Social Value Creation via IoT

Smart City, Enterprise and Service Solutions

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The Earth in 2050

(Source: OECD, FAO, PwC, and the United Nations)

We will need twice the amount of resources if today’s urban lifestyle persists

- Urban population: 1.8 times
- Energy demand: 1.8 times
- Demand for water: 1.6 times
- Greenhouse gasses: 1.5 times
- Demand for food: 1.7 times

Picture from a national and regional perspective

- Population East and South East Asia: 1.1 times
- Population (Africa south of the Sahara): 2.1 times
- Developed countries: 1.1 times
- Emerging countries and developing countries: 2.0 times
- East West and Central Africa: lower than 10%
- Japan, Korea, and Singapore: more than 35%

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Mega Trends

1. Chain of Resource & Environmental Issues
2. Growth in Emerging Countries
3. Maturing Society Models & Demography
4. Increase in Individual Power & Influence
5. Decentralized Power & Globalization
6. Diversified Threats, Safety & Security

Value Creation

- Sustainable Earth
- Safer Cities & Public Services
- Lifeline Infrastructure
- Industry Eco-System
- Communication
- Work Style
- Quality of Life

IoT Solutions

Internet of Things

Creating social value in the era of IoT

New value produced through the integration of Real and Cyber

Real time, Dynamic, Remote, Secure
Value Outcomes for Society

- **Safety**: Ensuring broad range of safety for all from individual to country
- **Security**: Serving society and the Earth
- **Efficiency**: Realizing sustainable growth
- **Equality**: Closing the social divide and eliminate inequality

**IoT System Enabling Capabilities**
- Real time
- Dynamic
- Remote
- Secure
Value Creation by Combining Real and Cyber Worlds
**Social Value Design**
Efforts to provide solutions from the two perspectives of “user” and “society” in relation to problems extracted through field work (on-site observations and investigations).

- **User Experience**
  - Improve social value from the perspective of “people”

- **Innovation**
  - Create new value from the two perspectives

- **Social Experience**
  - Improve social value from the perspective of “society”

**Lean startup**
Efforts aiming to essentially resolve problems with minimal costs and time by repeating, in relation to complicated social problems, hypotheses construction and verifications in short cycles.
Application of IIC to Social Value Creation

Social Value Viewpoint

Business Viewpoint

Usage Viewpoint

Functional Viewpoint

Implementation Viewpoint

Issue - Outcome

Aging population reduces workforce
Increasing impact & occurrence of natural disasters
Cyber threats and attacks
Increase efficiency with IoT and AI
IoT sensors & analytics predict & measure impact
Security built in end to end for IoT networks

Value

New ways humans work with robots
Improved human preparation, warning, response
Safe, secure & reliable information and resources

Industrial Internet Reference Architecture

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The Internet of Things Evolution

IoT is about right here!

- Afterglow Light Pattern 380,000 yrs.
- Dark Ages
- Inflation
- Quantum Fluctuations
- 1st Stars about 400 million yrs.
- Development of Galaxies, Planets, etc.
- Dark Energy Accelerated Expansion

Big Bang Expansion
13.7 billion years
The Basic Flow

- Sensor data
- Analyzing engine
- Database
- Real-time collection of vast amounts of data
- Value creation by advanced analysis
- Real-time feedback to Things, Humans and Processes

Transform Knowledge creation Process
Create new value streams
Redefine Industry structure
Enterprise/Smart City Internet of Things - “A network of interconnected devices, people and processes sharing information, data and actions creating, improving or transforming business outcomes and/or societal value.”
Human in the Loop and the IIC

**Industrial Internet Reference Architecture**

**Industrial Internet Analytics Reference Architecture**

**Key**
- Real Time
- Near Real Time
- Some Time
- Current
- History

**Edge**
- Device
- Actuate

**Platform**
- Sense
- Health

**Cloud**
- Analytics Models
- Rules
- Planning/Process Control/Engineering/Design

**Functional Domains**
- Business
- Information
- Application
- Control

**Physical Systems**
- Green Arrows: Data/Information Flows; Grey/White Arrows: Decision Flows; Red Arrows: Command/Request Flows
Humans Have Different Roles in IoT

