

Přednáška 12

Přesahy IT do dalších oborů

CORE013 Vývoj softwarových systémů: od myšlenky k funkčnímu řešení

12. Přesahy IT do dalších oborů

- Zdravotnickní
- Energetika
- Doprava
- Budovy
- Chytrá města
- Životní prostředí
- Průmysl
- Obrana
- eGovernment
- Finance

Domácí práce a příprava na příští přednášku

- Pročtěte si a okomentujte 2-3 články vložené do diskuzního fóra
https://is.muni.cz/auth/discussion/predmetove/fi/podzim2023/CORE013/trendy_a_budoucnost_it/

SMART WORLD

Libelium Smart World

Air Pollution

Control of CO₂ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection

Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing

Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care

Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care

Vital signs monitoring in high performance centers and fields.

Structural Health

Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions

Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection

Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control

Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels

Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels

Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion

Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads

Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting

Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping

Getting advices in the point of sale according to customer habits, preferences, presence of allergenic components for them or expiring dates.

Noise Urban Maps

Sound monitoring in bar areas and centric zones in real time.

Water Leakages

Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis

Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location

Search of individual items in big surfaces like warehouses or harbours.

Waste Management

Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking

Monitoring of parking spaces availability in the city.

Golf Courses

Selective irrigation in dry zones to reduce the water resources required in the green.

Water Quality

Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

<http://www.emrebastug.net/internet-of-things-iot-nesnelerin-interneti-sensor-networku-nedir.html>

Obory a multidisciplinarita

- Bioinformatika, chemoinformatika ([MUNI](#), [UPOL](#), [VŠCHT](#))
- Technologie a řízení dopravy ([Univerzita Pardubice](#))
- Jazykové technologie a počítačová lingvistika ([UK](#))
- Biomedicínská a klinická informatika ([ČVUT](#), [UK](#), ...)
- Geoinformatika ([UJEP](#), [VŠB](#))
- Průmysl 4.0 ([VŠB](#))
- Vojenské technologie, obrana a bezpečnost ([Univezita obrany](#))
- Podniková informatika ([MUNI](#))
- IT právo - Infrastruktura, SW, bezpečnost, právo, sociologie, psychologie

ZDRAVOTNICTVÍ

Zdravotnictví

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?

THE INTERNET OF (MEDICAL) THINGS TECHNOLOGY

3.7M Medical devices in use today connect to and monitor various parts of the body

Active implantable medical devices control stimulation &/or precision medicine therapy to treat disease and improve patient quality of life.



Monitors medical conditions specific to patient's disease & other systemic conditions such as heart rate, blood sugar, exercise, etc.

Closed-Loop System
"Smart" software supports device iteration based on data inputs to deliver best patient therapy

One IOMT system solution collecting data from medical devices, medications, & biometrics to modify the therapeutic window towards best care option



97% Wi-Fi adoption rates in hospitals
10% Medical devices enabled with Wi-Fi

OPTIMIZED RESULTS FOR:

PATIENT...



Receives **individually-optimized care** faster, with few doctor office visits, and decreased overall time "thinking" about the disease

HEALTHCARE PROFESSIONALS...



Monitor patient status, disease progression, & device performance. This allows for:

- Enhanced patient support
- Reduced Risk
- Feedback on device design improve opportunities

PATIENT FAMILIES...



Can be included in regular communications to **help monitor or have assurance of patient wellness.**

HEALTHCARE SYSTEM...



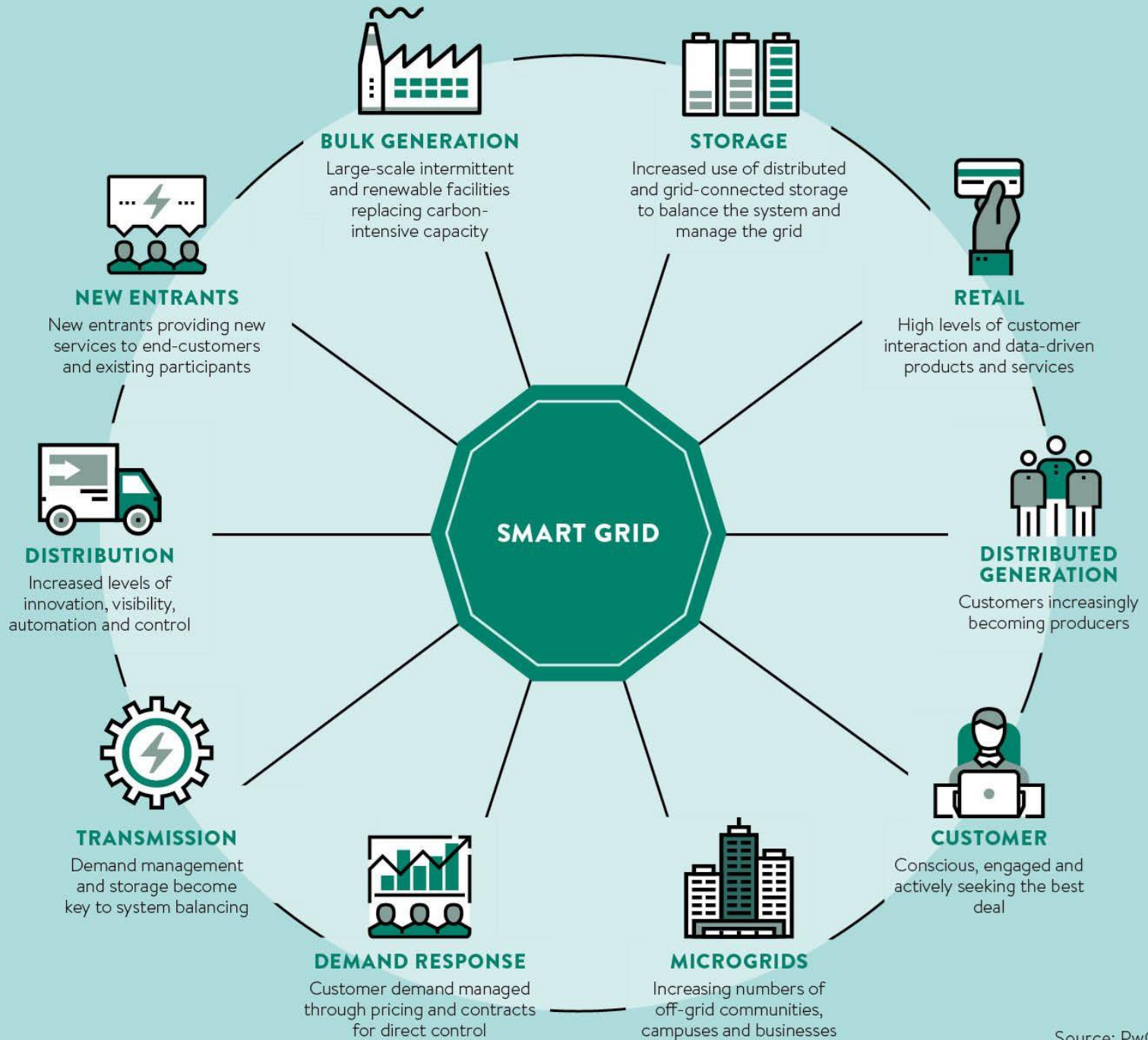
Automated advanced product monitoring & verification to **eliminate human error and falsification.**

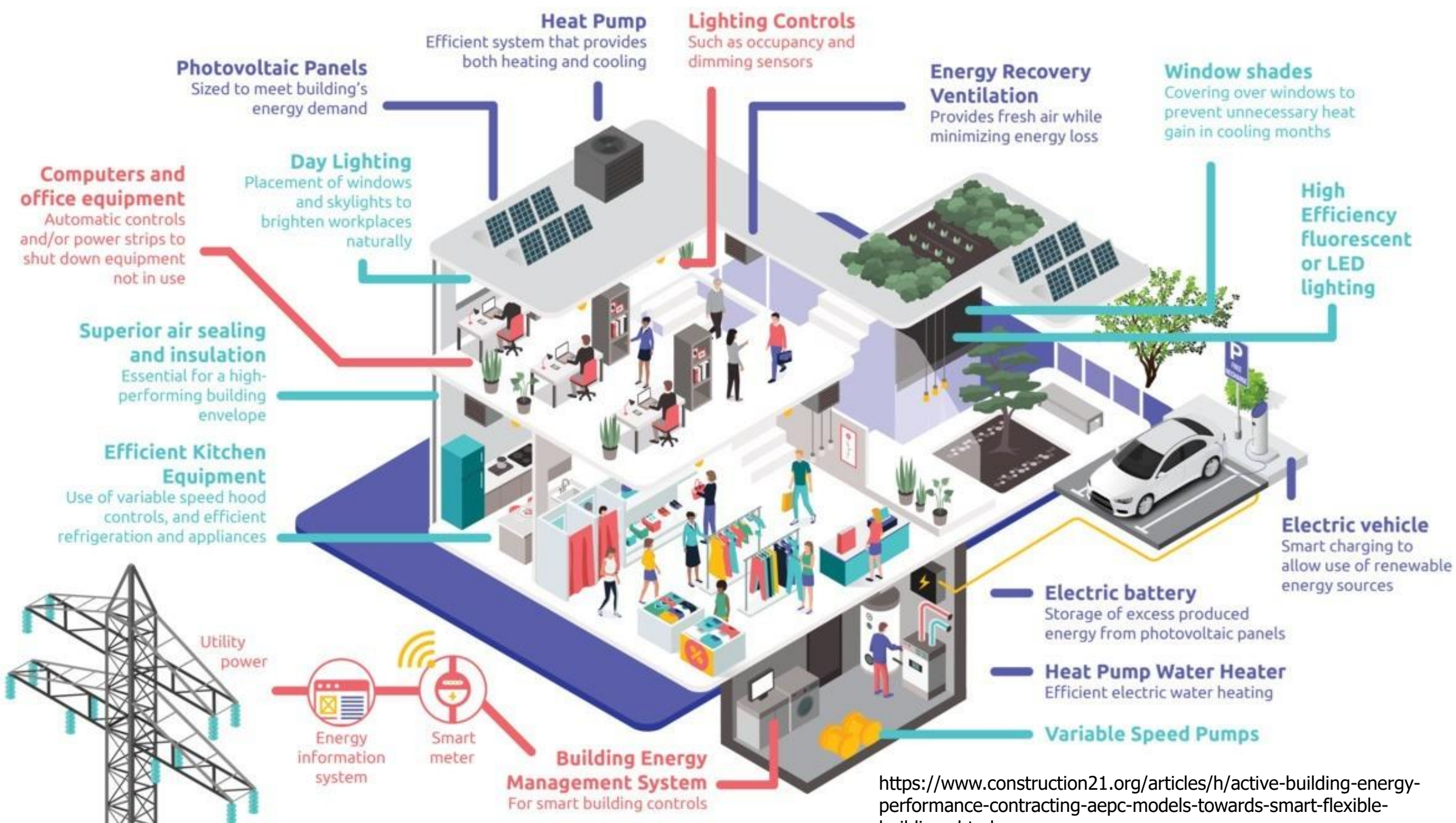
NEXEON

ENERGETIKA

Energetika

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?

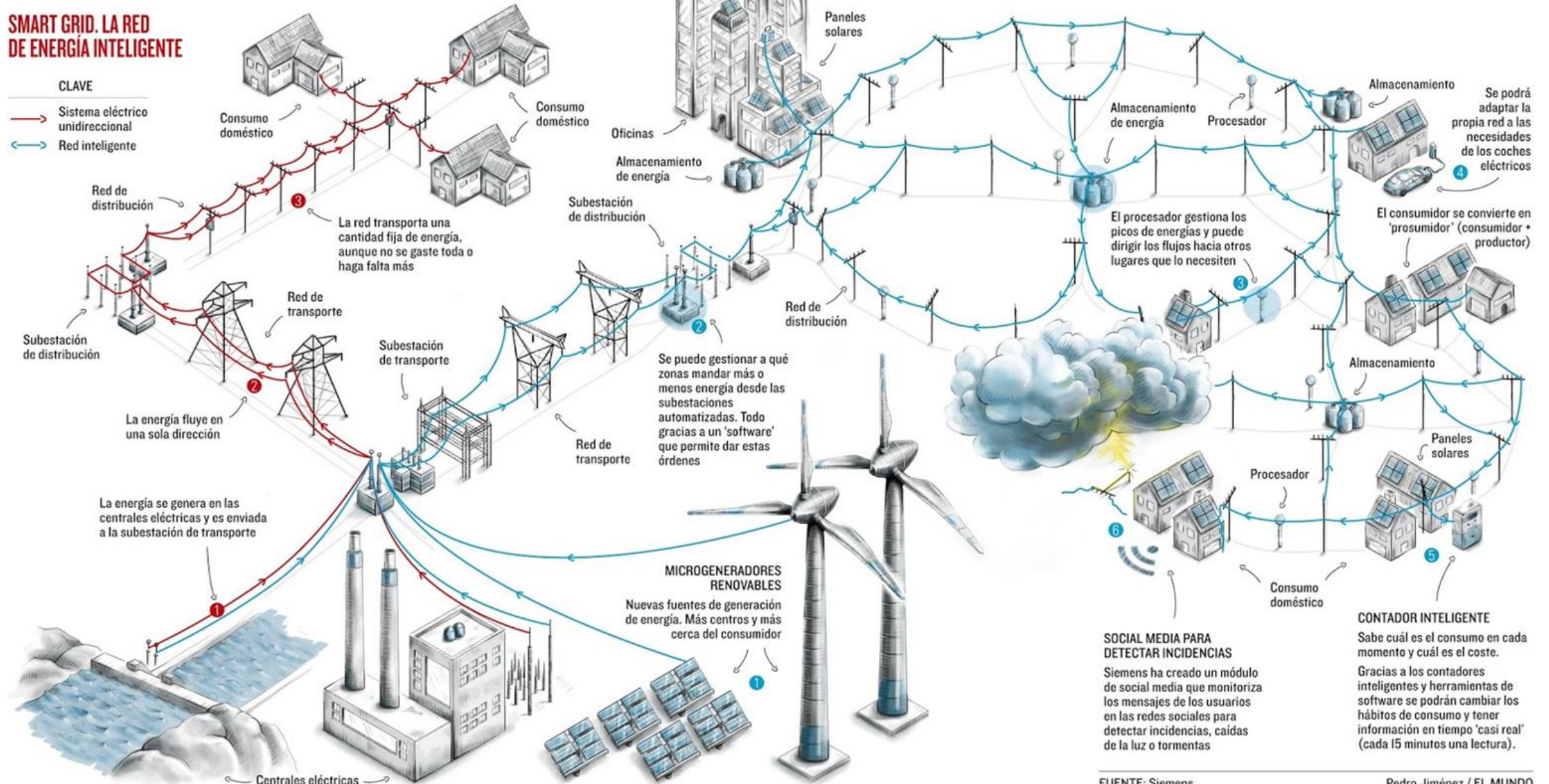




<https://www.construction21.org/articles/h/active-building-energy-performance-contracting-aepc-models-towards-smart-flexible-buildings.html>

