

# The value of a Human Sensor Network™

*How connecting human sensory to the spaces we  
occupy advances building interaction.*



# A bold new concept, the Human Sensor Network will change the way we gather insights and manage the spaces we occupy.

Despite the proliferation of apps over the past decade, there has yet to be an app that addresses the pain points we experience in the places we spend 90% of our time – the buildings in which we live and work. According to a June, 2015 study conducted by the McKinsey Global Institute, mobile enterprise solutions represent a \$9 trillion opportunity that is just beginning to be unlocked. While a majority of this value will be delivered through machine-to-machine applications, it has been estimated that up to one-third of this will be captured by applications requiring human input.

Building technology and the Internet of Things (IoT) have rapidly evolved over the past two decades, creating new and advanced ways to understand and manage our environments. These approaches are typically dependent on mechanical sensors and equipment that measure and control almost everything related to a building, including systems related to safety, lighting, temperature, ventilation, noise levels, and energy usage. These systems process millions of data points per second and account for every point of systemic feedback imaginable, except for one – the people.

Since the release of the first iPhone in 2007, consumer-facing apps (e.g., Twitter, Uber, Waze) have demonstrated that simple and intuitive mobile software can instantaneously execute complex tasks with the touch of a screen.

As this revolutionary technology continues to develop and expand, an equally revolutionary way to interact with the spaces we occupy is needed. These advancements in technology will transform a person with a mobile device into an endpoint within the IoT ecosystem. The more people who participate in the ecosystem, the more powerful it becomes, and the more rapidly technology improves. This positive feedback loop between users and technology is changing the world as know it.

*Welcome to the Human Sensor Network.*

## **The Human Sensor Network**

Imagine a world where we can receive a push notification when the printer is down, modify the office temperature through our phones, or leverage the power of crowdsourcing to finally fix that projector in the conference room. This is the Human Sensor Network (HSN).

A HSN is a community of people empowered with mobile devices to efficiently enable changes to the physical spaces in which they work and live. The value drivers of a HSN are hidden in plain sight, within the apps we use every day as consumers.

The Human Sensor Network engenders a wide array of benefits, including speed, accuracy, and actionability.

## **Speed of Information:**

Today, we can follow world events in real-time through our mobile devices. If we are particularly interested in a given topic, we can be updated the moment something new happens. It only seems natural that this should translate to enterprise and environments. Currently, when we encounter an issue that impacts our productivity, the options are limited. We can log a ticket through a web portal, make a phone call, write an email, or tell someone in person. Over 90% of the time, however, these issues aren't efficiently addressed and the person reporting is left entirely out of the loop. A HSN enables and encourages real-time reporting, automated updates, and flexibility to follow and effectively deal with environmental issues that impact our work and our lives.

## **Accurate Information:**

Modern day GPS applications allow us to compare multiple routes and modes of transportation, providing instantaneous alternate routing when we encounter traffic. The accuracy of these apps is impressive, enabled by advancements in location services and data processing speed. So why aren't we leveraging this in enterprise?

A Human Sensor Network unlocks this value by leveraging location-specific employee feedback to deliver meaningful and accurate information to organizational leaders. It allows those who can make change happen to develop deeper insights across a spectrum of performance indicators including space optimization, productivity, and safety. All of this is accomplished by blending location information with large sets of employee-generated data instantaneously through a simple user interface. In this way, HSN can give the most accurate depiction of what is really happening in an organization.

## **Actionable Information:**

Every day, our apps are getting smarter. Not only are we getting extremely accurate information instantaneously, we are also getting some alarmingly intelligent recommendations. The potential for such unprompted recommendations within the enterprise is enormous. HSN unlocks this potential by providing

people with the right information at the right time to make more intelligent decisions around items like organizational health, safety, and productivity

## **Why the Human Sensor Network and Why Now?**

Historically, work environments have been treated as static assets operated by small sets of professionals who are educated in the ways of building systems and best practices. So what happens when you flip this concept upside down and empower all a building's occupants to become part of the solution?

### **Safer Workplaces –**

From train stations and airports to office break rooms and other public places, the mantra for security has been "See something, say something". But what if all human senses could be engaged in the name of security. What if we could hear or smell something and say something?

