

Industry Watch

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Technologies have been playing a significant role in reshaping the societies. Big Data, Cloud, GPS, Drone systems, Augmented Reality, Robotics and many such digital technologies have enabled improved extension services, mobility, optimized food production through precision agriculture, provided aid in disaster management - yet the possibilities created by these technological advancements are questioned and the use case are not much widespread.

A combination of evidence based use cases and a wider view of the evolving ecosystems will enable technologies to stay at the core of the economy for significant momentum.

This issue of Industry Watch brings select industry trends and innovations that are making workflows more end-user-centric and are opening up new frontiers for the industries.

Special points of interest:

- Moving beyond experimentation to scaling technologies across enterprises
- It is more about the value than just data analytics and operating models
- Understanding where the industry fits on the technology curve 'from test and learn' stage to real transformation



Partnership and Industry Engagement at WGIC

WGIC through the Partnership and Industry Engagement program/s aims to create an enabling environment for Business Development through pro-active engagement with the user industries, their trade bodies, association and professional forums.

Various activities of WGIC focus on finding technology collaboration and conversion in solution centric business processes - for development of joint 'value impact' papers focusing on utility of geospatial information and technologies in user industries.

MAAS (Mobility-as-a-Service) for Mass Transit

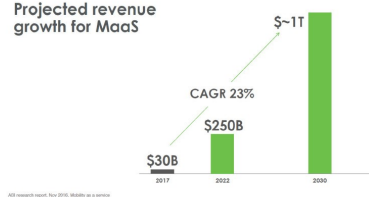
In the 21st century information age, many new opportunities are opening up to make existing transportation network far more efficient & user friendly to offer precisely what users want, when they want and how they want it through increased choices and convenience.

Mobility as a Service / Micro-mobility Model / Integrated Mobility are interchangeably used phenomena in the intelligent transport / public transport space. Helsinki bring the poster city of this concept, many other cities are piloting versions of 'peer-to-peer' (P2P) offerings to Integrated public transportation to combined mobility - wherein the vision is that citizens should fully start to rely on multi-modes of public transport with no need to own a personal car.

Public transportation now stands at a new frontier as most public transport planners in cities are conceptually embracing MaaS:

- to make cities less vehicle-centric
- to offer wider mobility options for the users

Projected revenue growth for MaaS



Market for MaaS is set for a growth of 23% CAGR between 2017 - 2030 , from \$ 30 billion to \$ 250 billion in 2022 and \$ 1 trillion in 2030.



Infrastructure:

MaaS is data-driven, user-centered paradigm that relies on the digital platform and powered by the growth of smartphones that integrates end-to-end trip planning, e-ticketing, booking and payment services. MaaS works in the Public-Private Partnership model and success factor will be getting all the players - mobility management players, telcos, payment processors, public and private transportation providers, and local authorities with responsibility for transportation and city planning, to work together

EU, for example has created **MaaS Alliance** that facilitates information sharing and engagement among transport operators, service providers, users, and to help transportation planners to think through how various modes link up.

The data provider is one of the intermediary layers between the transportation operator and the end user. It manages the data exchange between the multiple service providers, providing the application programming interface (API) gateways and analytics on usage, demand, planning, and reporting. Any multimodal MaaS solution would also require access to the public transit system's route and real-time location data to be successful.

For more information

<https://maas.global/blog-the-business-model-of-mobility-as-a-service-maas/>

<https://www.raconteur.net/technology/maas-changing-travel>

“MaaS works in the Public-Private Partnership model and success factor will be getting all the players - to work together”



IoT to Maximize Food Production

IoT has been a point of experimentation for global enterprises and industries. According to the Boston Consulting Group, the IoT market is expected to reach \$267 billion by 2020. Applications of IoT has been spreading across industries and will be a driving factor for growth. The performance of devices and applications that make the overall functioning of IoT devices possible and substantial data transactions monitoring and surveillance to make every interaction secure and consistent will further foster growth for IoT in the longer run.

IoT in agriculture is, today, a fast-evolving trend. The investment in technology in the field of agriculture has reached a whopping \$4.6 billion and that was in 2015! However, population figures continue to grow which has the potential to affect resource availability at some stage. The global population is set to touch 9.6 billion by 2050. To keep pace with the growing population, agricultural output must increase by 60% by 2030.