SMART GRID. LA RED DE ENERGÍA INTELIGENTE

- CLAVE**
- Sistema eléctrico unidireccional
 - ↔ Red inteligente



SOCIAL MEDIA PARA DETECTAR INCIDENCIAS
Siemens ha creado un módulo de social media que monitoriza los mensajes de los usuarios en las redes sociales para detectar incidencias, caídas de la luz o tormentas

CONTADOR INTELIGENTE
Sabe cuál es el consumo en cada momento y cuál es el coste. Gracias a los contadores inteligentes y herramientas de software se podrán cambiar los hábitos de consumo y tener información en tiempo 'casi real' (cada 15 minutos una lectura).

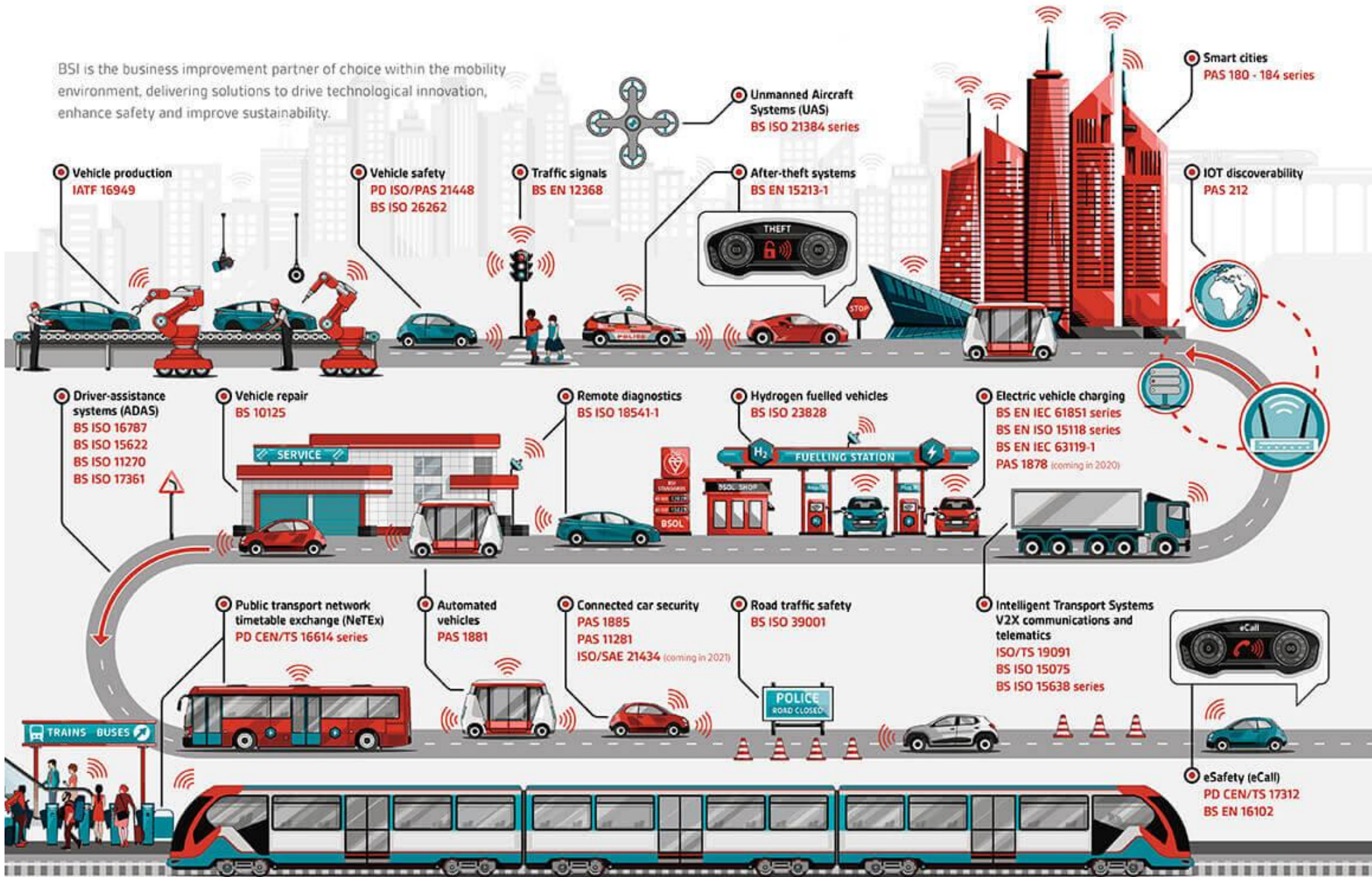
DOPRAVA

Doprava

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?



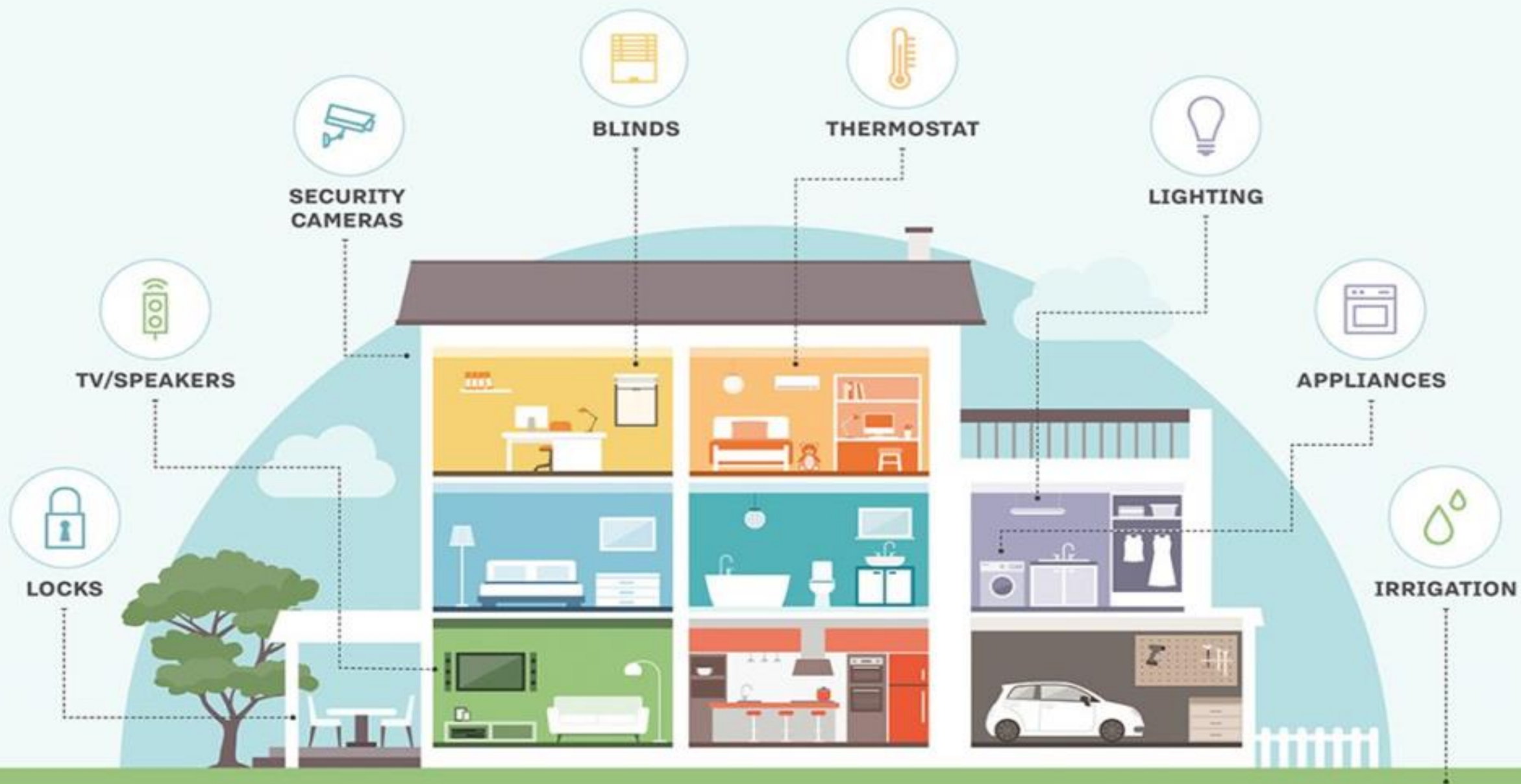
BSI is the business improvement partner of choice within the mobility environment, delivering solutions to drive technological innovation, enhance safety and improve sustainability.



CHYTRÉ BUDOVY

Chytré budovy

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?



SMART BUILDINGS INITIATIVE

How It Works

Smart Buildings is a technology and service that allows PSPC to **track, monitor** and **reduce** energy use.



Smart Buildings improves overall building **efficiency** and **reduces** greenhouse gas emissions, **lowering operational costs.**



Smart Buildings is currently installed in **103 buildings** across Canada. The technology has resulted in **energy cost savings of \$3.1M** to date and average annual energy savings of **10% per site.**



Smart Buildings continuously gathers raw data from devices that control a building's **heating, ventilation, air conditioning, hot water, heating and lighting systems.** The information collected is then transferred to a "cloud" and the service provider **analyzes** and **provides recommendations** to solve potential operational issues.

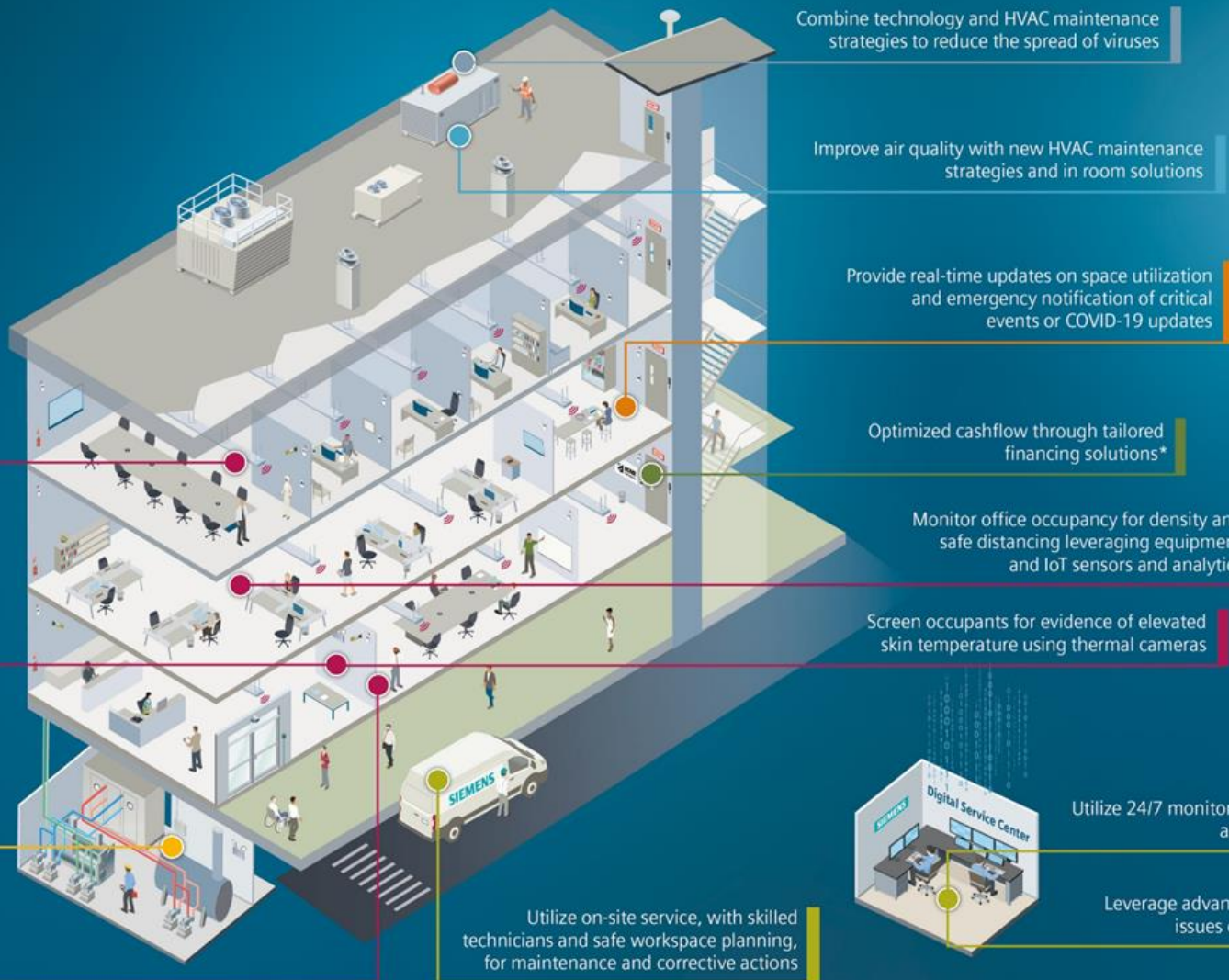


Smart Buildings will **lower** energy costs, **reduce** greenhouse gas emissions and **identify** building operation problems so they can be **solved quickly.**



<https://www.tpsgc-pwgsc.gc.ca/biens-property/intelligents-smart/index-eng.html>

How can smart buildings support when adapting to the "new normal"?



