55	8.72	2.90	6.29	5.15	2.90	9.82	5.38	9.24	9.31	6.02	10.00	7.84	6.72	9.30	8.01	7.30	7.51

#1 // There are many indices investigating the local implementation status of e-government activities.

Source: https://easyparkgroup.com/smart-cities-index/

"The e-participation index (EPI) is [...] focusing on the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation"), and engagement in decision-making processes ("e-decision making")."

Source: UN E-Government Survey
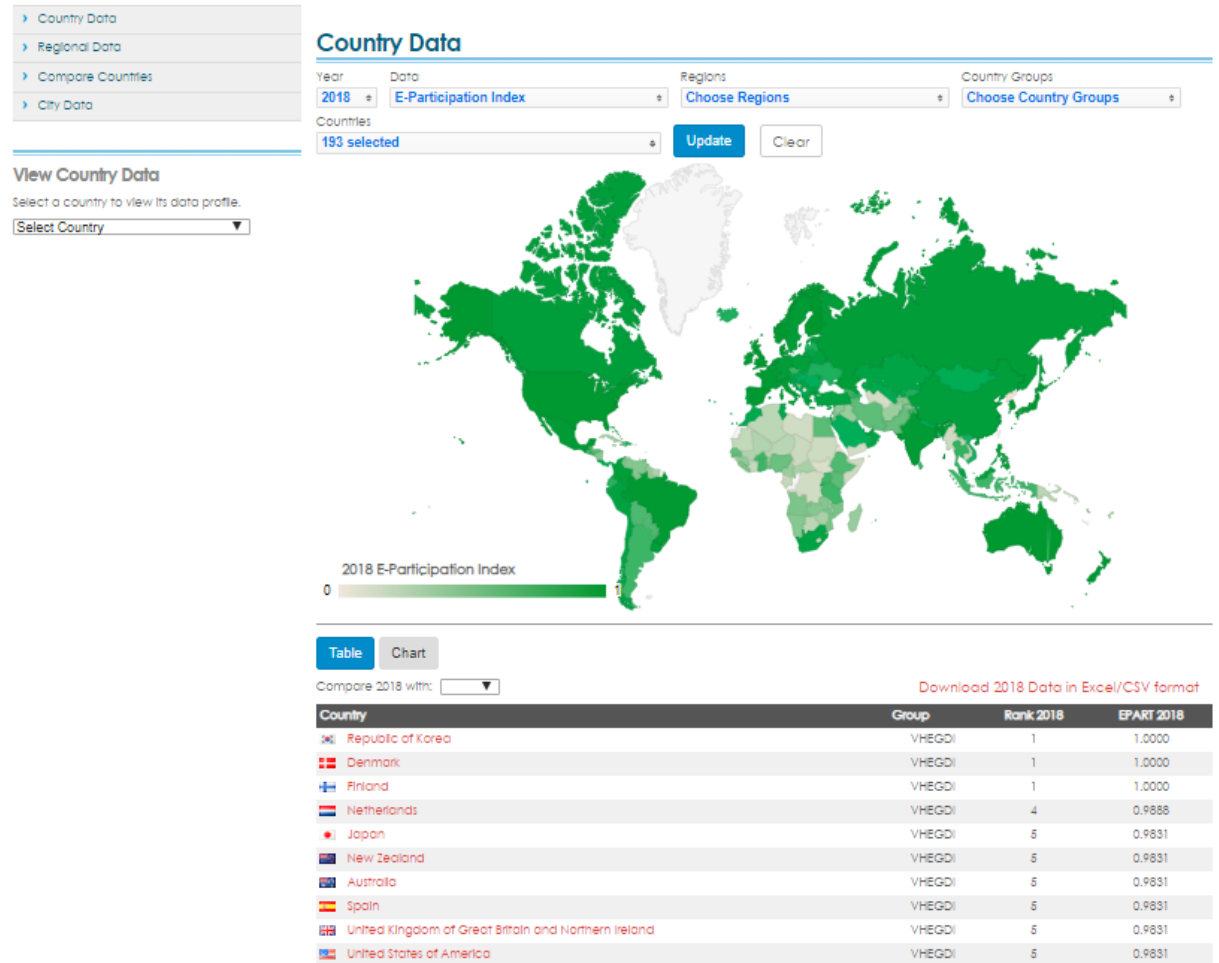
#2 // Some indices are especially focusing on the status of e-participation across countries and cities.

Source: https://publicadministration.un.org/egovkb/Data-Center

„Rapid changes demand quick responses from both the private and the public sectors. Future state poicies must, therefore, consider the needs of their citizens among their highest priorities."

Figure 3

Strategies to build a customer-centric government

Characteristic	Strategies
Foster organizational change	• Use technology and support systems to provide more user-friendly services • Centralize customer data and standardize procedures and forms to reduce bureaucracy • Improve flexibility for quick and efficient decision making • Conduct surveys regularly to gain a better understanding of customers' needs
Cultivate leadership	• Respond quickly to changes citizens' demands • Communicate strategies through all levels of the organization to ensure everyone is working toward the same goals • Define responsibilities and accountabilities clearly • Involve more people in cooperative decision making to instill trust in decisions
Establish culture and values	• Define strategic organizational values that align with employees' expectations • Use motivational techniques to create an environment that promotes change • Employ team-building approaches to create a knowledge-based organization with shared values
Build customer relationships	• Respond quickly to changing customer needs • Employ customer relationship management (CRM) and conduct surveys to improve customer service • Develop customer-oriented products and services
Improve operations	• Deploy advanced technologies (e-administration, websites, mobile phones) to broaden communications channels • Standardize IT systems to reduce costs and complexity • Adopt more cost-effective channels (Internet, automated phone systems) to deliver services
Manage performance	• Use benchmarks and key performance indicators (KPIs) to measure efficiency and performance of processes • Establish remuneration system to reward top performers • Develop training programs to foster knowledge-based organizations
Support sustainability	• Bring together individuals, interest groups and non-government organizations to support sustainability • Promote "green" government by focusing on economic, social and environmental issues • Employ e-services and multi-channel communications to encourage sustainability

Sources: A.T. Kearney Citizen-Centric Government survey; A.T. Kearney analysis

#3 // An important factor for e-participation is a customer centric perspective and consideration of citizens' needs.

Project "Sauberes Wiesbaden App" (Clean Wiesbaden App)

- Initiated by the project office of the city mayor of Wiesbaden and the municipal waste services operator ELW

- Project's aim was to promote the participation of the citizens to quickly and easily report illegally dumped garbage and other waste disposal-related problems in the area of Wiesbaden, Germany

- App concept was developed within a research cooperation between the ELW and the RheinMain University of Applied Sciences in Wiesbaden

Location of Wiesbaden [show]

Coordinates: 50°04'57"N 08°14'24"E

Country	Germany
State	Hesse
Admin. region	Darmstadt
Government	
• Lord Mayor	Sven Gerich (SPD)
• Governing parties	CDU / SPD
Area	
• Total	203.9 km² (78.7 sq mi)
Elevation	115 m (377 ft)
Population (2017-12-31)[1]	
• Total	278,654
• Density	1,400/km² (3,500/sq mi)

Sources: For more information see: Berntzen et al. (2018): Citizens as Sensors, https://www.thinkmind.org/index.php?view=article&articleid=smart_2018_1_30_40068
https://en.wikipedia.org/wiki/Wiesbaden, https://www.wiesbaden.de/leben-in-wiesbaden/gesellschaft/engagement/sauberes-wiesbaden.php

Key Facts and Project Approach

- The app was developed within about four months based on a user-centered design approach.