Informing about potential issues more quickly and efficiently mitigating risk improves safety and service levels for everything from slip hazards, noxious fumes and evidence of rodent or insect infestation to A/V equipment that requires attention and lavatories that need cleaning.

### **More Productive Workplaces –**

People are more productive when they are comfortable. By optimizing workplace conditions to meet the expectations of employees and efficiently address productivity issues, everyone is better off. Comfort is increased, communication is improved and productivity skyrockets.

### **More Intelligent Workplaces –**

Gathering rich layers of data allows leaders to identify opportunities and trends that can help them better manage the workplace. They can now more easily and effectively identify employee priorities and spaces that are not performing optimally. This new information and access cuts costs and improves morale.

## The Human Sensor Network In Action:

While ASHRAE standards dictate that 67° F is appropriate for an office environment, people are not thermostats. However, when Bob in Accounting is pulling off his tie while Susan in Marketing is putting on a second sweater, there are two instances of lost productivity at the same time!

What if Bob and Susan could both access the HVAC system to specialize the climates in their respective departments?

Such is the power of a HSN!

Or what if someone notices condensation near an expensive component? In the old days (and, in many offices, even today), they would have to email or call a manager, who would then alert the building management, who would then have to initiate a maintenance ticket. By the time someone came to check and hopefully deal with the issue, the moisture could be compromising the systems and the integrity of the entire company.

What if the employee who first noticed the condensation could report directly to maintenance and see exactly when the issue had been taken care of?

Such is the power of a HSN!

With HSN, we now have the ability to instantaneously collect and aggregate large amounts of geo-positioned data from individuals and large groups of people. Advancements in hardware, operating systems, and design tools allow us to unlock The Human Sensor Network and transform the way people interact with buildings.

## The Big Market Opportunity

The McKinsey Global Institute found that technologies leveraging IoT systems and sensors connected to the IoT has a total potential economic impact of \$3.9 trillion to \$11.1 trillion a year by 2025.<sup>1</sup> At the top end, that level of value—including the consumer surplus—would be equivalent to about 11% of the world economy.

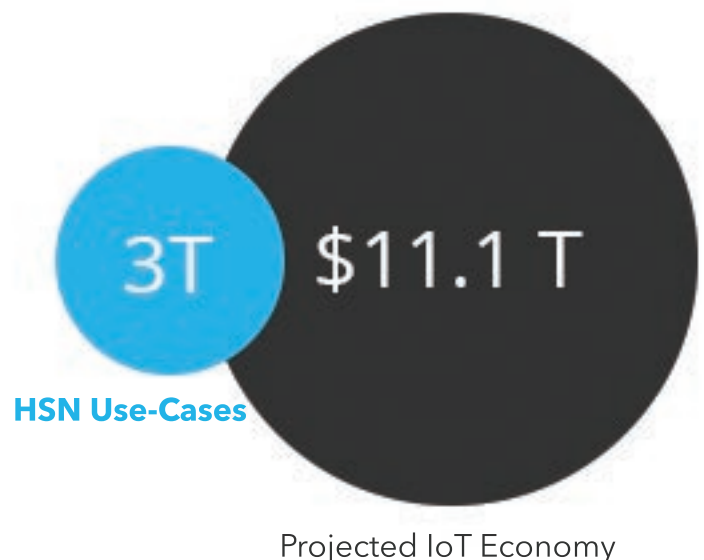
HSN capitalizes on this market trend, as the people in the Human Sensor Network inherit the traits and connectivity of sensors, but produce even better data.

Companies embracing the Industrial Internet revolution believe that this market opportunity is already changing how businesses offer value. For example, GE's Chief Economist Marco Annuziata believes that service, not simply products, will transform the economy as we know it.

