

2016 Innovation Symposium: The Intelligent Enterprise

*Insights from the 2016 Innovation
Symposium at Harvard*





Introduction

The convergence of megatrends including the Internet of Things (IoT), mobility, and cloud computing have led to a new operational paradigm known as the Intelligent Enterprise. As physical assets are given a digital voice, the Intelligent Enterprise allows businesses to run operations more efficiently and make better decisions with improved real-time visibility. Achieving greater enterprise asset intelligence offers businesses a sense of what is happening in their operations, provides them with a way to quickly analyze the information and gives them a platform to act on it to reach higher levels of growth, productivity, and service.

In order to further examine the Intelligent Enterprise, the Technology and Entrepreneurship Center at Harvard (TECH), with support from Zebra Technologies, convened the **2016 Strategic Innovation Symposium: The Intelligent Enterprise** on September 27-28.

At the Symposium, we defined what an Intelligent Enterprise is and explored best practices and opportunities for organizations of varying sizes and industries. We took a deep dive into topics concerning infrastructure, management, IoT technologies, and enterprise asset intelligence. Learning, sharing and discussions were focused around key questions, including:

- What are the key aspects and best practices of an Intelligent Enterprise?
- What resources are needed to seed and foster innovation in Intelligent Enterprise?
- What factors impact the readiness of businesses to transform their organizations?
- How can businesses leverage existing tech investments at the edge of their enterprise in converting the physical to digital?
- What successes, key learnings, and challenges do businesses face in this space and how do they overcome them?
- How can organizations become more intelligent regardless of their level of investment to date? And what can organizations do now to be future-ready?
- What is the explicit value of becoming a more intelligent enterprise in terms of productivity and service?

Key learnings from the Symposium are detailed in this report.



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Executive Summary

Dr. David Ricketts

The convergence of megatrends including the Internet of Things (IoT), mobility, and cloud computing have led to a new operational paradigm known as the Intelligent Enterprise. As physical assets are given a digital voice, the Intelligent Enterprise allows businesses to run operations more efficiently and make better decisions with improved real-time visibility. Achieving greater enterprise asset intelligence offers businesses a sense of what is happening in their operations, provides them with a way to quickly analyze the information and gives them a platform to act on it to reach higher levels of growth, productivity, and service.



In order to further examine the Intelligent Enterprise, the Technology and Entrepreneurship Center at Harvard (TECH), with support from Zebra Technologies, convened the **2016 Strategic Innovation Symposium: The Intelligent Enterprise** on the campus of Harvard University.

The symposium brought together senior leaders from a diverse set of industry, government and academia. Attendees and speakers included representatives from GE, Target, Whirlpool, Zebra Technologies, Google, IBM, Accenture, NFL, City of Boston, MIT and Harvard, as well as many other leading companies. The two day intensive symposium focused on understanding what the Intelligent Enterprise is and how it can be harnessed to drive business success and benefit society.

Kevin Ashton, who coined the term “Internet of Things” (IoT) shared the history and thought process that began the RFID and IoT revolution. At the center of the paradigm shift enabled by IoT is the removal of human interaction for data collection. With sensors, many of which Ashton predicts will power themselves in the future, information will be gathered autonomously, enabling explosive growth in the amount of data available.

Analyzing and processing that data will be a challenge. Rich Rao, Global Head of Devices and Education at Google, shared a vision for capturing, storing and processing that data. Going beyond cloud storage, Google envisions advanced computing through machine learning algorithms and high-performance computers that are able to provide the startup with the same technical infrastructure as the giants. Snapchat and Zulily are just two examples of success accomplished without any IT infrastructure.

Tom Bianculli, CTO of Zebra Technologies, provided a framework to understand the trends in IoT – and the opportunities. It starts with solutions that “sense” information from enterprise assets, such as packages moving through a supply chain, equipment in a factory, workers in a warehouse, and shoppers in a store. Operational data from these assets, including status, location, utilization, or preferences, is then “analyzed” to provide actionable insights. These insights can then be mobilized to the right person at the right time so they can be “acted” upon to drive better, more timely decisions by users anywhere at any time.