- Project members were employees of the IT department and the call center of ELW, the City Council, and the University RheinMain.

- An implementation approach based on a hybrid app (PhoneGap) was chosen.

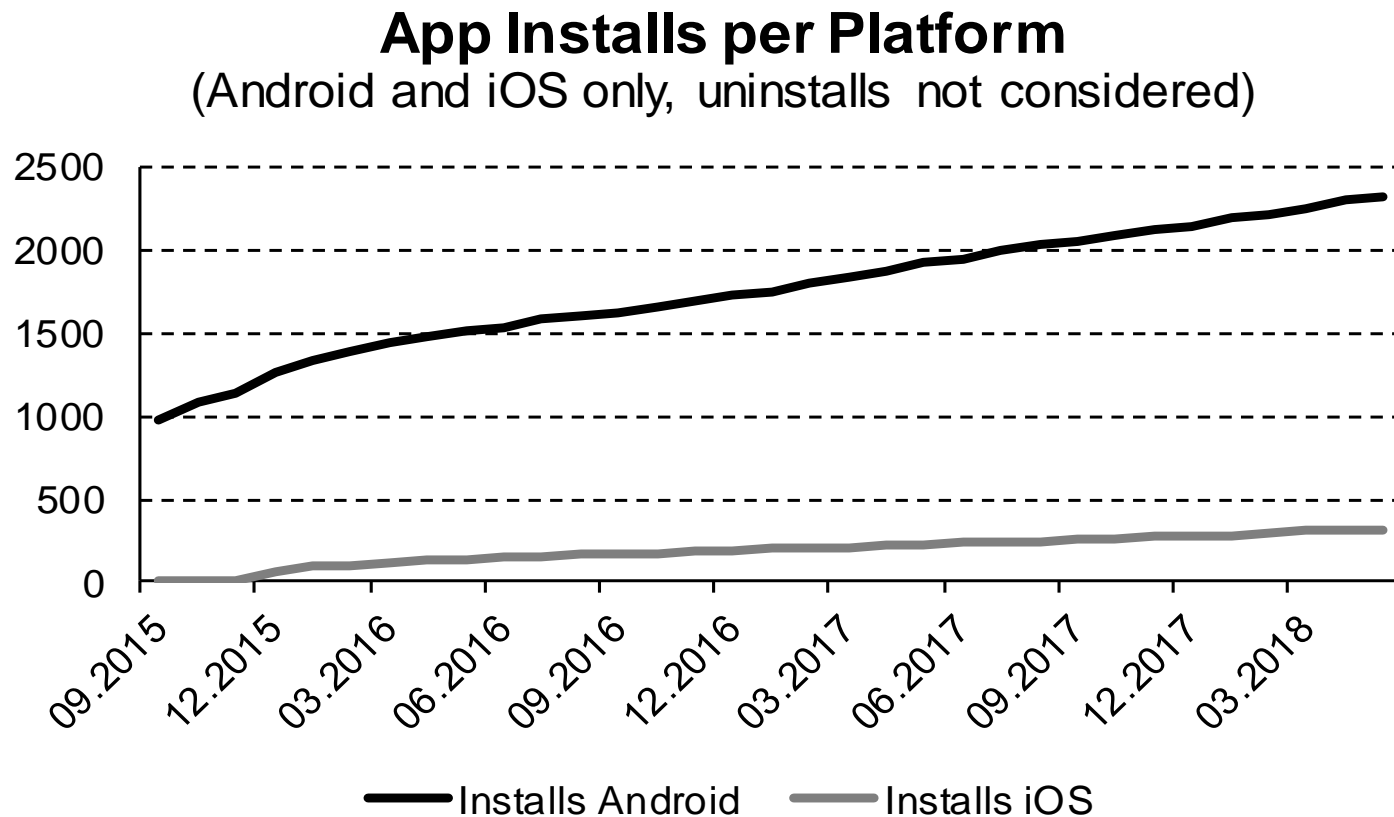- Android app was officially launched in the Google Play Store on October 9th, 2015 (for other OS some weeks later).

Sources: https://play.google.com/store/apps/details?id=com.elw.swapp&hl=de

Mobile App Features and Functionalities

Sources: https://vimeo.com/224282572/878c51180d

Impact of the App (1/3): App Installs

During the first month, there were more than 1,000 downloads. In this period 469 events were reported.

App Installs per Platform
(Android and iOS only, uninstalls not considered)

Installs Android   Installs iOS

Sources: For more information see: Berntzen et al. (2018): Citizens as Sensors, https://www.thinkmind.org/index.php?view=article&articleid=smart_2018_1_30_40068

Impact of the App (2/3): Reported Cases

The number of app-based reported issues as well as the app's share of reports has increased continuously over the last three years.

App-based Reported Cases
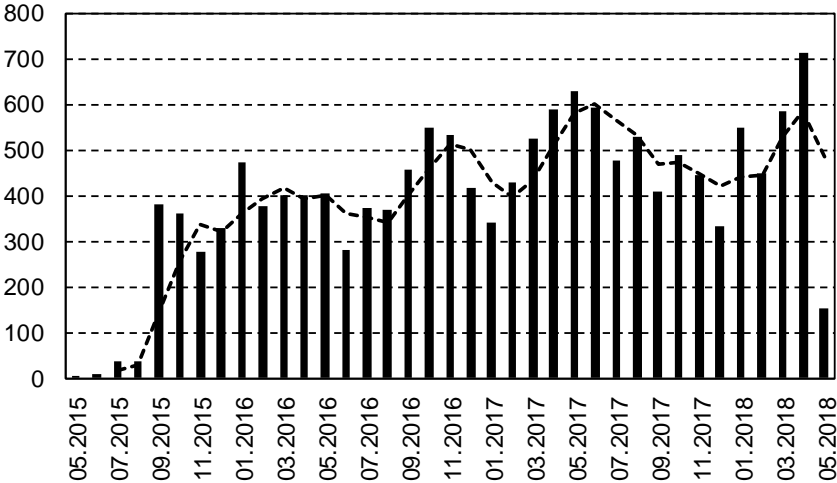
Share of Cases Reported by App
(from App and Phone Channels)

Impact of the App (3/3): Reports by Category

A large part of the issues is accounted for by (1) bulky waste,
(2) general waste and (3) metal and devices.

	2015	2016	2017	2018 (Until May 1st)	Total (in %)
Dog dirt bag dispenser (empty, defect)	10	21	67	26	0.8%
Metal/electronics (devices etc.)	208	662	670	257	12.2%
General waste	315	1,359	1,585	667	26.7%
Garbage bags/cartons	83	234	221	108	4.4%
Waste bin (full, defect)	34	129	292	74	3.6%
Hazardous waste (paint, varnish, etc.)	38	133	185	64	2.9%
Bulky waste (furniture etc.)	667	2,411	2,729	1,191	47.7%
Uncategorized	68	83	30	64	1.7%
Total (reports)	1,423	5,032	5,779	2,451	100%

Conclusions

- 14,685 reported issues between May 2015 and May 2018 are related to (only) 2,633 total downloads for the Android and iOS platforms.