**Transformation**
- Training, prediction, modeling, dashboards, ….

**Collaboration**
- Audio, video, web sharing, workgroups, team formation, ….

**Notification & Alarm**
- Calls, announcements, IM, email, media services, ….

**User Telemetry**
- Presence, communication activity, tracking, location, ….

**Human Data Source**
- Biometrics, Personal Information, Healthcare, Call Details, …

Figure 7.2: Alignment of IIRA functional view and IIoT system view
Human in the Loop

Biometrics

Unified Communications
Figure 7.2: Alignment of IIAR functional view and IIoT system view
Importance of the Cloud

System of Record  System of Engagement

Cloud computing
System of Systems for Operational Technologies

- Person Identification
- Behavior Analysis
- Deep Learning
- Invariant Analysis
- Object Identification
- Rapid Machine Learning
- Heterogeneous Mixture Prediction & Forecast
- Natural Language Processing
Enterprise and Smart City Case Studies
Crowd behavior analysis technology for swift, decisive disaster response

https://www.youtube.com/watch?v=Aja-QF3Puw
City of Santander, Spain

Rubbish and garbage bin sensing devices to optimize collection

https://www.youtube.com/watch?v=lmk9kMO4MsY
Tigre City, Argentina

Public safety and security by behavior monitoring and visual identification

https://www.youtube.com/watch?v=mp5hR-BGKB0
Wellington City Council, New Zealand

**Challenges**
- Maintaining traffic infrastructure and providing security
- Enhance resilience to disaster
- Reduce greenhouse gas emissions and protect biodiversity
- Promote business and enhance citizen’s lives

**Solution**
- Multimodal Transport and Pedestrian Counting traffic flow solution for counting transport modes
- Flexible sensing platform to create sensing hub
- Cloud City Operating Centre that integrates Smart City components into a functional dashboard
- Living Lab project to improve community wellbeing and the safety of citizens

**Results**
- Availability of data about traffic infrastructure, security and the environment provides insights into community wellbeing, economic benefit, and environmental sustainability
- Integrated big data analytics and open-source data exchange between agencies
- Real-time information for informed decision-making
- Roadmap to achieving goal of being smart, safe, and eco-friendly city


https://www.youtube.com/watch?v=gZLY2yt8hBM
Toshiba Machine

• IoT/Big Data Solution enhances trouble-free operations by detecting malfunctions of machines before they occur.

• New business model for Toshiba to provide predictive maintenance services to customers

• Less downtime, less waste, less energy, greater productivity

Retail IoT Solution

Visualize & Customize The Customers Shopping Journey
- Understanding....knowing what we don’t know

Store Visit | Browsing | Stopping | Check Products | Purchase
---|---|---|---|---
**Demographics** | **Customer Traffic** | **Hand Movements** | **Sales History**
Age/Gender | Traffic Flow | Dwell Time | POS Data

LEARNING and IMPROVING THE CUSTOMERS SHOPPING JOURNEY

Unified Communications and Collaboration to integrate staff and functional teams
Industrials and Enterprise IoT Value is Social Value

Connecting People, Things & Processes Delivering New Value
Its More Than Just Technology

Source: Ignite | IoT Methodology | IIC BSSL

Source: www.nec.com
Orchestrating a brighter world
Thank you for attending this session.
"Smart City, Enterprise and Service Solutions"

- IoT’s value goes beyond an exchange of sensor information and analysis. It is a revolution in information and communication that creates an enhanced social infrastructure in which the cyber world is uniquely integrated with the real world. An integration that rearranges and increases the role of cyber based devices and information with when, where and how humans interact or react.

- Even with increases in device connectivity, humans remain the most important aspect of the system. It is the value they extract in terms of safety, efficiency, security, environmental protection and equality that is the benchmark of success. In this session, we will share examples and best practices of how to deploy IoT sensors, structure tiered information analysis and more importantly bring the “human in the loop” for smart city and enterprise IoT solutions.

- Referencing IIC frameworks and case studies, we will explore items to consider to avoid common issues, concerns and pitfalls when deploying an IoT system.