This was augmented by Anders Gustafsson, CEO of Zebra Technologies, vision of the three megatrends in IoT: **Data Collection and Analysis:** Being able to gather data in real time and control or act on physical processes and information is being used successfully and is closer to becoming a large-scale reality. **Cloud Technology:** Decentralized data storage and access are now readily available at an affordable price point for both consumers and enterprises, ensuring that an ever-increasing amount of information is available on demand. **Mobility:** Adoption of mobile technology and the number of mobile-connected users have grown so rapidly that companies are constantly finding new opportunities to leverage the connected world for innovation.

Several case studies were presented offering concrete examples of the Intelligent Enterprise. Yogesh Dhingra, CEO of Blue Dart in India, showed the power of full integration of software and custom hardware over simple apps on smart phones to solve the challenging problem of transportation logistics and e-commerce in India. Alison Jones, Sr. Director of NAR Logistics at Whirlpool, shared their recent project that reduced the number of tracking devices from 9 custom configured to two units with standardize firmware. An integrated RF communication system allows updates to be pushed instantaneously to all devices, thus removing the complexity of rolling out updates and new software across multiple manufacturing sites.

Yuri Quintana, Assistant Professor Harvard Medical School, shared the trends in healthcare – not only in data collection, but also management and the creation of e-health ecosystems. Tim Kottak, CTO Global Services, GE Healthcare, brought this point home with several projects GE has initiated with their customers to move from a technology perspective to one of an Intelligent Enterprise. The GE FastWorks system addresses how to scale up solutions quickly, and was used to understand and increase efficiency, utilization and productivity of their imaging equipment by a particular hospital. By analyzing operational data from the MRI systems and evaluating departmental workflow, they were able to make recommendations for increasing exam efficiency and reducing exam appointment slots by up to 30%. This would open capacity, creating potential for an additional 3,250 cases per year.

The focus was not only on business solutions, but also society. Nigel Jacobs, from Boston's Mayer office of New Urban Mechanics, shared several trends in Intelligent Enterprise in the city. Examples spanned from apps to track school buses to easier ways to share data with parents enrolling their children in schools. Paolo Santi, Research Scientist at MIT, shared recent research into how data can give us insights in to mobility trends – and save us time and money. By examining 150 million taxi trips in New York City, Santi and his team were able to determine that 95% of all Taxi rides could be shared, without any significant impact on rider comfort. Such a trend could significantly reduce congestion and improve quality of life for all city residents.

From the high-level, strategic view presented by Kevin Ashton and Anders Gustafsson, to the detailed case studies by Alison Jones and Yogesh Dhingra, the 2016 Strategic Innovation Symposium: The Intelligent Enterprise, developed new insights in what it means to have an Intelligent Enterprise and the immense impact it can have on industry and society in general.

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*–Tom Bianculli
CTO at Zebra Technologies*



The Internet of Things: Past, Present, and Future

Presented by Kevin Ashton, Author and Co-Founder of Auto ID Center at MIT

The Internet of Things got started in Cambridge, Massachusetts during the late 1990s and early 2000s. During that time my colleagues and I would talk about the technological possibilities that awaited us in the future. We coined the term 'Internet of Things' and shared our predictions with people, who told us we sounded ridiculous. As it turns out, our predictions actually weren't ridiculous enough.

Today we sit with sophisticated computers in our pockets. We call them smart 'phones' but really the phone call is just one of many apps and capabilities. We take pictures with high definition cameras, text, tweet, play Angry Birds, access the internet, make purchases, email and so much more. These are all things we take for granted today, but if you look at how far we've come in such a short period of time, these monotonous things are actually very miraculous.

Predicting the future is about looking at what we have now and trying to zoom in from there. Think about the first fuzzy picture you took with your very first cell phone and compare it with the pictures you can take with your smartphone today. Technological prediction is about dreaming what the picture will look like next year, with the next generation phone. To contemplate the future, you must have a firm understanding of both the past and the present.