- The app-share of reported issues reached over 60 percent a short time after launch (end of 2015) and has leveled off to around 80 percent in 2018.

- High level of satisfaction by the users (e.g. 4.4 stars rating in Google Play)

Success Factors

- Top-level management support (e.g., city mayor of Wiesbaden).

- User-centered design approach – first high-fidelity prototype was available after four weeks.

- Early and active involvement of all "stakeholder" (e.g., call center personnel from ELW).

- "Co-creation" of code (critical code was implemented by ELW – student was hired by ELW after project)

Wiesbaden: Kampf gegen Sperrmüllhaufen und volle Abfalleimer - Stadt, ELW und Hochschule-Rhein Main präsentieren Handy-App

Von Manfred Knispel vor 3 Jahren

Mal wieder einen Müllberg auf dem Gehsteig gefunden? Mit der App „Sauberes Wiesbaden" genügen vier Klicks und schon ist die Meldung über eine wilde Müllablagerung bei den Entsorgungsbetrieben ELW gelandet.

Die App "Sauberes Wiesbaden". Bildmontage: VRM

WIESBADEN - Anerkennende Blicke erntete Oberbürgermeister Sven Gerich am Donnerstag, als er die Telefonnummer der Wiesbadener Sauberkeits-Hotline auswendig aufsagen konnte. „Ich habe sie ja oft genug

Contact

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SoftNet 2018

Nice, France, Oct. 15, 2018

On Citizen-Centric Systems
Theme: Bringing Smart City Vision to Life: Getting
Citizens Involved

SoftNet 2018,

Nice, France, Monday, Oct. 15, 2018

Topic: On Citizen-Centric Systems
Theme: Bringing Smart City Vision to Life: Getting Citizens Involved

Open Data and Open Services: smart city citizen's perspective

Panel presentation by

Przemyslaw Pochec, University of New Brunswick, Canada

Summary: smart city citizen's perspective

- *smart city*:
  Individual citizens have access to, and the ownership of, large amounts of **data** and a considerable **computing power** on their mobile communication devices, aka smart phones.

- *getting citizens involved*:
  They may decide to make these data (e.g. phone book, images, location) and services (CPU cycles, bandwidth) available to other citizens as their contribution to open society.

Resource type	Example	Uses
Data		
	location	Traffic congestion detection
	Location, personal data	Emergency services
Computing power		
	bandwidth	Multipath data services
	bandwidth	Emergency services

Examples

- Google maps

"See live traffic, delays, and disruptions no matter how you get to work - whether you drive, take transit, or a combination of both."

<div align="right">itunes.apple.com</div>

- GoodSAM Responder

"GoodSAM connects those in need with those in the local community with life saving skills to help until the emergency services arrive. By alerting first aid trained bystanders to local incidents, GoodSAM aims to prevent the irreparable brain and heart damage which all to frequently occurs during a cardiac arrest or traumatic incident."

<div align="right">itunes.apple.com</div>

Examples

- Multipath

"Multipath TCP is particularly useful in the context of wireless networks [2]- using both Wi-Fi and a mobile network is a typical use case.[3] In addition to the gains in throughput from inverse multiplexing, links may be added or dropped as the user moves in or out of coverage without disrupting the end-to-end TCP connection."

en.wikipedia.org/wiki/Multipath_TCP

- Mobile Medium (our work)

"(...) realizes the connection between two hosts with the cloud of nodes serving as the data communication medium (aka Mobile Medium) and forming the communication channel. Any particular connection in the Medium does not matter as long as the channel between communicating users of the M2ANET can be formed.
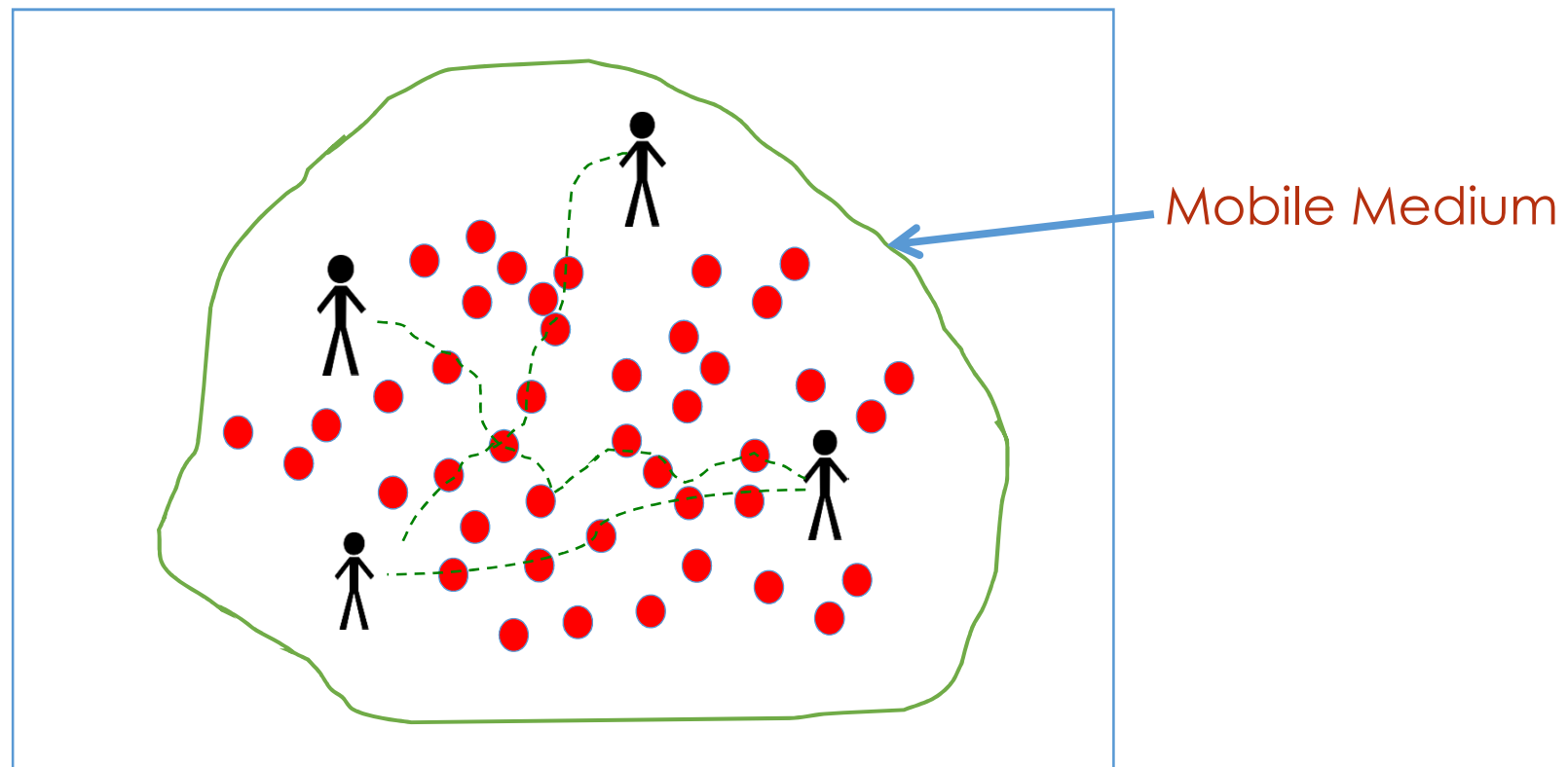
our ICSNC2018 paper