- Reduce the spread of airborne and surface contaminants
- Improve air quality
- Manage energy performance
- Enable social distancing
- Provide real-time updates
- Sustain healthy & safe environments
- Financing business models



CHYTRÁ MĚSTA

Chytrá města

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?



INTERNET OF THINGS IN CONNECTED CITIES

TRANSPORTATION CONGESTION SENSORS

Smart transportation systems use sensors to detect congestion and bottlenecks in traffic patterns. They also rely on cameras to enforce speed and traffic infractions. In doing so, these tools gather real time information that can be used by city DOTs to make mobility networks safer and more efficient.

WATER AND WASTEWATER MONITORING

Monitoring devices can detect leaks as well as changes in water pressure to determine whether water infrastructure is working properly.

PARKING APPS AND KIOSKS

Apps coordinate with smart parking meters to inform drivers of where there is parking availability.

BRIDGE INSPECTION SYSTEMS

Sensors monitor the structural soundness of bridges and inform city engineers of any issues. Drones are used to inspect hard to reach areas.

SELF-DRIVING CARS

Self-driving cars shuttle people in and out of the city, providing rides for others and making deliveries while their owners are occupied with work or other activities.

WASTE MANAGEMENT SENSORS

Sensors detect the amount of garbage in receptacles around the city so that sanitation workers can maximize efficiency in their routes.

LIGHTING

LED lights are weather adaptive and communications are automatically sent to the Department of Public Works when the bulbs need to be changed.

FIRE DETECTION

Sensors monitor conditions in public parks and wooded areas that might be prone to fire. Sensors can also detect fires in buildings and initiate a call to the fire department in an emergency.

ENERGY MONITORING

Power plants can be monitored for safety and city officials can be informed of any influx in radiation levels.

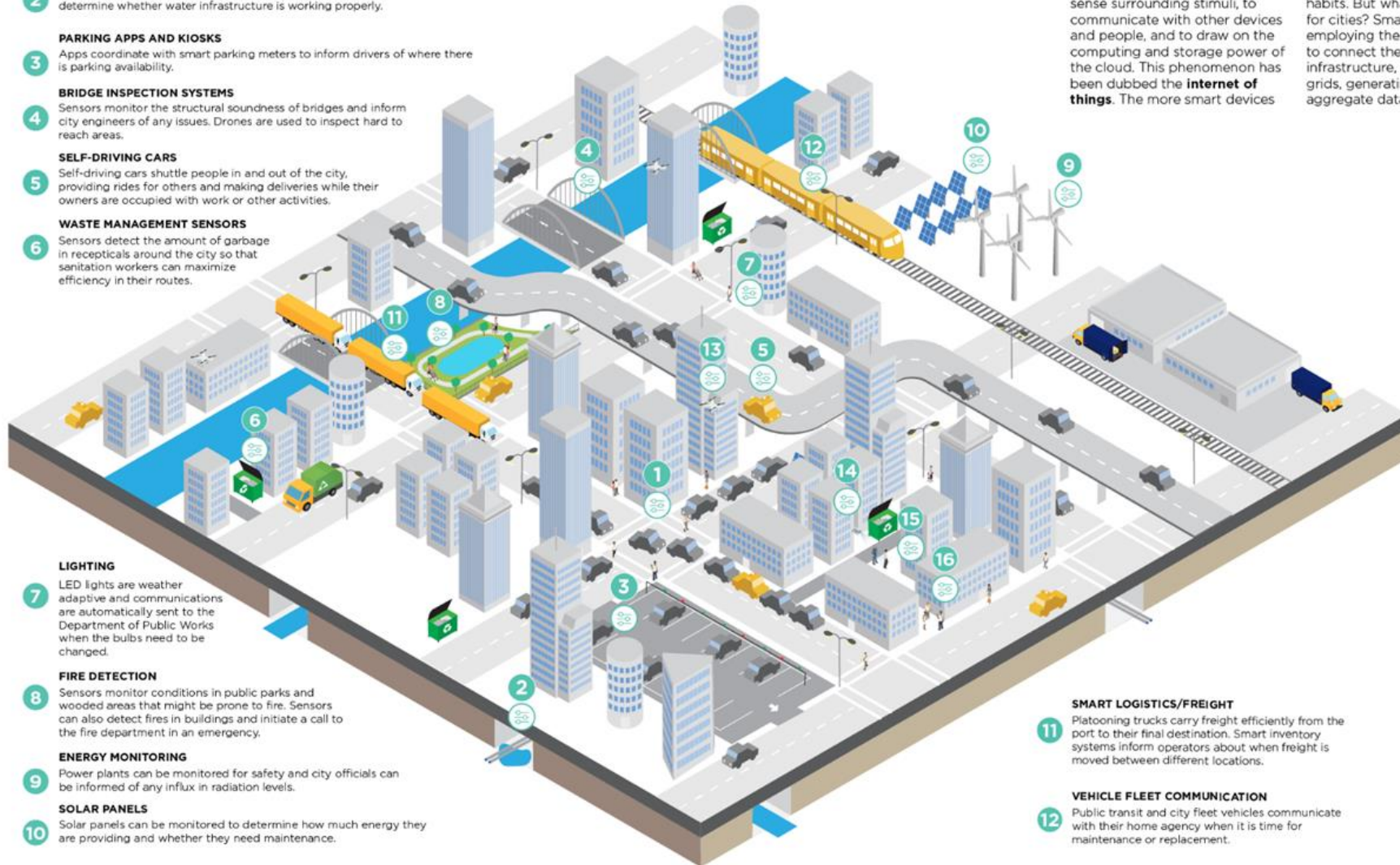
SOLAR PANELS

Solar panels can be monitored to determine how much energy they are providing and whether they need maintenance.

Every consumer product and piece of infrastructure increasingly has the ability to sense surrounding stimuli, to communicate with other devices and people, and to draw on the computing and storage power of the cloud. This phenomenon has been dubbed the **internet of things**. The more smart devices

and sharing platforms there are, the more data is generated about consumer's preferences and habits. But what does this mean for cities? Smart cities are employing the same technology to connect their disparate utility, infrastructure, and public service grids, generating real-time aggregate data. This, in turn, can

help cities manage their programs and services more effectively and gauge their impact immediately. The city of the future is an interconnected one, where devices communicate with one another in a constant stream of data that provides real-time information to the public and to the municipality.



DRONES

Drones can be used for law enforcement and firefighting, as rural ambulances, for infrastructure inspections, and for environmental monitoring. Commercial uses include precision farming, aerial photography, and in the near future, package delivery.



SURVEILLANCE CAMERAS

Cameras ensure security by monitoring activity in areas that are not frequented by public safety officers. Areas that are not open to public access can be monitored to keep unauthorized personnel out.



BODY CAMERAS

Public safety officers can wear body cameras that capture footage of interactions between themselves and city residents to ensure safety for both parties.



WEARABLE DETECTION

Cities can build in smartphone and wearable detection sensors so that people can be an active part of the internet ecosystem, communicating with the city, and with each other.



BROADBAND INFRASTRUCTURE

A reliable internet ecosystem is the glue that holds the internet of things together.



SMART LOGISTICS/FREIGHT

Platooning trucks carry freight efficiently from the port to their final destination. Smart inventory systems inform operators about when freight is moved between different locations.

VEHICLE FLEET COMMUNICATION

Public transit and city fleet vehicles communicate with their home agency when it is time for maintenance or replacement.

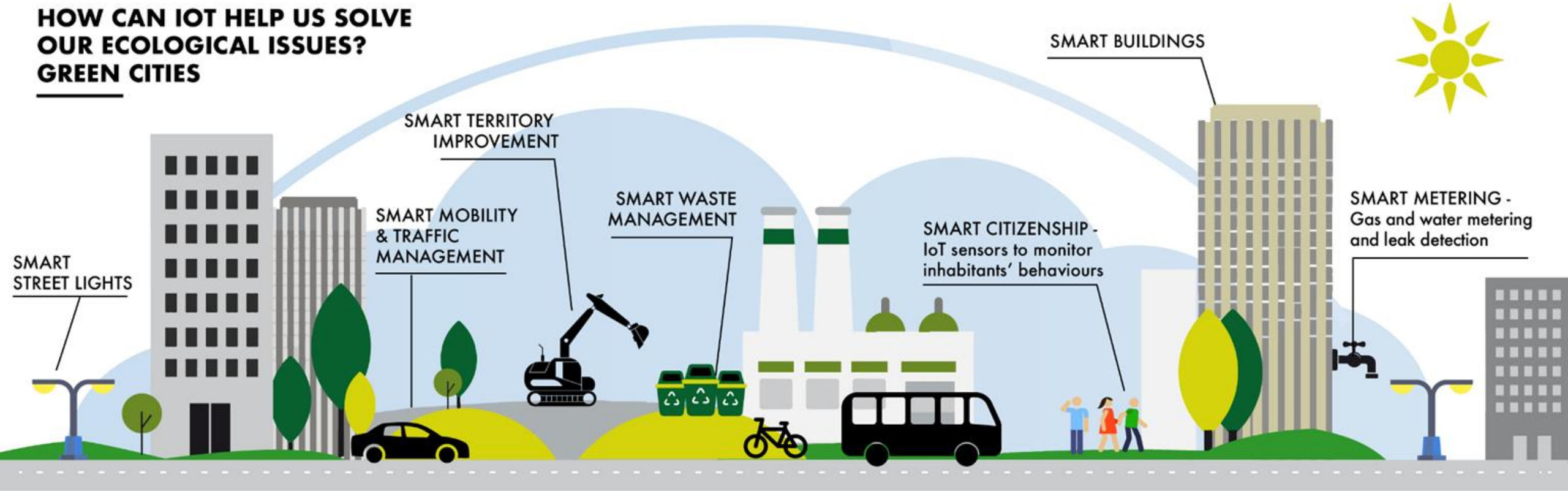
<https://www.nlc.org/resource/smart-city-development/>

ŽIVOTNÍ PROSTŘEDÍ

Životní prostředí

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?