According to a report by Cisco, **there is an estimated \$14.4 trillion in value at stake with the emergence of IoT** alone across various layers of the pyramid in the industries - with improved customer experience (\$3.7 trillion), in time reduction of supplies to the market (\$3.0 trillion), in supply chain logistics (\$2.7 trillion), in cost reductions (\$2.5 trillion), and in increasing manpower productivity (\$2.5 trillion).

The IoT is simplifying and streamlining the collection, inspection and overall distribution of agricultural resources using sensors on equipment and materials.

Another interesting application of tech in agriculture is the usage of drones for crop monitoring and as a means to combat drought and other harmful environmental factors. A smart greenhouse that intelligently monitors as well as controls the climate, eliminating the need for manual intervention is also a possibility using IoT.

Robotics in agriculture is yet another innovative way IoT is being integrated into farming. Use of robots helps improve productivity and also results in higher and faster yields. Spraying and weeding robots reduce agrochemical use by an incredible 90%. RFID sensors can be used to track food from the field to the store, forming a complete trail from farm to the table! This technology could help build trust between manufacturers and end consumers ensuring fresh produce reaches the end consumer in the best possible manner.

BI Insider research is predicting that IoT device installations in the agriculture world will increase from 30 million in 2015 to 75 million in 2020, for a compound annual growth rate of 20%. The future of farming is in collecting and analyzing big data in agriculture to maximize efficiency. But there are far more trends to understand with IoT leveraging machine learning and advanced analytics to mine data for trends. With IoT in agriculture, we will witness a new era of Agriculture 4.0 that will transform the way agriculture is practiced around the world.

For more information:

<https://www.forbes.com/sites/danielnewman/2018/05/14/top-six-digital-transformation-trends-in-agriculture/#214f8234ed2e>

<https://www.oliverwyman.com/our-expertise/insights/2018/feb/agriculture-4-0-the-future-of-farming-technology.html>



“With IoT in agriculture, we will witness a new era of Agriculture 4.0 the way agriculture is practiced around the world.”

RFID For Smart Urban Environments

Radio Frequency Identification (RFID, that can be classified as a sub-group of automatic identification and data capture (AIDC) technologies) is an emerging technology, and an emerging market with an increasing demand. The origin of RFID's induction in smart cities started with Cisco Systems helping South Korea turn Songdo into an automated urban environment in 2009. Though the technology has been available for over a decade, the uniform induction is a recent growth for the urbanization industry.

RFID cards and even biological implants (the size of a rice grain) are becoming increasingly popular. Countries like Sweden, UK, USA and others have already adopted the technology in many varying forms.

Cases ranging from machinery for agriculture to security to underground infrastructure all benefit from the use of this technology in identification, monitoring and tracking for repair, exchange or maintenance.

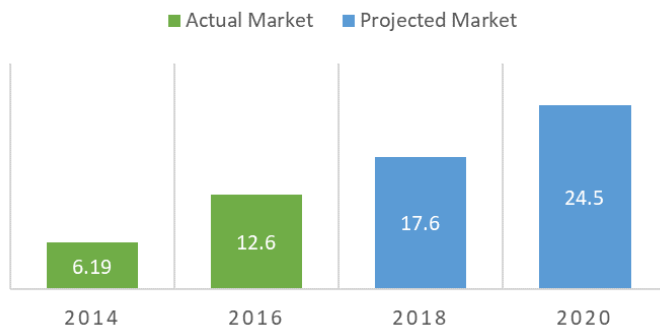
The adoption of RFID has been sluggish (about 99 percent of the available market remains untapped) since RFID tags in combination with integrated manufacturing execution systems (MES) may open the door to hackers, threaten a company's information security and spur cyber - crime. However, with the recent introduction of data protection and localization laws across many countries, the growth of RFID and its implementation seems likely.

Several RFID based applications are on the horizon for public safety, waste management & recycling, public utilities, mass transit management, and high value asset & equipment tracking.