The [IoT] will bring about a profound transformation of the economy. It will blur the traditional distinction between manufacturing and services. Businesses are already rethinking the value they offer to their customers: no longer products, but efficiency, productivity, everything "as a service."<sup>2</sup>

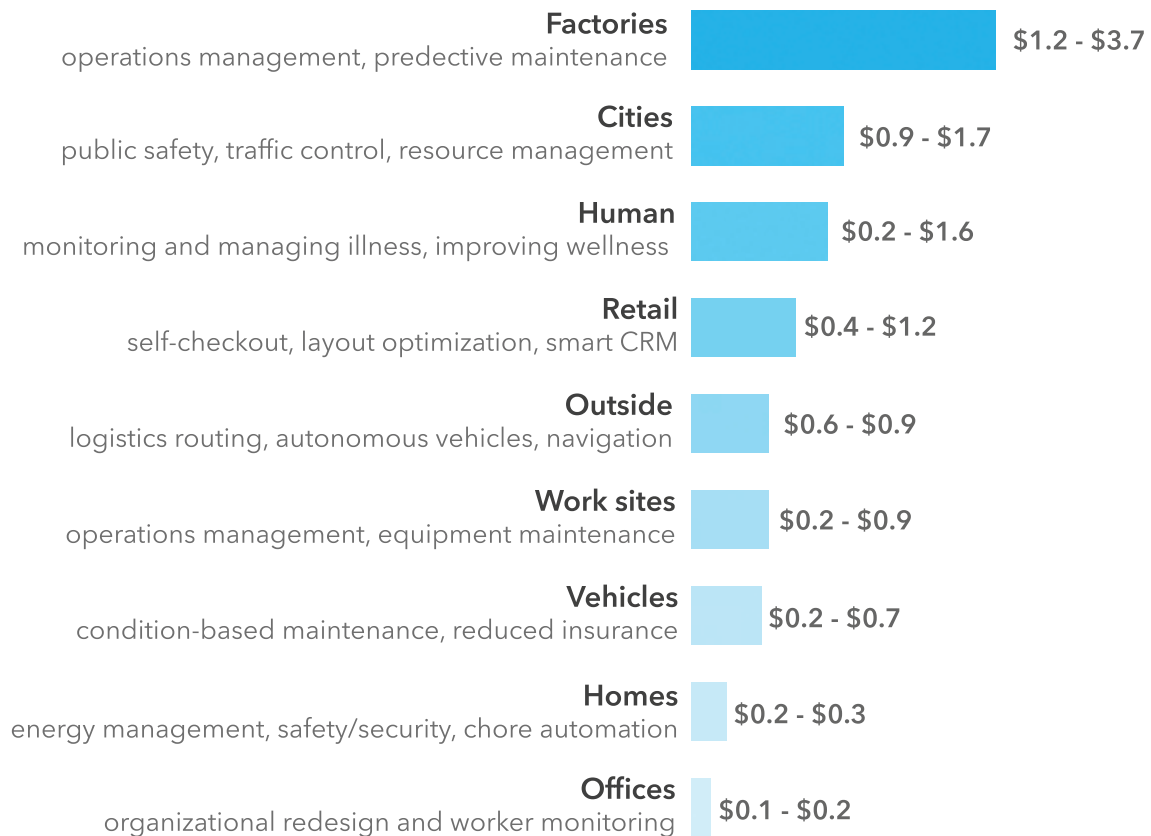
We at CrowdComfort believe that the use cases from a Human Sensor Network, based on the estimates by GE and the McKinley Institute, will occupy a third of this projected IoT economy. That roughly equates to 3 trillion dollars, or 3.6% of the global economy by 2025.

## How much will Human Sensor Network use-cases in the Industrial IoT be worth by 2020?





# The Internet of Things offers a potential economic impact of \$4 Trillion to \$11 Trillion a year in 2025.



**Total: \$4 - \$11 Trillion**

Adjusted to 2015 dollars; for sized applications only; includes consumer surplus. Numbers do not sum to total, because of rounding.

Source: McKinsey Global Institute analysis

## About the Author

Eric Graham

As CEO of CrowdComfort Eric is revolutionizing organizational communication with employees and customers by leveraging mobile technology and cloud analytics. Facility and HR managers access aggregated data to improve employee productivity, safety & comfort to optimize building performance and lower operational costs. CrowdComfort's technology leverages the Human Sensor Network to bring new levels of reach and engagement to business operations and the built environment.

### Sources and Footnotes:

1.) Unlocking the Potential of the Internet of Things, James Manyika, Michael Chui, Peter Bisson, Jonathan Woetzel, Richard Dobbs, Jacques Bughin, and Dan Aharon, McKinsey & Company ([link](#))

2.) The Moment for Industry, Marco Annuziata, GE ([link](#))