HOW CAN IOT HELP US SOLVE OUR ECOLOGICAL ISSUES? GREEN CITIES

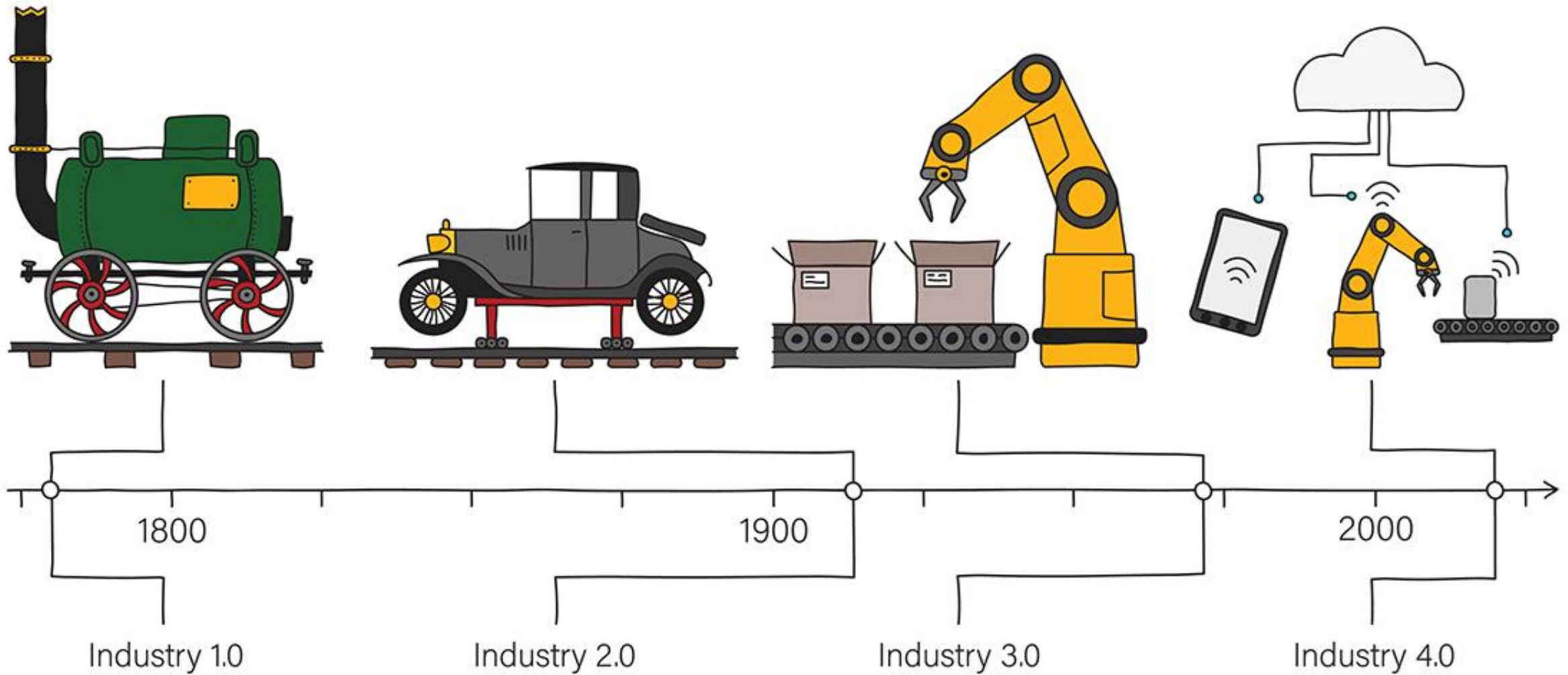


<https://www.saftbatteries.com/energizing-iot/how-can-iot-help-us-solve-our-ecological-issues-episode-3-green-cities>

PRŮMYSL

Průmysl

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?



1800

Industry 1.0

The Industrial Revolution begins. Mechanization of manufacturing with the introduction of steam and water power

1900

Industry 2.0

Mass production assembly lines using electrical power

2000

Industry 3.0

Automated production using electronics, programmable logic controllers (PLC), IT systems and robotics

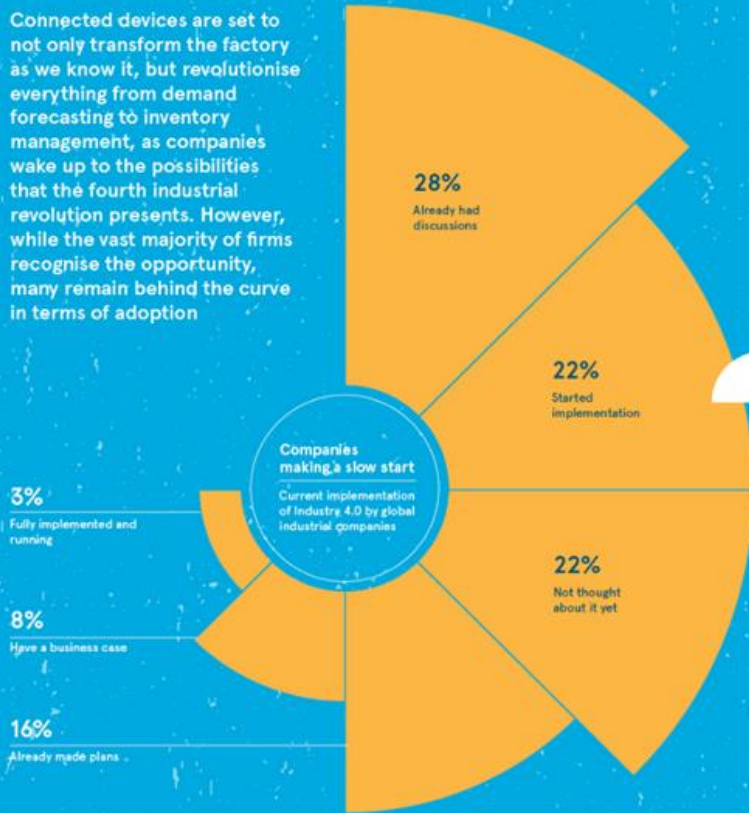
2000

Industry 4.0

The 'Smart Factory'. Autonomous decision making of cyber physical systems using machine learning and Big Data analysis. Interoperability through IoT and cloud technology.

INDUSTRY 4.0

Connected devices are set to not only transform the factory as we know it, but revolutionise everything from demand forecasting to inventory management, as companies wake up to the possibilities that the fourth industrial revolution presents. However, while the vast majority of firms recognise the opportunity, many remain behind the curve in terms of adoption



*Percentages do not equal 100 due to rounding
Stanton Chase 2017

88%

of global industrial companies agreed that the industrial internet of things (IIoT) is critical to their future success

66%

said IIoT will result in new revenue streams and business models for their company

49%

believe IIoT will enhance the customer experience

Industry of Things World 2017

Advanced human-machine interfaces

Internet of things platforms

Mobile devices

Big data analytics and advanced algorithms

Cloud computing

Authentication and fraud detection

Smart sensors

3D printing

Augmented reality/wearables

Multi-level customer interaction and customer profiling

Machine tools and product development take the lion's share of budget

Where manufacturers are allocating capital investment in technology

The Manufacturer/Hennik Research 2017



Maintenance and output expected to improve

Percentage of industrial firms that selected the following areas expected to improve through IIoT...

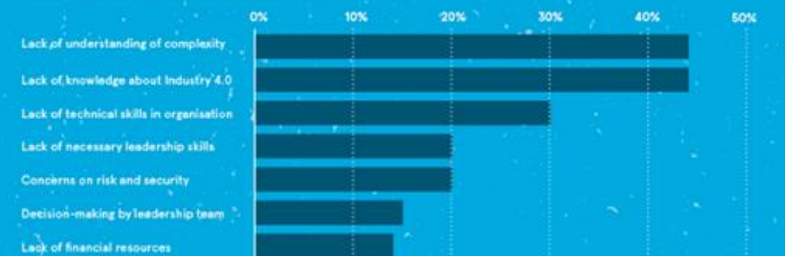
Industry of Things World 2017



Knowledge gap holding back implementation

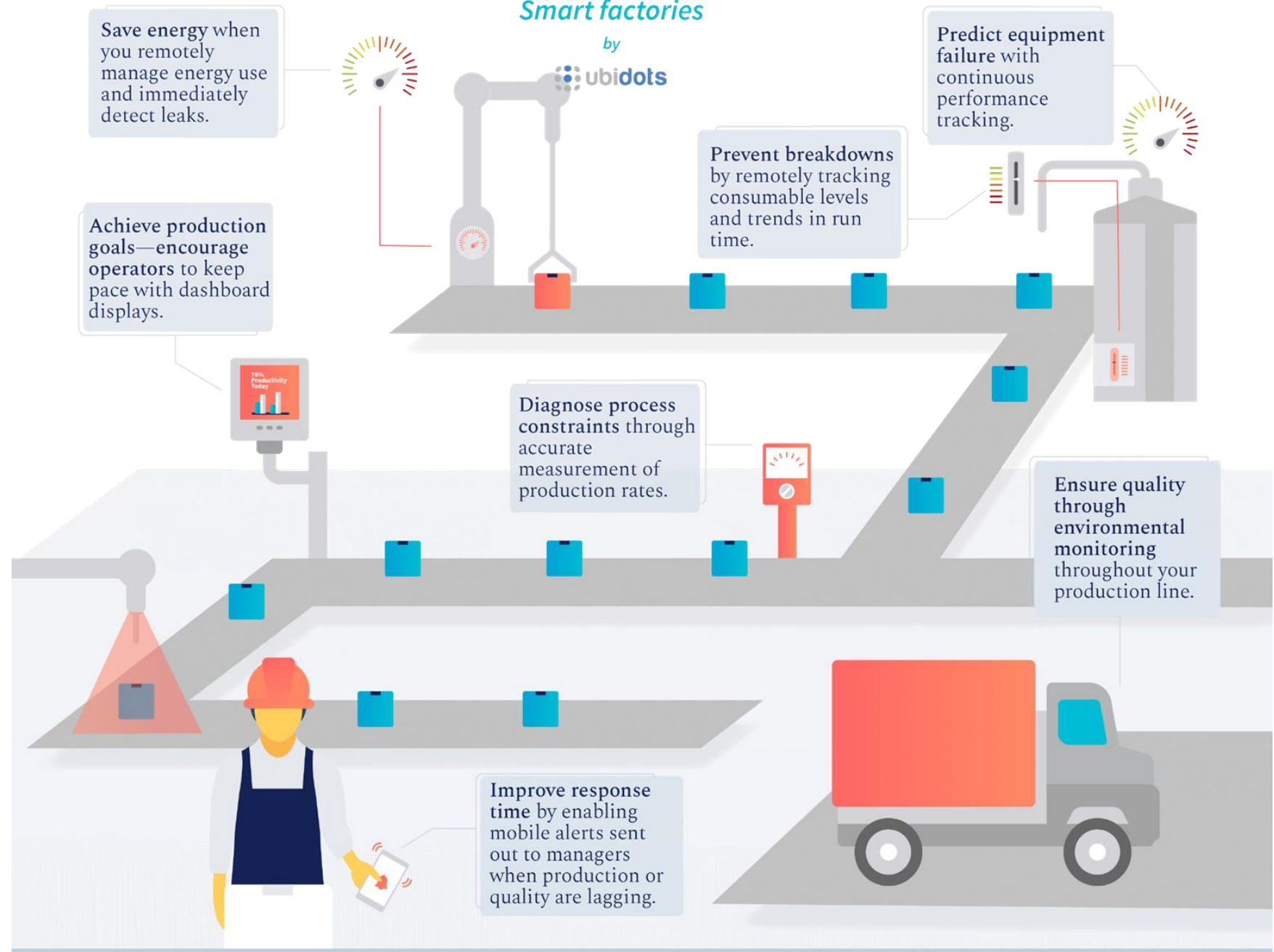
Percentage of global industrial executives who selected the following challenges to implementation of Industry 4.0...

Stanton Chase 2017



Inside Smart factories

by



<https://ubidots.com/manufacturing/>

MUNI
FI

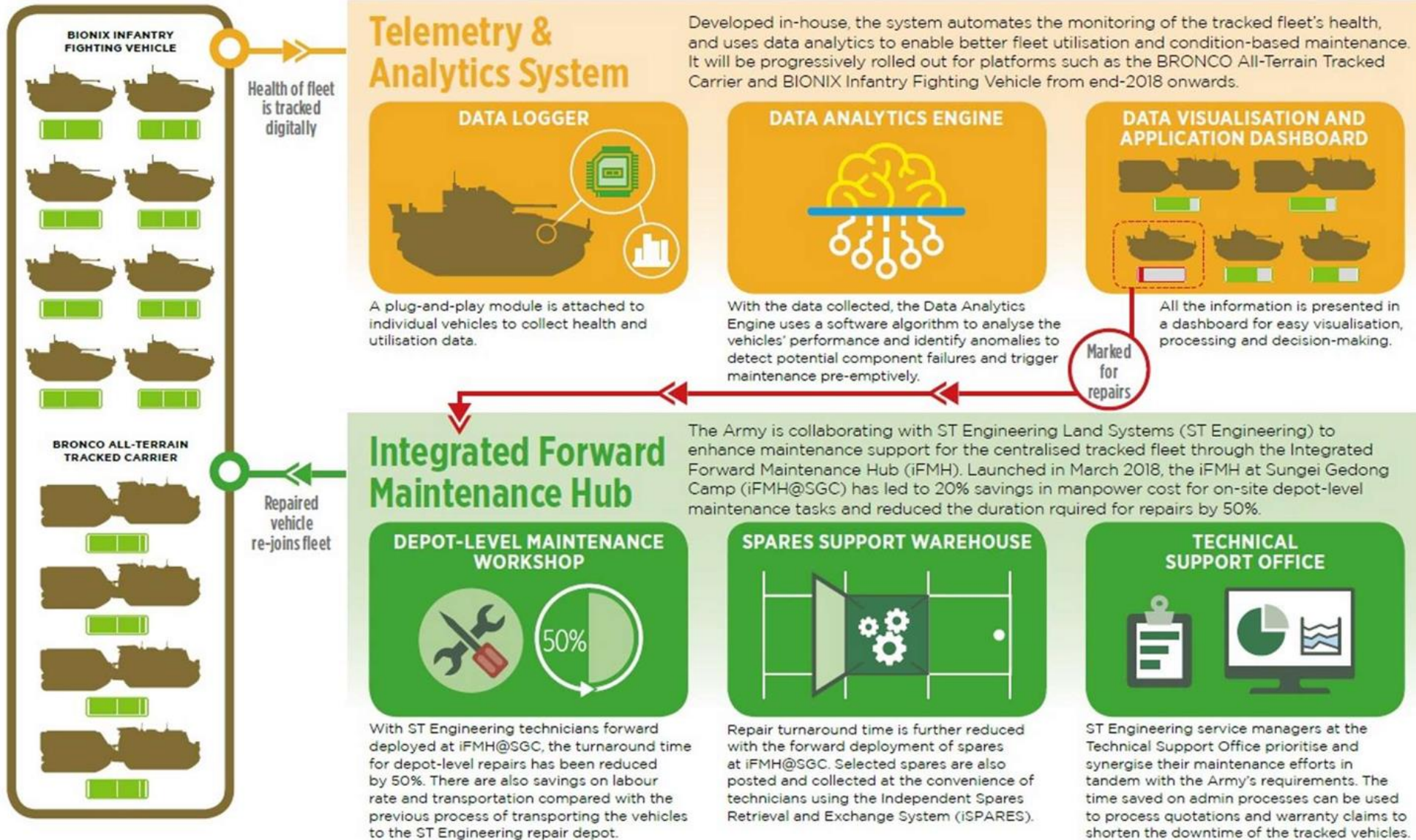
OBRANA

Obrana

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?