Computers Interacting with the World

The technology that was the foundation of the Internet of Things is RFID – radio frequency identification. It is the basis of IoT because it allowed computers to identify the things around them in the world. Although smartphones are the most dominant form of computers in the world today, RFID tags are currently more abundant and cheaper.

In 2012 there were just under 3 billion smartphones made and sold, but that same year nearly 4 billion RFID tags were produced and sold. That pattern has continued, and each year about a billion more RFID tags are sold than smartphones. While smartphones cost hundreds of dollars and need a service plan, RFID tags average just under four cents each.

"The challenge today is managing the information."

–Kevin Ashton
Author and Co-Founder of
Auto ID Center at MIT

RFID tags have a variety of uses today. They can be used to sense cars on the toll road, parts on a production line, and they are even used by Disney – magic RFID bands that allow you to pay for things and access certain areas.

What is interesting is that RFID tags do not need an energy source. They do use energy. However, they get that energy from the radio wave that is communicating with them. They typically don't have a battery and don't need to be plugged in and charged up.

This demonstrates that we already live in a world where many computers can 'power themselves,' so to speak. My prediction is that this trend will continue and most computers will be able to power themselves within 20 years. Going off Cummy's Law, which states that the amount of energy and electricity required to form a computation has halved every 1.5 years since computing was invented, our devices are requiring less energy over time. In the future, we will be able to do more with devices that can harvest power (via radio waves, vibrations in the room, light, etc.) or have such a long-lasting onboard battery that it will never have to be changed.

Computers Gathering (and Processing) Data

Until recently, information technology had a fundamental limitation: it depended on human beings to give it its data. The kind of information that computers processed was the kind that could be entered using a keyboard. Things have gotten more complex, and the kind of information we have to manage today is the kind that can't be easily entered using a keyboard. Today's information is detailed, hard to observe, and changes in real time, necessitating a system for automatically capturing data instead of manually entering it.

The first successful example of automatic data capture was the bar code. Although ubiquitous today, the bar code was also miraculous – when first developed it was hard to print accurately and it required a laser or high-resolution camera to read.

So the idea around the Internet of Things is not just sensing technology, like RFID which can interact with the world, but connecting that sensing technology and automatic data capture to the internet. By doing so, we can have our computers gather information about the real world for themselves then look at the data and solve problems.

There is a hurdle we have to overcome in this area, though. We have moved from a system where computers not only gather the data but also process it and make decisions – and many people are not yet ready to let go of their decision-making power.

For example, those who reject the idea of a self-driving car believe that they are best at controlling the vehicle and making driving decisions – regardless of the fact that there are thousands of vehicular deaths each year caused by 'human error.' On the other hand, a driverless car has radars that can see a 360-degree view, sense at least two dimensions, then use machine learning and the computer to combine all the information to figure out what is going on and react accordingly. After thousands of tests, there has only been one major accident. The self-driving car prototypes have already proven that computers are better drivers than humans.

Another example is what happens in the workplace. Companies spend large sums of money on systems that gather data on their customers, their supply chain, and other important elements of the business. A junior employee generates a report from the system, turns it into a pie chart, and puts it into a PowerPoint presentation. A meeting is scheduled where executives look at the chart, try to think what it means, then make a decision that will be eventually implemented next month.

This is 20th-century thinking. The 21st century is all about real-time, automatic data streaming and processing where decisions can happen automatically from machine learning systems.

A Final Prediction

So far I have offered a glimpse of the past, present, and future of the Internet of Things, but there is one more important prediction to share: there are going to be players in YOUR industry who are using automated data capture and processing tools to gain an advantage. In fact, it could be happening at this very moment. YOU have a choice whether to adopt these latest developments and take full advantage of the Internet of Things. You can embrace the future today and become an industry leader. Or you can call these things *ridiculous* and fall behind. The choice is yours.