Creating Mobile Medium

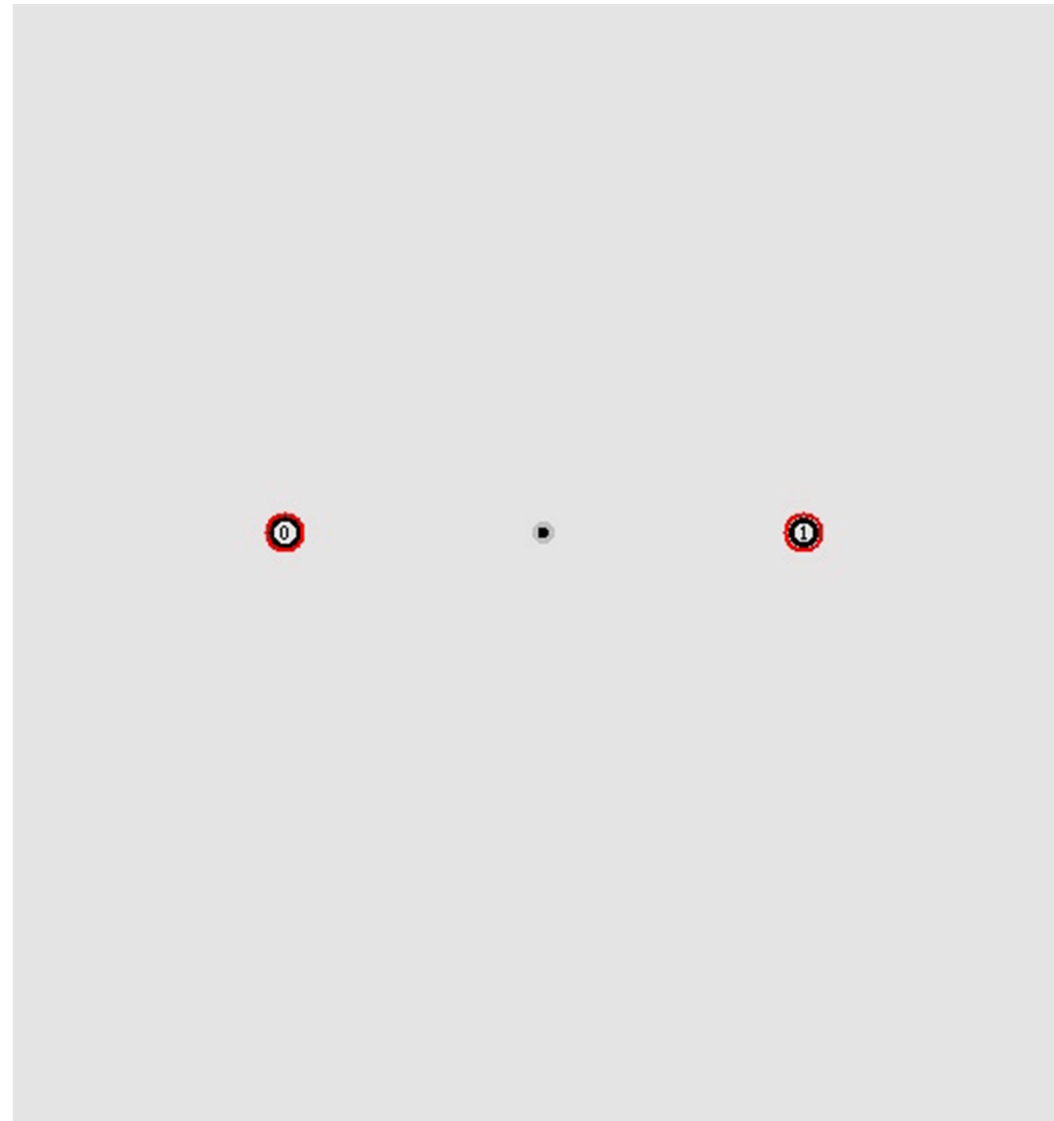- Deploy a large number (a cloud) of forwarding nodes over the area of interest
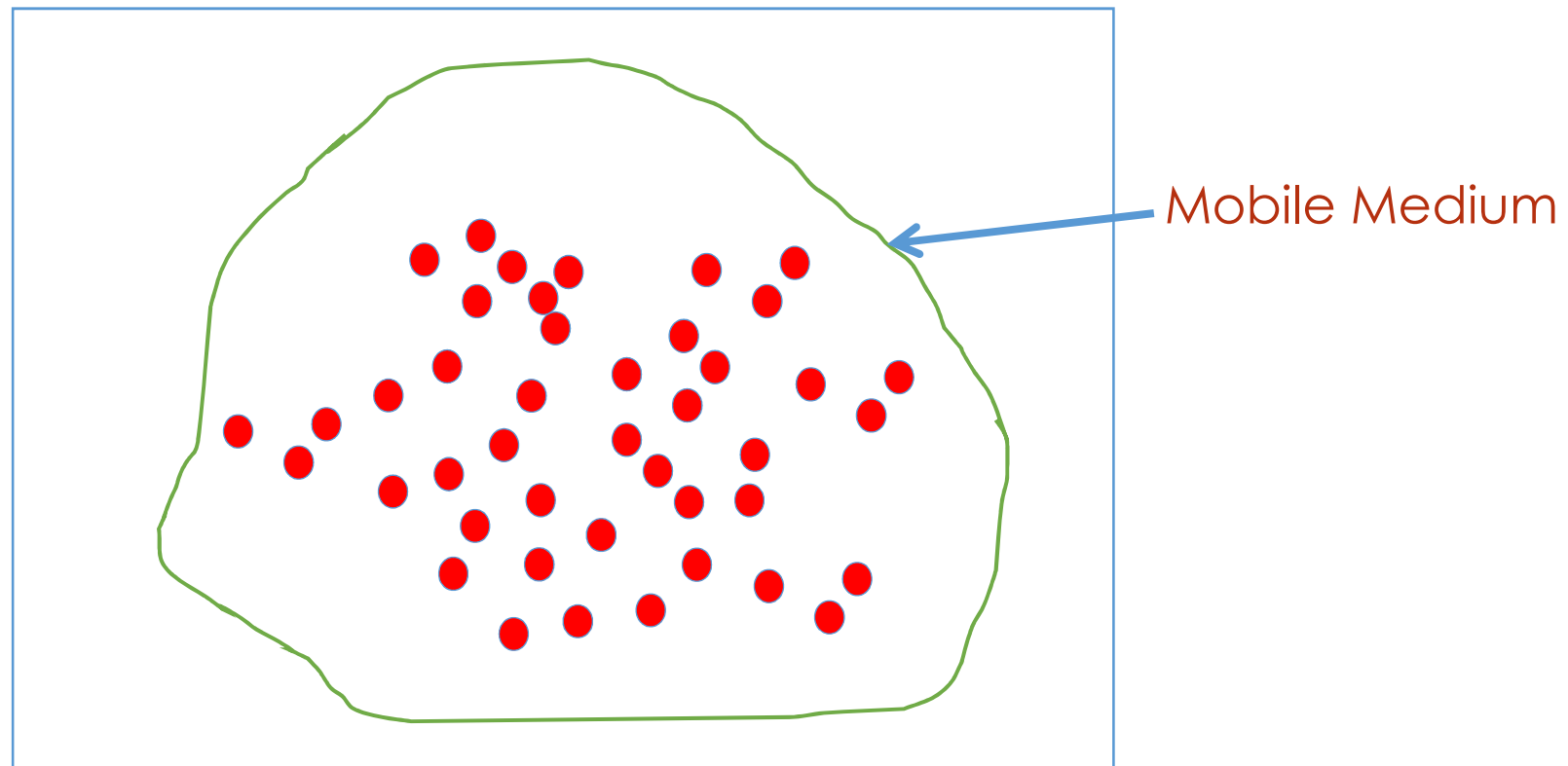
Mobile Medium