MORE EFFICIENT MAINTENANCE & MANAGEMENT OF THE ARMY'S TRACKED VEHICLES

The Singapore Army is exploiting data science and forward deploying selected depot-level maintenance capabilities into military camps to strengthen the maintenance support for its equipment fleet and to better meet operational and training requirements.



<https://www.mindef.gov.sg/web/wcm/connect/mindef/04405629-e1ee-43e9-86d2-cb30b0055a5e/army-infographic.jpg?MOD=AJPERES>

E-GOVERNMENT

E-Government

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde Kpotenciál pro další využití IT v budoucnu?

PUBLIC SERVICES ONLINE

‘Digital by default, or by detour’

Towards a new generation of eGovernment services

WHY?

Towards cheaper, better and faster services through eGovernment

ONLINE TRANSACTIONS ARE CHEAPER

Online transactions are twice as cheap compared to transactions via telephone and 3,5 times cheaper compared to face-to-face transactions.

FACE-TO-FACE



TELEPHONE



ONLINE



BETTER SERVICES ARE DESIGNED AROUND USER NEEDS

- Available online, both for nationals and foreigners
- Easily usable
- Time saving & flexible
- Personalised
- Interaction through social media

HOW?

Addressing collaboration, commonality and transparency

Transformation is required to achieve a new ‘outside-in’ model and vital to achieve a new generation of eGovernment services. It requires collaboration across government domains (joined up) to establish common building blocks that all public service providers can use consistently. Transparency is unmistakably part of that transformation: to demonstrate how public administrations operate and function as well as to empower citizens to access and control their own data.

USING TECHNOLOGY TO REALIZE A NEW, FASTER GENERATION OF E-SERVICES

- Key enablers enable eGovernment
- ‘once-only’ registration and use of authentic sources to deliver services electronically or even automatically
- Using data consistently and securely across public agencies
- Big data analytics



www.floydworks.com

WHAT?

The eGovernment Benchmark offers comparison and insight on 3 inter-related areas



1 DEMAND-SIDE CITIZEN SURVEY

The survey reached 28,000 internet-using citizens across 32 EU countries, exploring 27 questions, and 19 most common citizen services. This provides a picture with 95% confidence (relevancy) of the views of the 600 million European citizens.



2 LIFE EVENT SERVICE PROVISION



BUSINESS START UP AND EARLY OPERATIONS

LOSING AND FINDING A JOB

STUDYING

- Data on 15 to 30 specific services per life event, in 32 countries resulting in 100.000+ data points
- New life events will be added in 2013



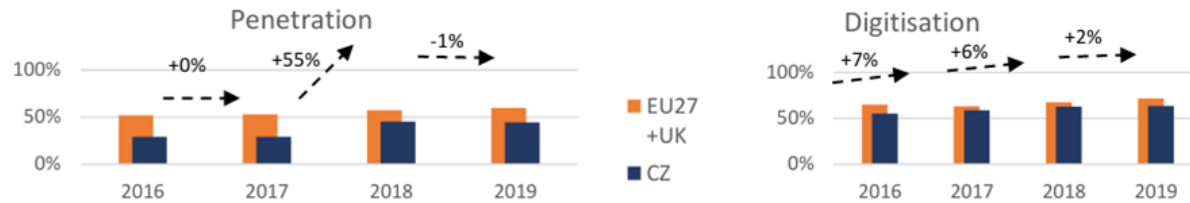
3 AVAILABILITY OF KEY IT ENABLERS

- eID
- eDocuments
- eSafe
- Authentic sources
- Single Sign On

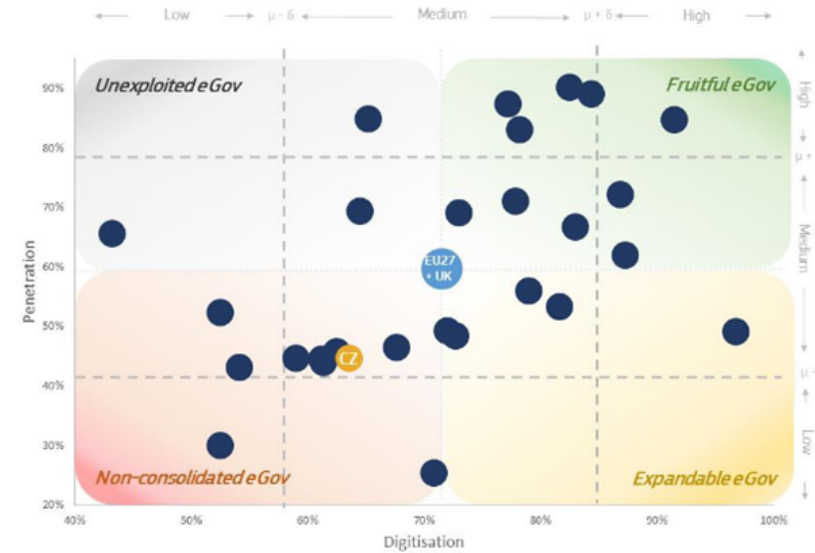
eGovernment Benchlearning performance

Performance

	Penetration	Digitisation
EU27+UK	60%	72%
CZ	44%	64%



Czech Republic is characterised by a medium-low level of Penetration and Digitisation. Therefore it is included in the Non Consolidated eGov scenario, a scenario where countries are not fully exploiting ICT opportunities. Despite a significant improvement in Penetration in 2018, and a constant growth in Digitisation, the country is still not aligned with the European levels.



Relative Indicators and Environment

	User characteristics		Government characteristics		Digital context characteristics	
	Digital Skills	ICT usage	Quality	Openness	Connectivity	Digital in the private sector
EU27+UK	50%	58%	70%	69%	52%	44%
CZ	49%	54%	68%	66%	45%	50%



Czech Republic's relative indicators show a country with all the characteristics (User characteristics, Government characteristics and Digital context characteristics) in line with the European average.

Considerations

Penetration

Underperforming

Digitisation

Underperforming

Compared to countries with a similar environment, Czech Republic is Underperforming in both Penetration and Digitisation, with performances lower than expected. This means that countries with similar environmental characteristics have reached a better Penetration and Digitisation level. A country can improve the Penetration level by increasing the number of people that submit official forms online to administrative authorities or by automating processes and requesting fewer forms from citizens. Regarding Digitisation, its performance level can be increased by improving the level of the back-office and the front-office digitisation.

FINANCE

Finance

- Kde v této oblasti se aktuálně IT využívá?
- Jaký je zde potenciál pro další využití IT v budoucnu?

WHAT THE STATE OF FINTECH COVERS



PAYMENTS

Payments processing, card developers, money transfer platforms, and tracking software



BANKING

Digital-first banks or companies digitizing banking services for credit and debit



DIGITAL LENDING

Companies creating new solutions for personal or commercial lending



WEALTH MANAGEMENT

Personal finance tools, investment and wealth management platforms, and analytics tools



INSURANCE

Companies selling or distributing insurance digitally or providing data analytics and software for (re)insurers



CAPITAL MARKETS

Sales and trading, analysis, and infrastructure tools for financial institutions



SMB

Companies focused on providing solutions to small- and medium-sized businesses



REAL ESTATE

Mortgage lending, transaction digitization, and financing platforms

How a Bitcoin transaction works

Bob, an online merchant, decides to begin accepting bitcoins as payment. Alice, a buyer, has bitcoins and wants to purchase merchandise from Bob.

WALLETS AND ADDRESSES



Bob and Alice both have Bitcoin "wallets" on their computers.



Wallets are files that provide access to multiple Bitcoin addresses.



An address is a string of letters and numbers, such as 1HULMwZEPkjEPeCh43BeKJLybLCWrfDpN.



Bob creates a new Bitcoin address for Alice to send her payment to.

CREATING A NEW ADDRESS

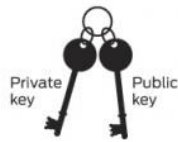


Each address has its own balance of bitcoins.

SUBMITTING A PAYMENT



Alice tells her Bitcoin client that she'd like to transfer the purchase amount to Bob's address.



Public Key Cryptography 101

When Bob creates a new address, what he's really doing is generating a "cryptographic key pair," composed of a private key and a public key. If you sign a message with a private key (which only you know), it can be verified by using the matching public key (which is known to anyone). Bob's new Bitcoin address represents a unique public key, and the corresponding private key is stored in his wallet. The public key allows anyone to verify that a message signed with the private key is valid.

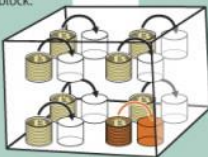
It's tempting to think of addresses as bank accounts, but they work a bit differently. Bitcoin users can create as many addresses as they wish and in fact are encouraged to create a new one for every new transaction to increase privacy. So long as no one knows which addresses are Alice's, her anonymity is protected.



Gary, Garth, and Glenn are Bitcoin miners.

VERIFYING THE TRANSACTION

Their computers bundle the transactions of the past 10 minutes into a new "transaction block."



The miners' computers are set up to calculate cryptographic hash functions.



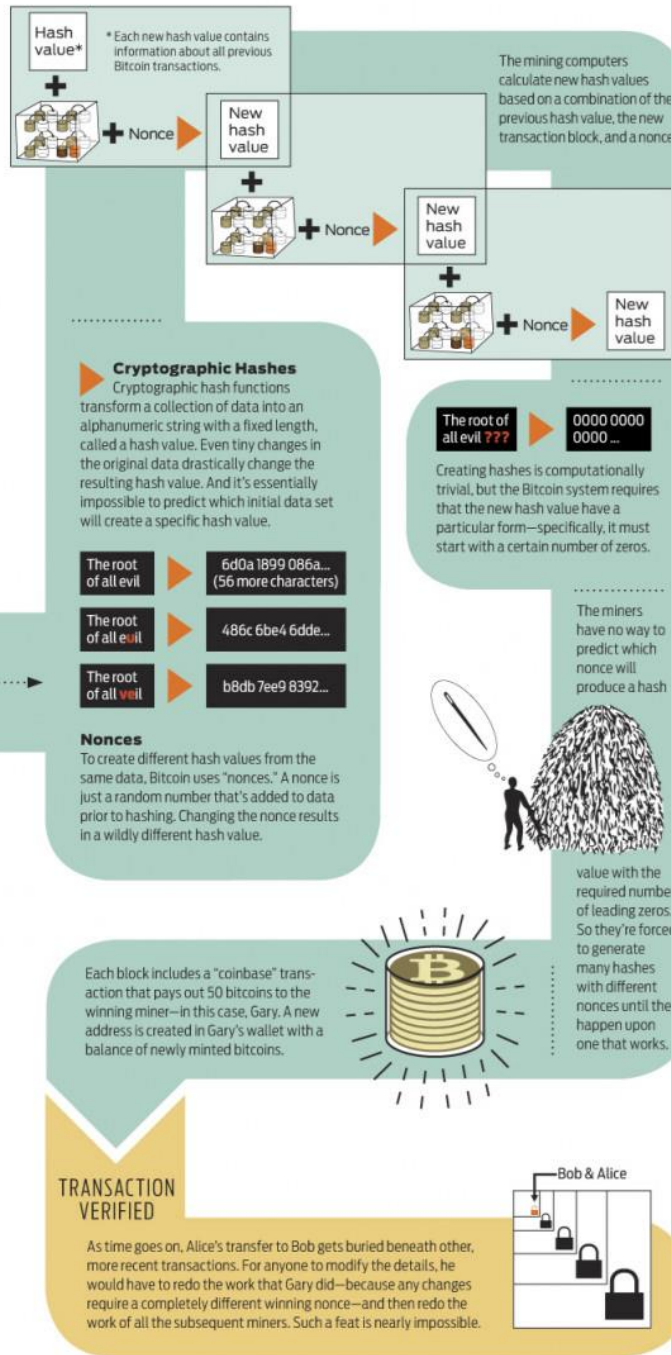
Private key

Alice's wallet holds the private key for each of her addresses. The Bitcoin client signs her transaction request with the private key of the address she's transferring bitcoins from.



Public key

Anyone on the network can now use the public key to verify that the transaction request is actually coming from the legitimate account owner.