The Intelligent Enterprise in the Experience Economy

By Tom Bianculli, Vice President and Chief Technology Officer at Zebra Technologies

IoT is bringing our world into a new industrial age, further blurring the lines between the physical and the digital. Our need to be constantly connected, at work and at home, has led to the rapid adoption of IoT technologies. However, up until now, adoption has been consumer-focused. What most people don't realize is that IoT is already changing the enterprise landscape today and paving the way for the experience economy. With 1.3 billion mobile workers in the workforce today and a projected 21 billion connected devices in the near future, enterprises are transitioning from selling services to selling experiences. To stay on top of the present and prepare for the future, enterprises will have to figure out how to connect and manage these devices and the data they generate as well as how to adapt their business processes and create new personalized experiences for their employees, customers, partners and all stakeholders.

And that is not an easy task.

To help enterprises on this journey, we have developed an operational framework that creates more intelligent enterprises. It starts with solutions that “sense” information from enterprise assets, such as packages moving through a supply chain, equipment in a factory, workers in a warehouse, and shoppers in a store. Basically, sensing information at the “edge” of enterprise operations. Data from these assets, including status, location, utilization, or preferences, is then “analyzed” to provide actionable insights. These insights can then be mobilized to the right person at the right time, so they can be “acted” upon to drive better, more timely decisions by users anywhere at any time.

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With smarter devices comes smarter things and smarter environments, paving the way for enterprises to become more informed and thereby intelligent regardless of their industries.

Here are some examples of how IoT has transformed age-old industry challenges:

- **Retail:** On average, only 65 percent of inventory reported through inventory management software is correct. To overcome this, major retailers are turning to more advanced inventory tracking solutions that leverage sensing including video, RFID and locationing technologies to accurately track inventory's every move.
- **Transportation and Logistics:** In transportation, the challenge continues to be how to optimize delivery as the average floor-loaded trailer could carry 30 percent more cargo. With tablet-based, trailer load analytics software, warehouses and fleet managers are given a clear image and the load statistics of each trailer, allowing them to easily track fulfillment and ensure cargo loads reach their full potential.
- **Manufacturing:** In today's on-demand world, consumers now expect shorter delivery times, challenging manufacturers to find more efficient ways to fulfill orders. With the visibility that mobile and IoT solutions provide, the warehouse can deliver on the promise of flawless and on-time fulfillment.
- **Healthcare:** The challenge to correctly identify, track and document patient care to provide timely, accurate and improved quality of treatment continues to plague hospitals and healthcare organizations. To overcome that, smart, non-invasive technology has been implemented to provide real-time, accurate tracking, and evaluation of data to issue the feedback necessary to correctly care for and monitor patient progress.

However, despite the potential that IoT presents, without the proper set of enabling technologies, enterprises will not be able to extract the full-value from their IoT investment. Making IoT in the enterprise world a reality can't be accomplished by one or even a handful of innovators. It will require businesses across industry sectors and market sizes to convene and partner with academic institutions and municipalities to come up with agreed-upon standard practices and guidelines so that all enterprises can connect and be "intelligent."

The Intelligent Enterprise Framework

- **SENSE:** Solutions automatically "sense" information from enterprise assets, such as packages moving through a supply chain, equipment in a factory, workers in a warehouse, and shoppers in a store.
- **ANALYZE:** Operational data from these assets, including status, location, utilization, or preferences, is then "analyzed" to provide actionable insights.
- **ACT:** These insights can then be mobilized to the right person at the right time so they can be "acted" upon to drive better, more timely decisions by users anywhere, at any time.



Insights: Opportunities and Challenges for IoT in Business

The Internet of Things (IoT) has the ability to transform businesses and entire industries. We are currently seeing creative applications across government, healthcare, retail and other areas. However, we are also seeing companies that are struggling to manage the data they are gathering and those who are refusing to adopt the technology in the first place. At the Symposium, participants discussed both sides of the equation, and here are some of the main opportunities and challenges that were identified.