Creating Mobile Medium

- Users connect to the Mobile Medium and the Mobile Medium forwards the data
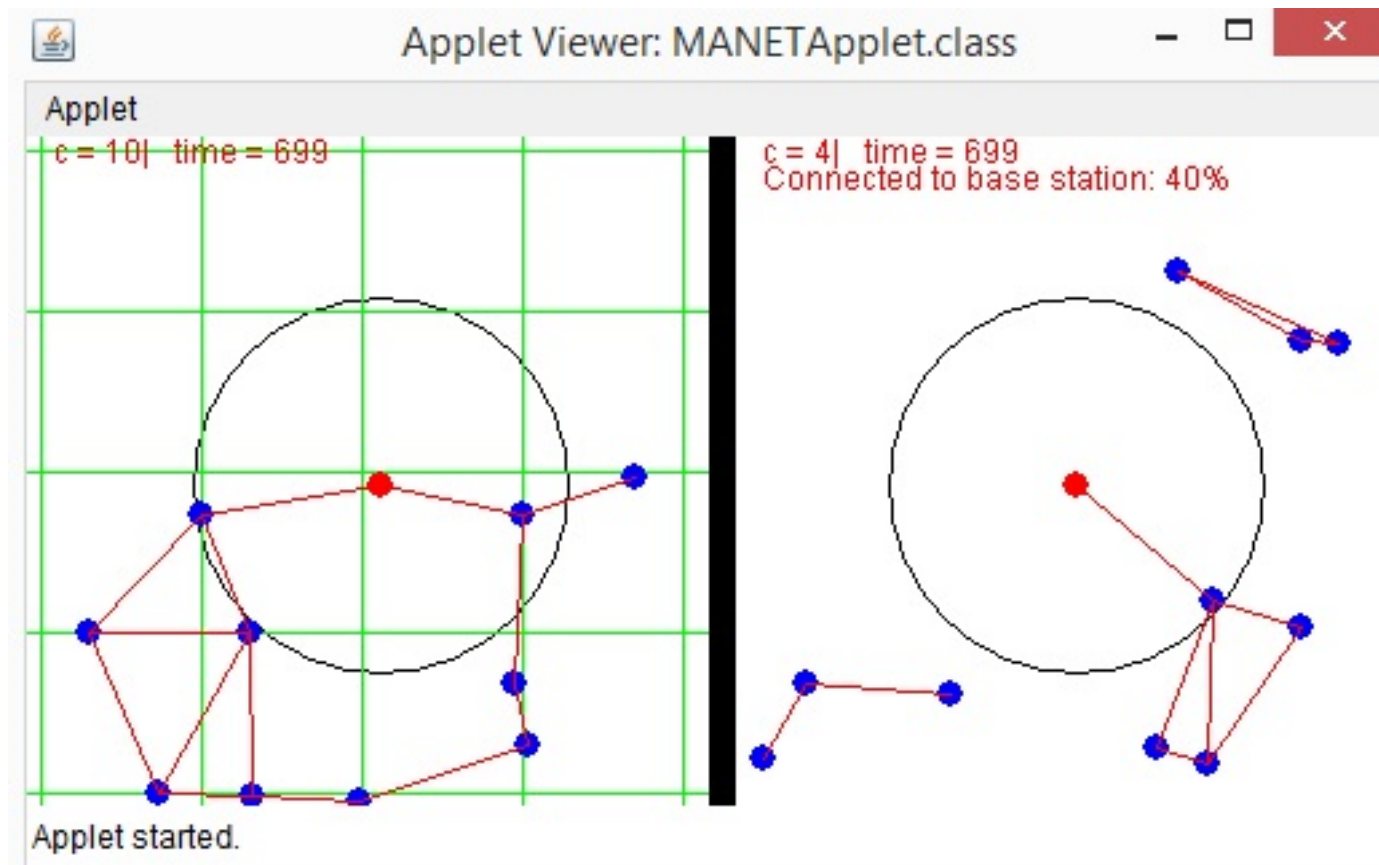
Mobile Medium

Sample deployment scenario

(Smart) city consideration

- Mobility of users may be restricted to particular path

Kerul Patel, J. DeDourek, and P. Pochec, "Investigation of Channel Formation in a MANET", The Fifth International Conference on Systems and Networks Communications ICSNC 2010, Nice, France, August 2010, pp. 229-231

Issues

- How to encourage citizen participation in creating enhanced smart city infrastructure and services?

Smart Cities and Healthcare

George Vassilacopoulos

University of Piraeus, Greece

Overview

- Smart cities
  - Introduction
  - Goals
  - Examples
- eHealth & Healthcare
  - Introduction
  - Opportunities
- Smart Cities & Healthcare
  - How Smart cities improve healthcare
- Real-life scenarios
  - Healthcare monitoring at Home
  - Healthcare monitoring at Health-care centers
  - Healthcare monitoring on the move

Smart Cities

What are Smart Cities?

Smart City

- More than **half the planet's population resides in cities**, which are fast becoming innovation hubs and are developing quickly into smart cities.
- The number of smart cities around the world is expected to grow exponentially over the next few years and by 2050, **70 per cent of the world's population will be living in smart cities**
- …**Spending** on smart cities technology will be **about $80 billion**, perhaps $**135 billion by 2021**

What makes a city Smart?

- Leverage technology to **serve people**
- **Manage the resources** found in an urbans cape in a way that's both sustainable and inexpensive
- Provide **clean, healthy living conditions** without pollution and congestion - city services instantly and conveniently available anytime, anywhere
- Provide the enabling infrastructure — energy, connectivity, computing, essential services — to **compete globally for high-quality jobs**
- Provide **services** without stealing from future generations

Goals of Smart Cities

Goals

- Better **city services and a higher quality of life**

- Promote **performance and well being** and increase its ability to respond to city-wide and global challenges

- Ensure its critical infrastructure is **safe and economically sustainable** and public service offers are more interactive, transparent and responsive

- Bring **together people, processes and technology** to enable a holistic customized approach that accounts for their city culture, long-term planning and citizen needs.