© 2014 BITCOIN MAGAZINE. ALL RIGHTS RESERVED. PHOTO: GETTY IMAGES

https://thumbnails-visually.netdna-ssl.com/bitcoin-infographic_5029189c9cbaf_w1500.jpg

M U N I
F I

ROLE IT V CELOŽIVOTNÍM UČENÍ

IT je budoucnost

- Všechny společnosti se stávají **technologickými** společnostmi.
- Nejlépe **placená** jsou pracovní místa v oblasti technologií.
- Miliony pracovních míst zanikají v důsledku **automatizace**.
- V technologickém průmyslu **chybí** miliony lidí.



“

Education is the most powerful
weapon which you can use to
change the world.

– Nelson Mandela

Průzkum StackOverflow mezi vývojáři 2017

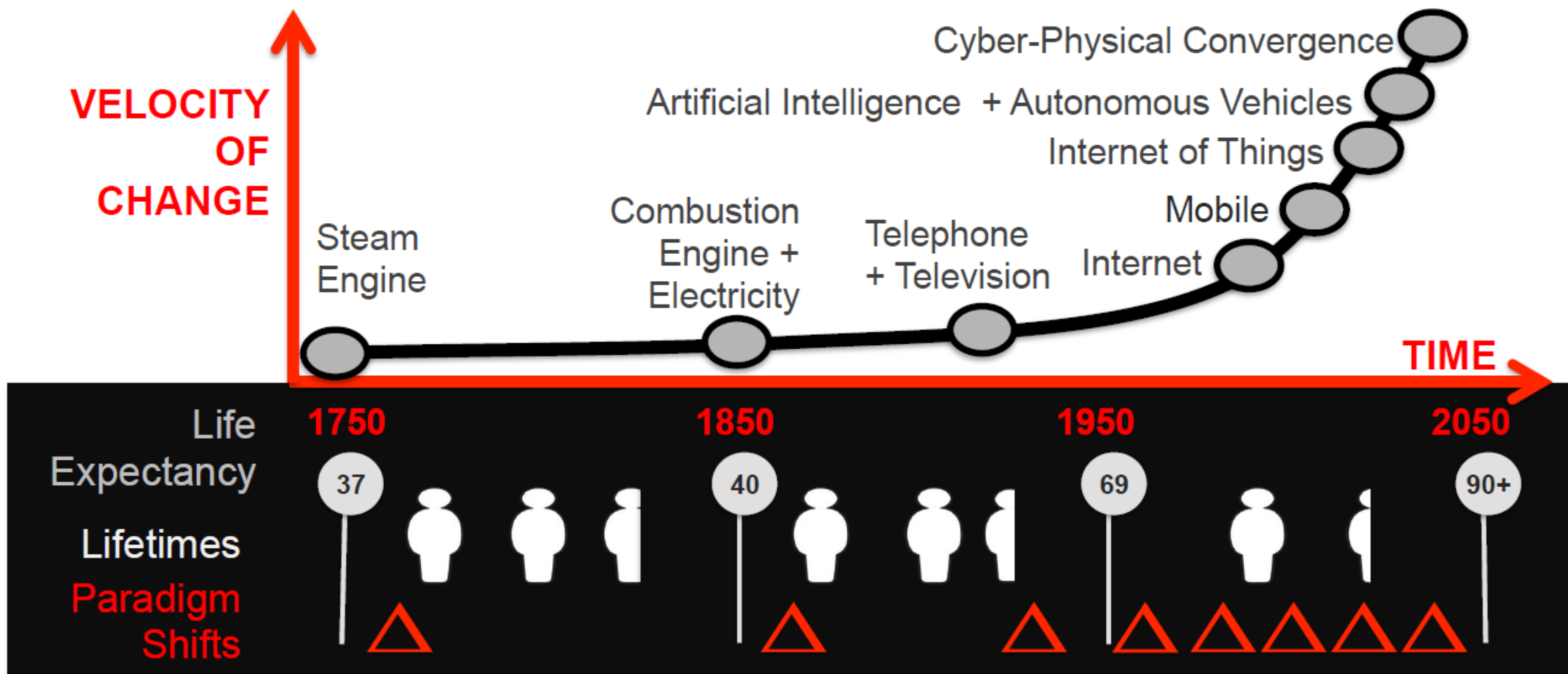
- 90 % respondentů tvrdí, že jsou alespoň částečně samouky. Mezi současnými profesionálními vývojáři,
- 55,9 % uvádí, že absolvovali online kurz, a 53,4 % uvádí, že absolvovali školení na pracovišti.

SÍLY PŮSOBÍCÍ V CELOŽIVOTNÍM UČENÍ

PRESSURE#1

The world is accelerating.

Context: Change Requires Adaptation



© Chris Shipley + Heather McGowan

Context: Talent Shifts in The Next Era

OUR MENTAL MODELS ARE HERE ↓ **TIME: WE ARE HERE** ↓

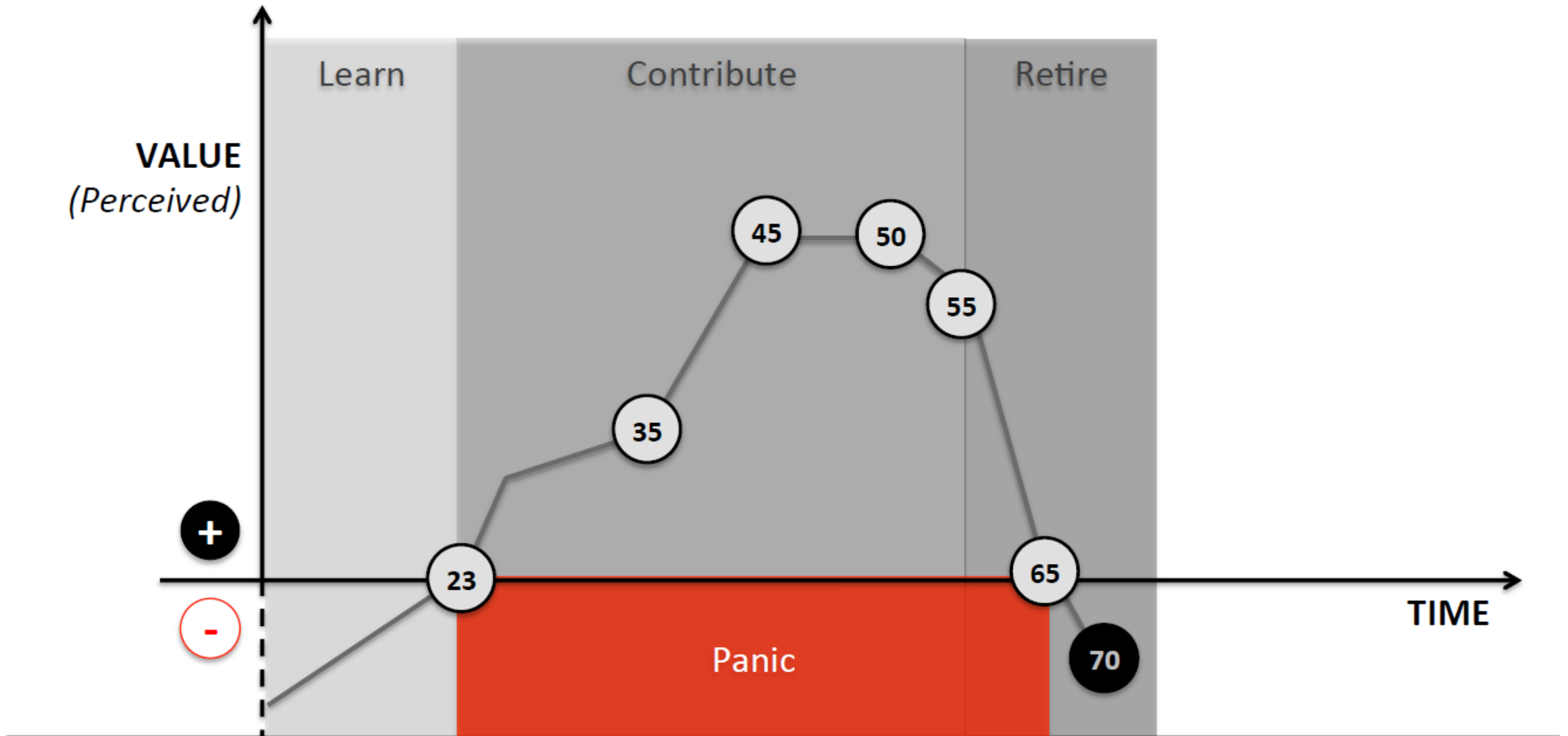
	Hunter – Gather Era	Agricultural Era	Industrial Era	Information Era	Augmented Era
TIMESPAN	1,000,000s	1,000s	100s	10s	
TALENT	Strength + Speed	Know How + Stamina	Efficiency + Optimization	Acquired Knowledge + Skill	Creativity, Agility + Adaptability
TOOLS	Labor Efficiency	Labor Augmentation	Labor Replacement	Cognitive Reduction	Cognitive Augmentation

Concept of Augmented Era © Jeff Kowalski, CTO Autodesk

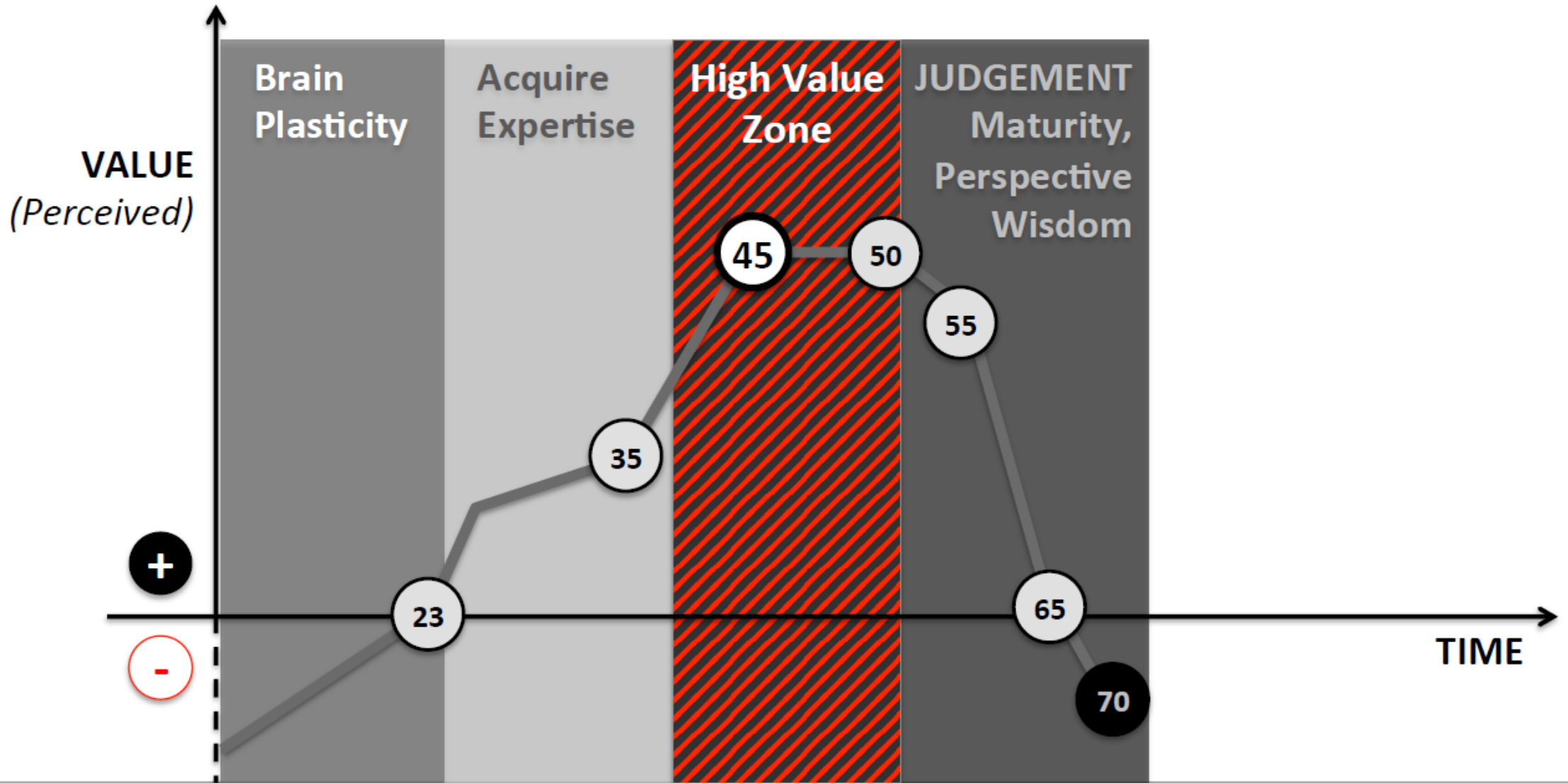
PRESSURE#2

Workforce from different eras is mixing at the workplace.