Smart Technologies for Smart Cities

GLOBAL MARKET FOR RFID FOR 2014-2020 IN USD



For more information

<https://www.iospress.nl/journal/international-journal-of-rf-technologies-research-and-applications/>

<https://www.nlc.org/sites/default/files/2017-01/Trends%20in%20Smart%20City%20Development.pdf>

<https://www.advancedmobilegroup.com/blog/5-ways-rfid-will-create-smart-cities>

“To catch the reader's attention, place an interesting sentence or quote from the story here.”



Vertical Urban environments will transform the landscape of cities

Pay-as-you-go Solar Power to transform Africa

The PayG model is a rising technology phenomenon in rural Africa that is being employed to bring solar electricity and other services to people who have no access to it. It allows families in rural off-grid areas to purchase a solar home system via an instalment credit. In the last three years, existing technologies such as photovoltaic panels, energy efficient LED lamps, mobile money and GSM data transfer protocols have been combined in new efficient and affordable Solar Home Systems. These systems provide light, mobile charging, sometimes a radio, and in some cases also a TV.

Fee-For-Service (FFS) or Pay-As-You-Go (PayG) concepts for solar home and photovoltaic systems are being adopted by large number of companies. Distributed Energy Service Companies (DESCOs) or Off-grid Energy Companies (OECs), as they are called, primarily follow two business models - there are companies that do not sell the system itself, but only the power generated by the systems. They also ensure the correct operation and maintenance of the systems. This results usually in one-time installation costs as well as weekly / monthly payments. On the other hand are companies selling the systems using PAYG-concepts. They follow rent to own pricing model. Again, a purchase price usually has to be paid in the beginning and a customizable monthly/weekly/daily fee is applied if the user wants to use the system.



In both the above cases, the system is blocked automatically if the weekly/monthly/daily fee is not provided and cannot be used again until credit has been purchased. In the ownership model, at a given amount of payments, the system unlocks automatically and for an unlimited time, therefore the user becomes owner of the system and does not have to pay fees anymore. In general, the payment of the time-related deposits is done using scratch cards or mobile payment services. As a result, transaction costs can be saved. These DESCOs OECs are estimated to sell around 3 million solar home systems between 2015-2020.

What has contributed to the success of PayG model is the rapid adoption of mobile phones and remote lockout technology (to lock the system in case the daily/monthly payment is not received). Companies active in the off-grid solar market have received over \$250 million since 2014, according to global clean energy market research and communications firm Mercom Capital's Solar Funding and M&A report. With almost a billion people living off the grid globally, the market potential is estimated to be in billions of dollars, attracting both national and international funding agencies as well as private equity players and venture capitalists.

For more information:

<https://www.renewableenergyworld.com/articles/2016/12/pay-as-you-go-solar-model-brings-security-to-small-kenyan-communities.html>

<https://www.renewableenergyworld.com/articles/2016/09/africa-mobile-pay-go-solar-developer-beats-the-odds-raises-22-5m-in-venture-capital.html>

<https://www.wri.org/blog/2017/02/pay-you-go-solar-could-electrify-rural-africa>

“With almost a billion people living off the grid globally, the market potential is estimated to be billions of dollars.”

Telecom Underpinning AR Ecosystem

Augmented reality (AR) in contrast to many other versions of “reality” related technologies holds the potential to cause massive disruptions to many industries as well as create new ones.

In the business-to-business (B2B) applications, Telecom industry could play a pivotal role in underpinning critical elements of the AR ecosystem to help it transition from its current experimental state to the mass market.

The primary reason is that AR, unlike Virtual Reality (VR), aims at amplifying the experience of the real world by combining digital information and media, which can be used across much wider spectrum of applications and use cases, exponentially increasing its likely impact.

But, as we all know, the real-world experience involves multiple changing scenarios and variables, and is compounded further by the unpredictability of user behaviors.

This makes AR, in a full potential mode, extremely data intensive, requiring massive amounts of data processing being computed via complex algorithms. And all that in real time. Despite the significant advancement in computing technologies in recent years, we are still a long way away from the level of real time data transactions – volume, speed, security – required for AR to reach its full potential.



But who is in a better position to address these challenges than the telecom industry? Only it can create the advanced network infrastructure and the platform-based ecosystem to enable complex data processing, storage and transport that advanced AR applications will require. ICT service providers that recognize this opportunity early will also capture larger share of the financial benefits.