Examples of Smart Cities
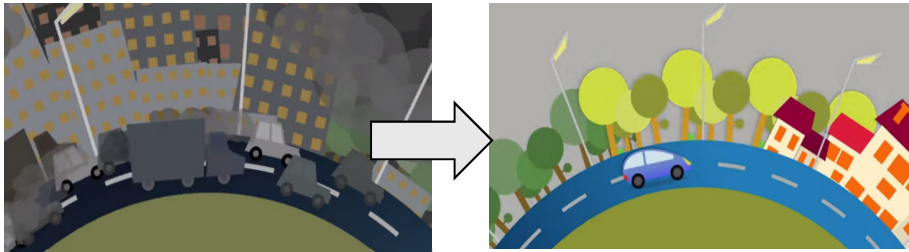
Smart City examples

- Connected streets
- Lights automatically switch on
- Real-time parking spots
- Waste-collection know how full containers are
- Weather sensors manage automatic watering systems and detect leaks
- Real-time alerts in case of accidents
- Warnings on connected road signs
- Adjustable traffic lights
- Better quality of health…
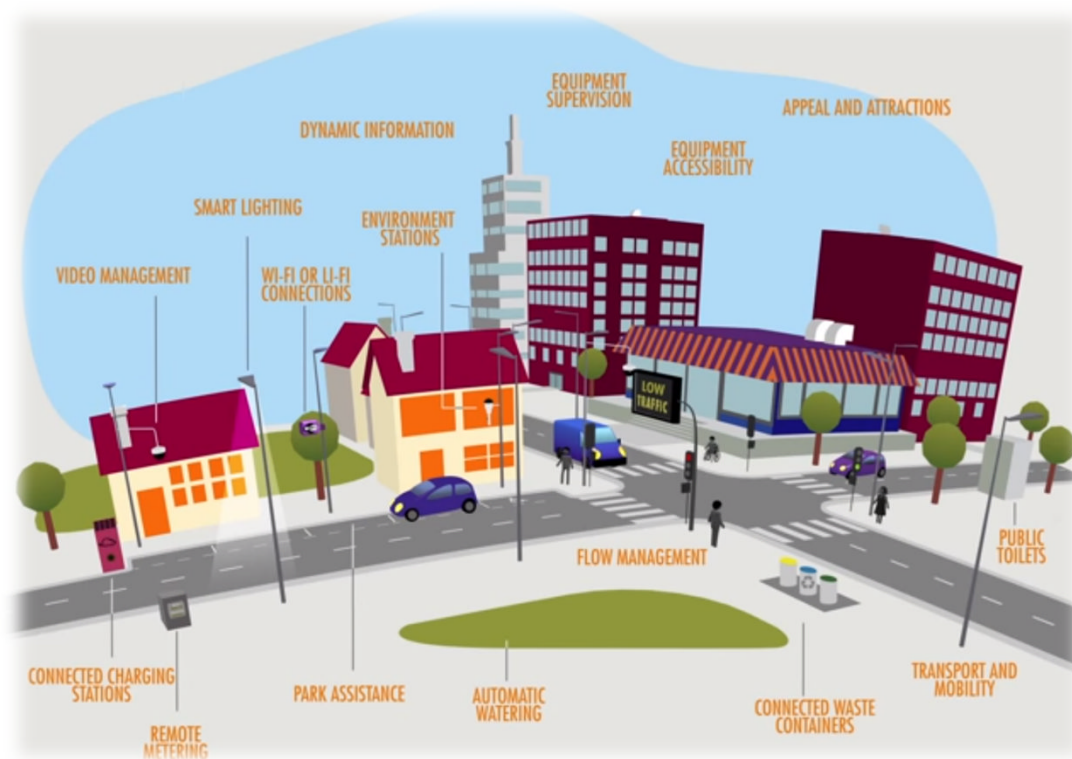
eHEALTH & Healthcare

WHAT is eHEALTH?

XHEALTH

- Looking after **ourselves**
- Looking after our **loved ones**
- Receiving **care**

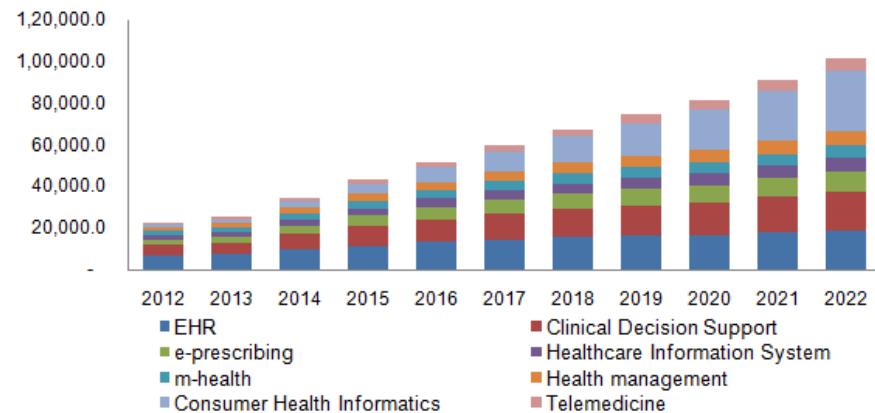**eHEALTH**

- Computers, mobiles, tablets, internet and social media that offer:
  - Better healthcare and a healthier life through digital technology

WHY eHEALTH?

- Better **sharing** of information
- Secure **digitization** of records
- Better **quality** data
- **Record** treatments and return test results in almost real-time
- Better **diagnosis** and appropriate treatments

- Health records **available** wherever they are needed
- **Remote** care
- 24-hour condition **monitoring**
- **Management** of our own health

WHY eHEALTH?

- Increase of **life expectancy**
- Growing population of elderly people (**long-term care**)
- Live at **home**
- Delivery of **high quality** and **affordable** healthcare ecosystem
- **Connect** people and medical data
- Tackle **infectious diseases** (Obesity, Tuberculosis, HIV)
- Place **patients** rather than budgets at the centre of their systems