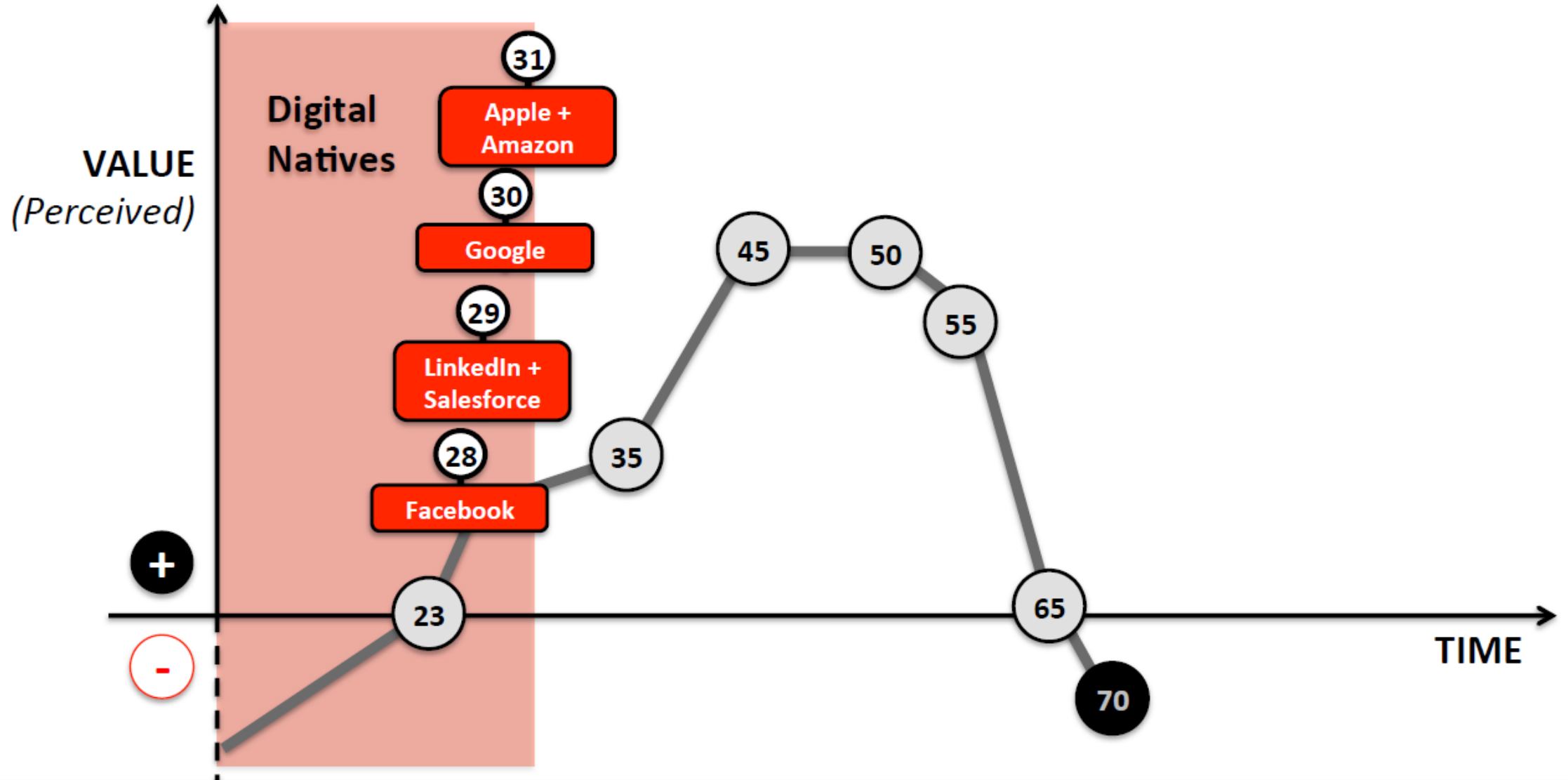
CONTEXT: The Career Arc (The Old Model)



CONTEXT: The Career Arc (The Old Model)– Perceived Value



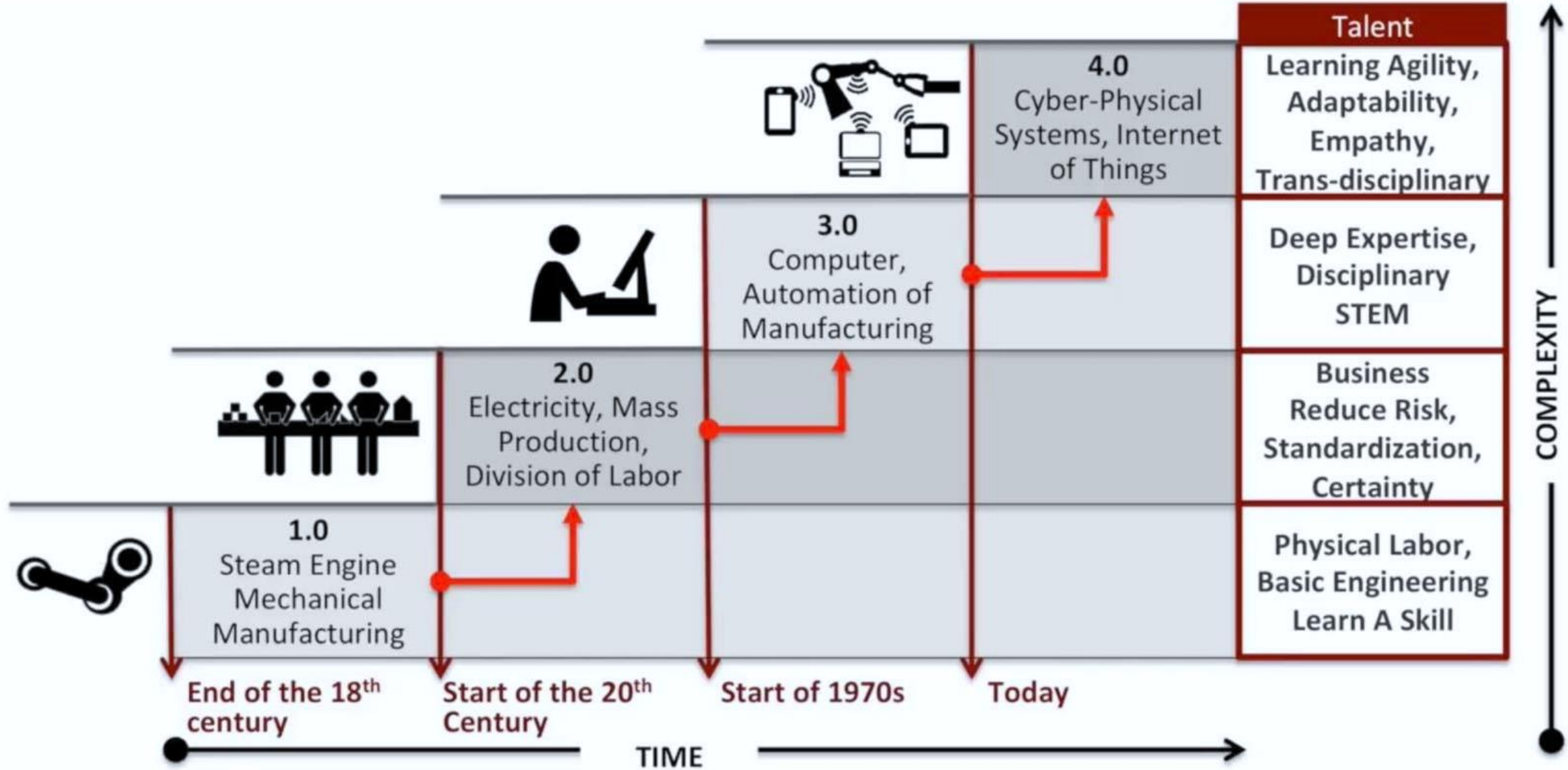
CONTEXT: New Economy + Digital Natives



PRESSURE#3

The required skillset is changing.

CONTEXT: Next Industrial Revolution (World Economic Forum 4th)



Emerging Solutions: Agile Learning Mindset

Learning Agility

(Learning + Unlearning,
Learning Styles)

Adaptability

(Navigate Ambiguity,
Unstructured Problems)



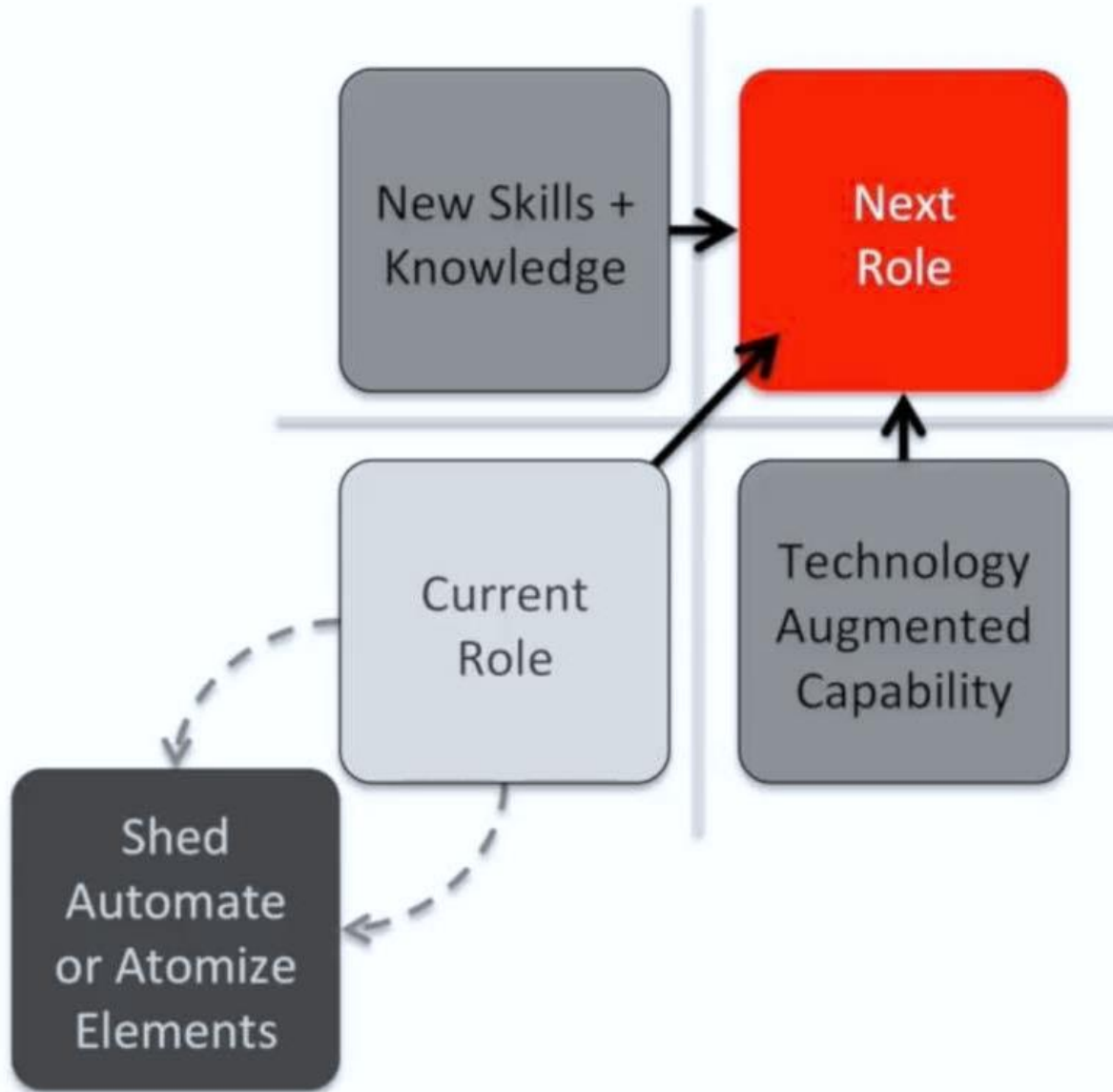
Uniquely Human Skills

(Empathy,
Social Intelligence,
Creativity, etc.)

Agency

(Motivation,
Self Awareness,
Personality Types)

THINK DIFFERENTLY: Career Map: Assess + Evolve (Learn + Adapt) Continuously



Current Role and Self Definition



Tasks Automated or Atomization



New Skills + Knowledge
(Business Models Evolution)



Extended Human Potential
(Augmentation)



Next Role

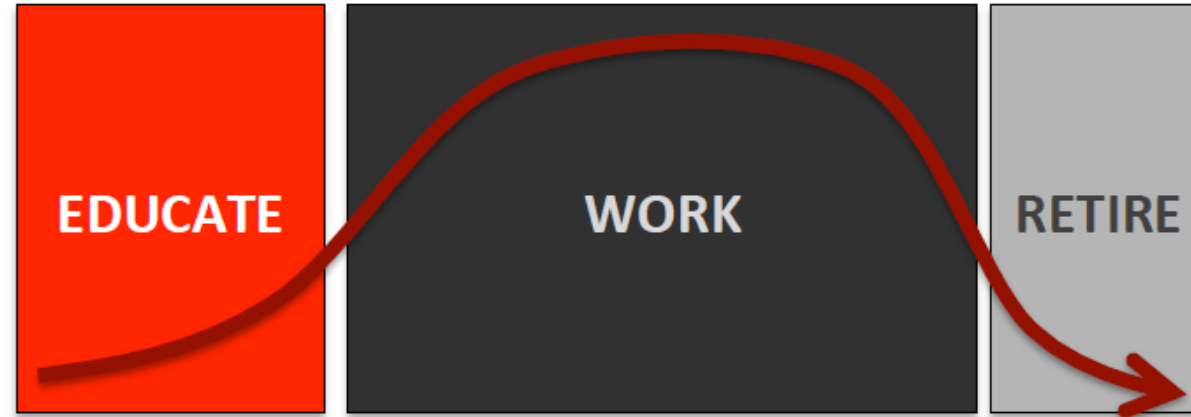
REPEAT PROCESS

PRESSURE#4

Career agility becomes a new norm.