For more information

<https://www.zdnet.com/pictures/11-upcoming-ar-trends-that-will-redefine-the-technology/11/>

<https://www.allerin.com/blog/augmented-reality-trends-in-2018>

<https://www.itproportal.com/features/augmented-and-virtual-reality-business-trends-you-need-to-know/>

“Telecom industry could play a pivotal role in underpinning critical elements of the AR ecosystem to help it transition from its current experimental state to the mass market.”



Real Time Data Tool Kit for Safety In Construction

Startling statistics these! 178 work-related accidents happen every 15 seconds and more than 2.78 million people die as a result of work-related diseases or occupational accidents per year. In the United States alone, annual costs associated with occupational injuries and illnesses total USD \$170 billion. This calls for major steps to control and prevent accidental injuries and fatalities. It is here that Artificial Intelligence [AI] & Internet of Things [IOT] are playing a key role in ensuring worker safety in the construction sector.

The IoT excels at collecting data by means of connected sensors that help us understand our working environments better. Connected sensors help in monitoring everything from factory equipment to the location and well-being of human beings. Both internal and external factors can be tracked using sensors. IoT data from wearables like helmets, jackets and watches can be combined with environmental sensors to monitor both workers' wellbeing and the state of their working environment. By tracking indicators of physical fitness like heart-beat and skin temperature, sensors can also help employees who are starting to show strain or other signs of potential problems.

Real-time IoT data when combined with advanced analytics, provides valuable insights that can help address safety issues before they become problems. Developing IoT tools to connect workers, site supervisors and the back office, enables faster injury response, hazard reporting and near-miss investigation.

Use of technology at the jobsite includes not just project management software but also wearables, sensors, robots and drones, which all contribute to overall jobsite safety. Almost 82% of contractors using wearables report site safety improvements. GPS tracking is being widely used to monitor vehicle and equipment health, coach safer driver behavior and limit distracted driving with more effective communication. GPS tracking in-cab alerts with audible buzzer and a flashing light notify drivers of situations that require their immediate attention.

Off-road, location-based analytics help streamline operations and can help identify unsafe areas, operating times or practices. Site managers can now track if machines are congregating unsafely or operating at unsafe hours. Data on speed, harsh cornering, harsh acceleration and seat belt usage can help control dangerous driver behavior.

Geofencing is another extremely important trend that has come to the fore. It allows for creation of zones for a jobsite. This can ensure that construction equipment doesn't enter the wrong barrier of the jobsite or people don't go to the wrong areas. Even certification criteria can be tied into those zones, so only people with a certain certification or level of expertise are allowed to enter.

Radio frequency identification (RFID) technology is being used to map worker movement and work duration too. This enables supervisors to better plan project sequences to minimize wastage of time and resources.

Investment in telematics and IoT technology yields positive returns not just in safety, but also in form of fuel savings, productivity and reduced equipment downtime.

For more information:

<https://www.ibm.com/blogs/internet-of-things/iot-worker-insights-worker-safety-and-ai/>



“In the United States alone, annual costs associated with occupational injuries and illnesses total USD \$170 billion.”

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Creating Geospatial Economy in a Digital World

Moving from experimentation to transformation

When a current ecosystem in an industry is disrupted with rapid technological advancements - it is important to address a few pertinent questions such as -

- How far and how fast the industry wants to move?
- Are the existing models of business enough to evolve or new models will have to be explored?

- The critical question will be to know whether it is time to move “now” or to draw a future roadmap?

Industries are gearing up to embrace digitization often by integrating new capabilities and setting aside traditional ones - to begin with a clearer vision for the immediate future and long term scalability.

With a vision to be a collaborative platform to advance the role of geospatial industry and strengthen its contribution in world economy and society - WGIC was co-founded by 21 leading organizations that represent entire ecosystem of the industry.

Key aspirations of WGIC are to build global alliance to lead initiatives towards bridging the digital divide while parallely pursuing achievement of sustainable and inclusive social goals.

WGIC will build thought leadership platforms for intra and inter industry knowledge exchange for policy advocacy and development, partnerships and industry engagement; and communications.