eHEALTH – NEW OPPORTUNITIES

- Revolutionize healthcare
- Improve global health
- Change the way we live our lives
- Use of data to improve healthcare services
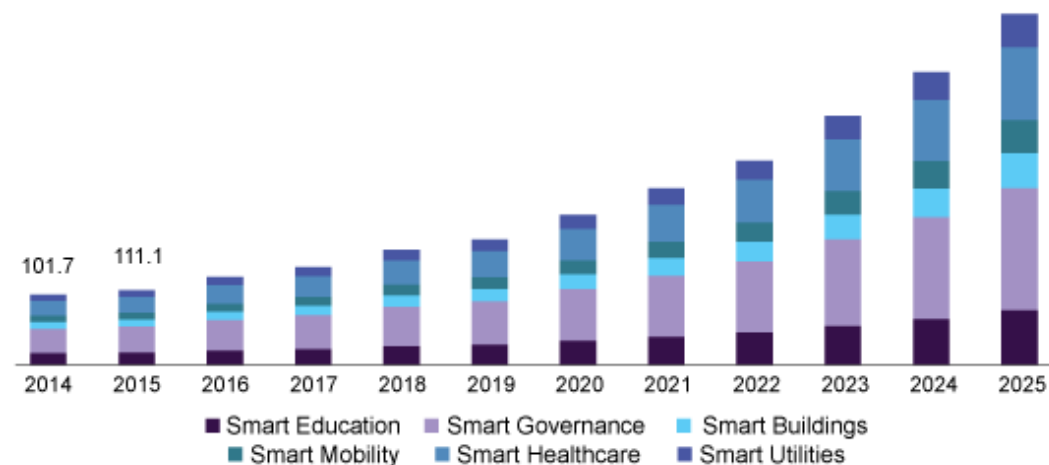- Develop new treatments through expert collaboration
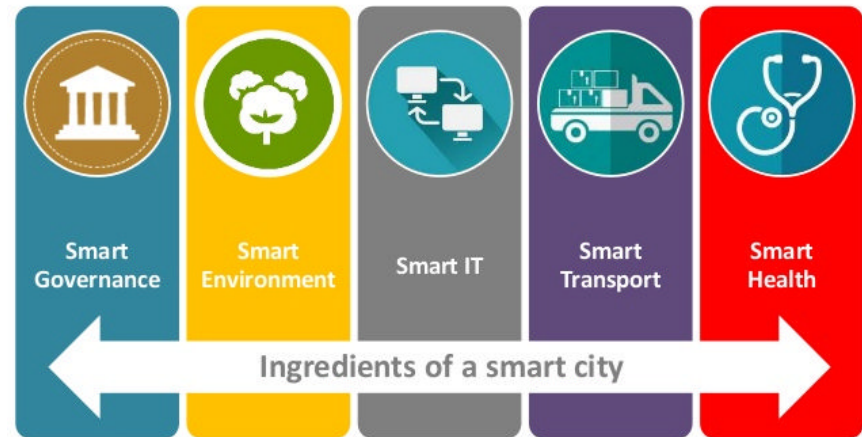
Smart Cities & Healthcare

Benefits of Smart Cities to Healthcare

Smarter healthcare in smart cities

- Smart healthcare will make up almost **15% of all smart city business by 2020**

- Smart healthcare product market is expected to reach **$57.85 billion by 2023**

- Smart healthcare uses the latest mobile and digital technologies to make **advances in eHealth and mHealth systems** while also driving the growth of intelligent and connected medical devices

- By making health data accessible to more parties, new improvements in healthcare can be had, by **sharing new medical learnings between healthcare professionals around the world**

U.S. smart cities market, by application, 2014 - 2025 (USD Billion)

101.7   111.1

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

■ Smart Education   ■ Smart Governance   ■ Smart Buildings
■ Smart Mobility   ■ Smart Healthcare   ■ Smart Utilities

# Benefits of Smart Cities to Healthcare

Smarter healthcare in smart cities

- With almost country-wide access to smartphones and laptops, **telemedicine is beginning to be a common practice in many hospitals today**

- A great **amount of time and money is saved** when a patient can video chat with their doctor instead of scheduling an appointment and driving to a physical location

- Citizens are more able to **communicate with authorities and vice versa**, and the always-on engaging nature of smart city technology means that authorities can gather more data than ever about citizens' health and wellbeing

- Smart cities can be equipped with sensors on lamp posts and other street furniture to monitor pollution and pollen levels, enabling **people to make more informed decisions relating to their health**
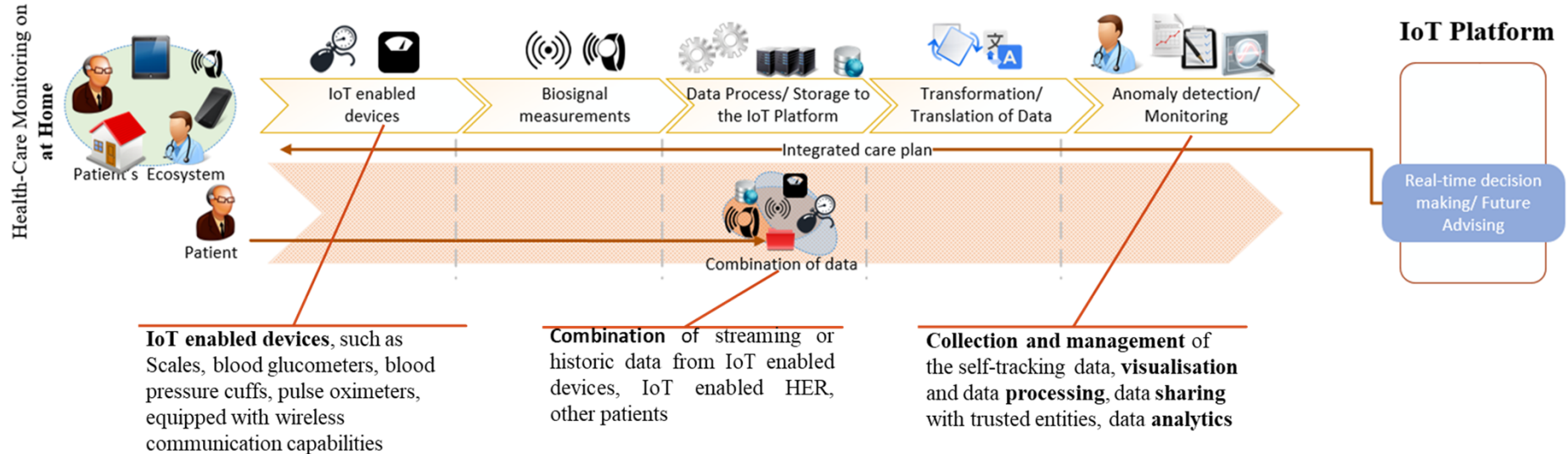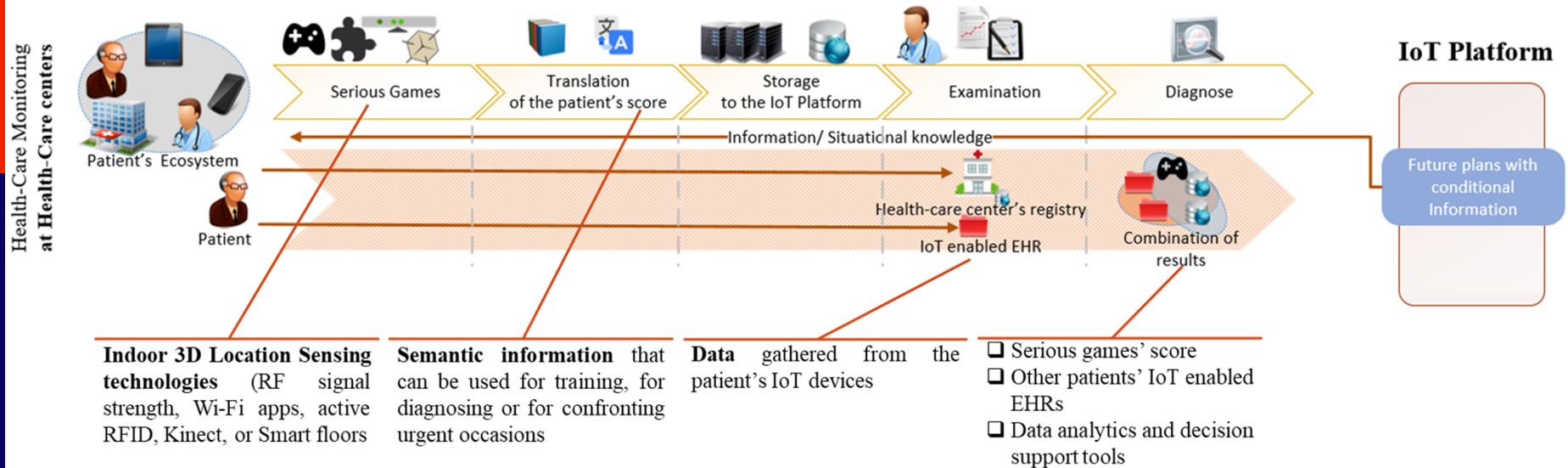
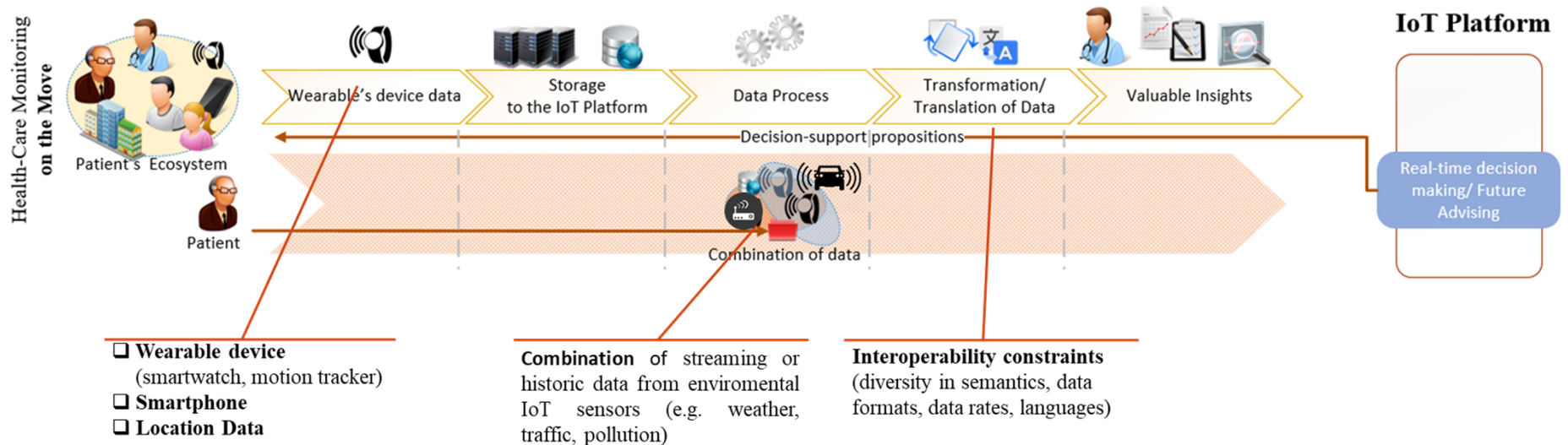# Real-life scenarios