New Economy Shifts Life Blocks

**OLD
ECONOMY**



Lifespan = 73 Years →

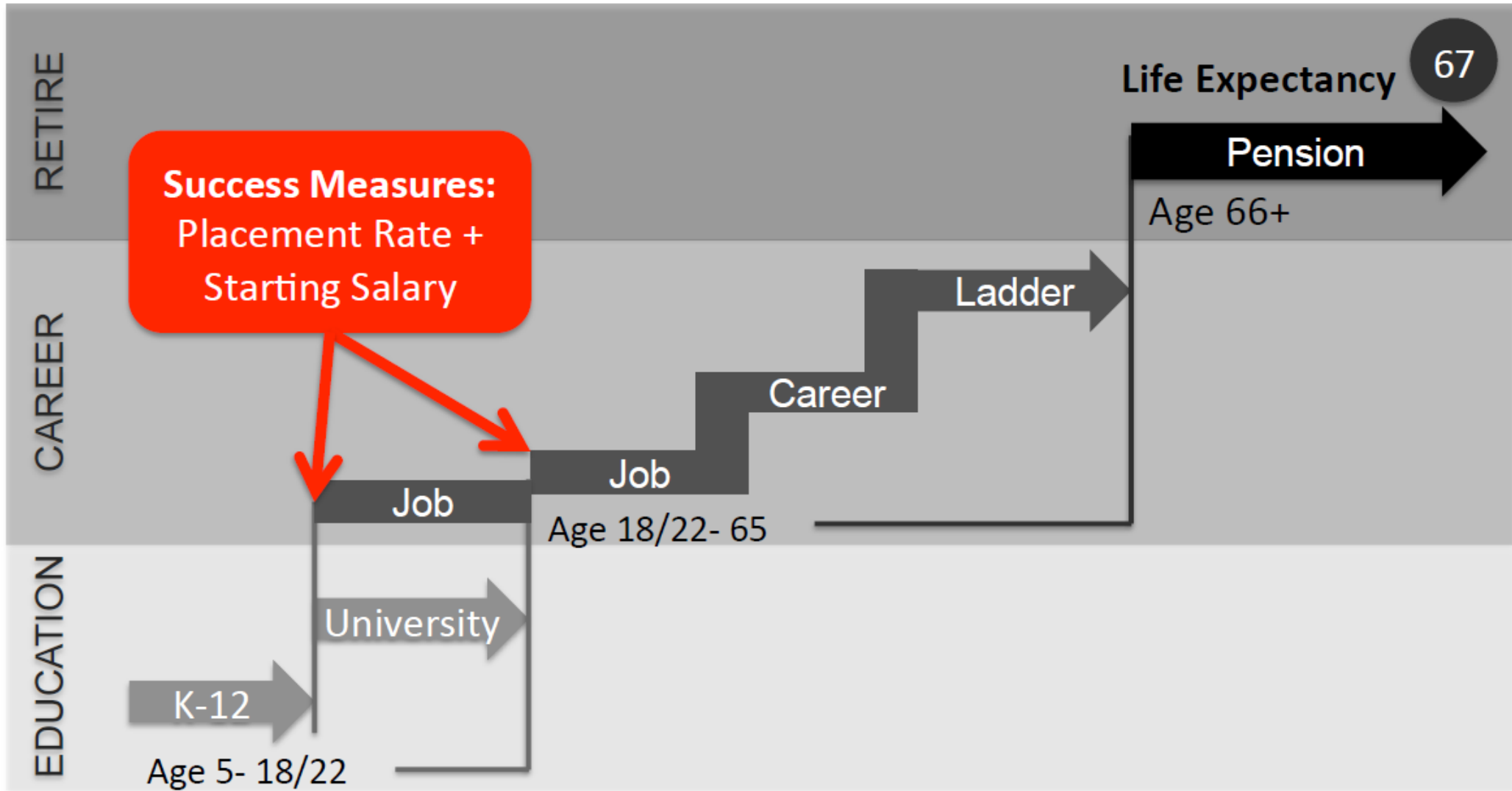
**NEW
ECONOMY**



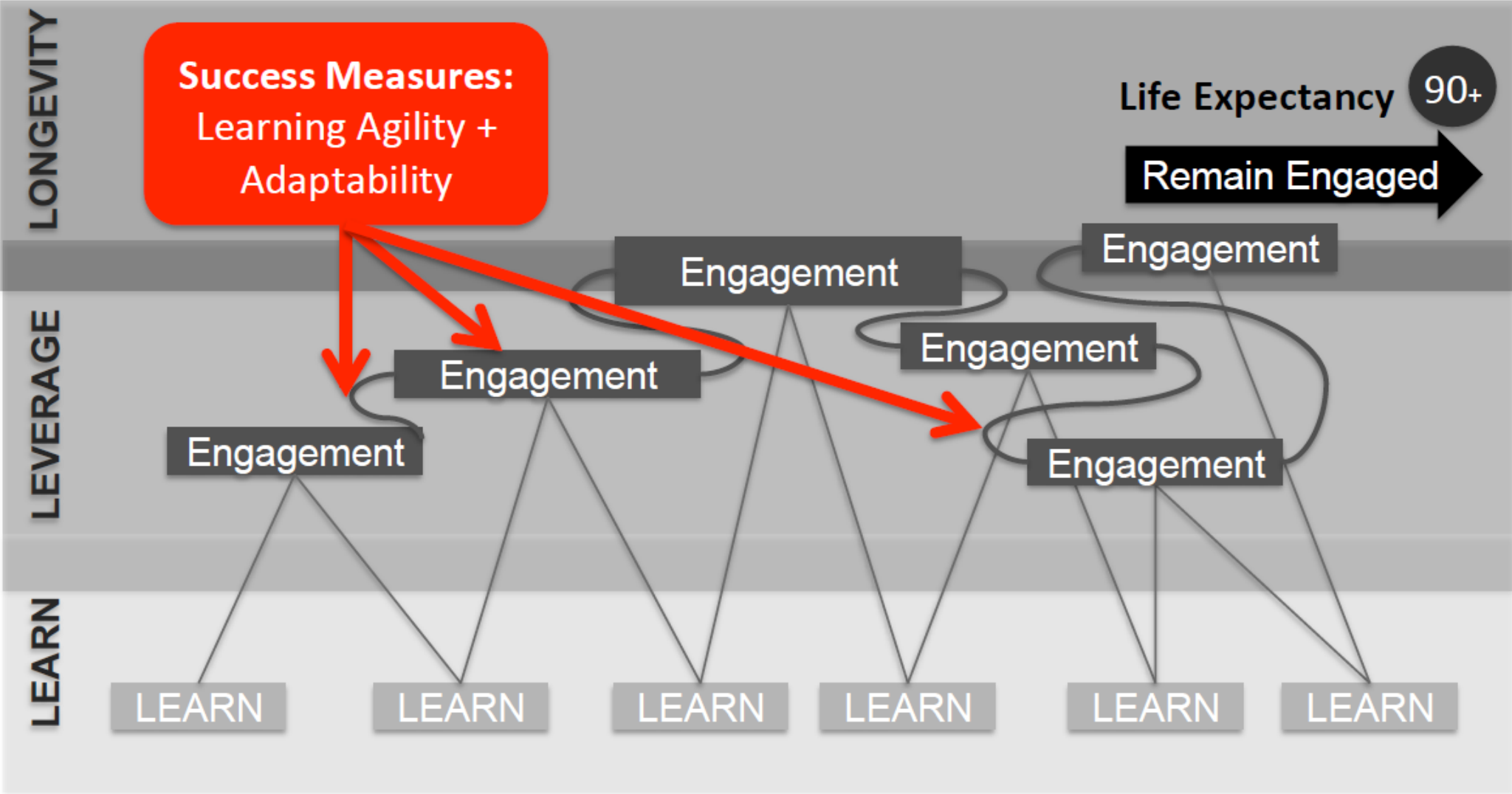
Lifespan = 90 Years →

→ @heathermcgowan

NATURE OF WORK: Old Economy Paradigm (Context)



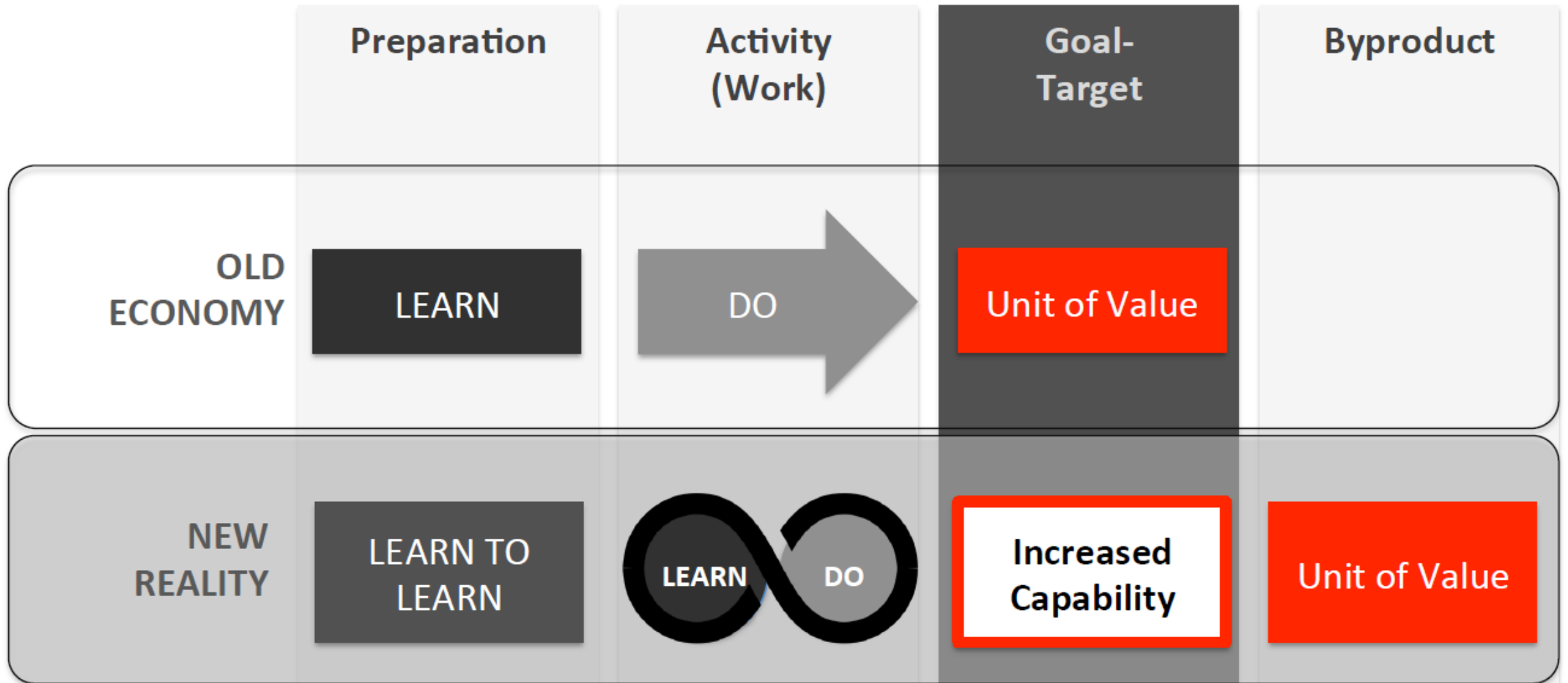
NATURE OF WORK: New Reality Paradigm



PRESSURE#5

The ability to learn becomes the ultimate value.

New Paradigm = New Goals



@heathermcgowan

Tips on how to learn to learn

- **Understand the principles** – information coding, consolidation, actualization.
- Get clear about your **motivation and learning goal**.
- **Create a plan** – when and where to learn. When to take rest.
- Choose the right **tools and techniques**.
 - **Visualization** – sketch noting, mind maps.
 - **Recall** – rephrase the main insights after a section, tell them to a friend.
- Learn to **control your focus**
 - **Inner dialogue** – with the author or yourself, comparison to the known, validation of hypotheses.
 - **Limit distractions**, manage procrastination
- **Celebrate** your (even the smallest) progress.

Learning can be hard, but it pays back

- Learning new things might be hard, but it is **the right kind of hard**.
- Being a novice learner is a great **act of bravery**.
 - Overcome the **fear of it** (to start from zero, make mistakes).
- Work towards improvement and innovation.
- Choose the learning path that **cultivates your talents and strenghts** that you might not be fully utilizing in the context of your job or life.

The more you learn, the easier it gets!

“

The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.

— Alvin Toffer

CO NÁS ČEKÁ NYNÍ

Co nás čeká nyní

- Zkouška a její organizace
 - V testu půjde o 2 otevřené otázky, formulované spíše na přehledové znalosti a jejich uvedení do souvislostí a příkladů situací.
 - Druhý termín bude vypsán v lednu podle těch, kteří ho budou potřebovat.
 - Pokud by byl nezbytný třetí termín, bude nabídnut i ten.
 - Pro zadání hodnocení bude kontrolováno i splnění vstupů do DF předmětu.
- Předmětová anketa
- Zdroje dalšího (samo)studia