Real-life scenarios: Healthcare Monitoring
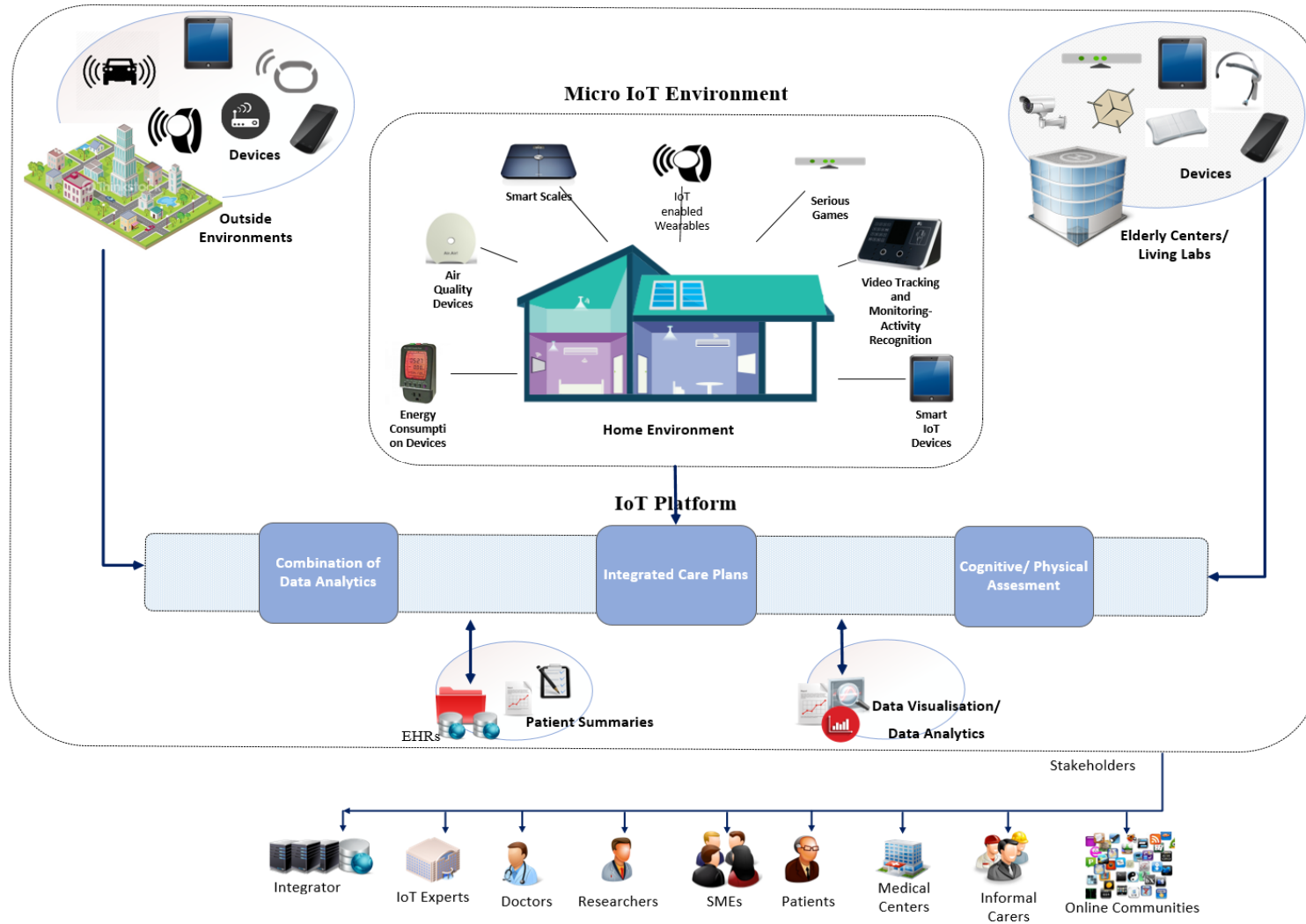
Real-life scenarios: Healthcare Monitoring at **Home**

Real-life scenarios: Healthcare Monitoring at **Health-Care Centers**

Real-life scenarios: Healthcare Monitoring on the Move

Thank you for your attention!