Opportunities and Examples

Some of the biggest opportunities are in sensing, beaconing, and RFID technology. Today's UHF RFID tags typically don't require a battery but have a longer read distance. This has made them more powerful and less expensive at the same time.

Some of the various examples of RFID that we heard about at the Symposium include:

- Disney uses RFID wristbands that allow people to quickly and easily pay for things.
- In the restaurant industry, we are seeing companies using loyalty cards which customers can load money onto via the company app. At the restaurant, a special 2D barcode scanner can be used to collect the money from the loyalty card.
- Another example from the restaurant industry is the placement of sensors on To Go parking spaces. When the customer pulls in to pick up their order, employees inside are notified that the customer has arrived.
- Sensors placed in the sewers in Cambridge, Massachusetts are gathering biochemical data related to viruses, bacteria, chemicals, what people are eating, what medications they are taking, and more.

- In the transportation industry, technology is being used to track the movement of assets: for example, the location of trucks in the fleet.
- In agriculture, crop sensors combined with weather data can help inform farmers when is the best time to harvest for the maximum yield.
- Real-time workflow optimization is an opportunity for many industries. This system can help route workers, using sensors and other data to direct what the worker's next move should be. For example, the retail industry operates on very thin margins, with labor accounting for two-thirds of the cost of running a retail store. Optimizing employees can, therefore, help boost profit.

The Data Dilemma

Although the opportunities for IoT in business are abundant, the main challenge is what to do with the data once you get it. Theoretically, you could tag everything, but what do you get from it? It is what you do with the data and how you translate that data into actionable insights that truly has an effect. In this respect, IoT will likely be more about the art of analyzing the data and turning it into outcomes, rather than the science behind the technology itself.

The data dilemma is the thing that will most differentiate companies adopting IoT into their business. While the device is still important, companies will differentiate on what they do with the data. In the end, that will differentiate the winners from the losers in the game of IoT.

Other Challenges

Although what to do with the data and how to turn it into actionable insights is arguably the biggest challenge for businesses using IoT, there are other issues that must be worked out as well. This includes:

- **Data Utilization Rates:** Some statistics show that only 4-5 percent of big data is actually used. Even if a company IS using the data to create actionable insights, how can we dig deeper and use even more of the data that is at our fingertips?
- **Adoption:** Some businesses have been doing things the same way for years. They don't want to change and aren't interested in adopting IoT. How can we show businesses the value of this innovative technology? If we can start by helping them understand the outcomes they could achieve (greater profit, productivity, use of resources, customer insights, etc.) then the technology will follow.
- **Change Management:** Businesses who do adopt IoT and other technology often struggle with adapting to the change and then sustaining the change. How can the IT unit best work with operations to facilitate change and ensure that the application or technology is going to work for those people who will have to work with it in their daily jobs?
- **Data Management:** There are also challenges with what to do with the data after you obtain it. Who owns the data, should you share it, how do you disseminate the information, and how do you protect anonymity and keep individual data safe?

In the end, there are plenty of challenges to overcome, but they are by no means insurmountable. As businesses understand the opportunities and advantages of adopting IoT, it is sure to become mainstream across all industries.



Cloud Computing & Machine Learning: Past, Present, & Future

Presented by Rich Rao, Global Head of Devices and Education, Google

Willie Sutton was an American bank robber who stole an estimated \$2 million during a forty-year criminal career. When a reporter asked why he robbed banks, he answered: “Because that’s where the money is.” ‘Sutton’s law,’ as it is now called, can be applied to your business too. When contemplating investments, you should go where the money is. And in today’s environment, that means investing in technology, and more specifically, the cloud.

In my ten year career at Google, I have helped large companies, small businesses, and educational entities implement technology. The experiences have given me a glimpse of the past, present, and future of cloud computing and machine learning.

The Past

They say that necessity is the mother of invention and that was indeed the case for Google. It was 2007–2008, during the global financial recession, when Google announced that they would be launching their own browser. People wondered why, saying that there were already enough browsers on the market. However, people at Google were noticing several problems that would be solved if they created their own browser. For one, the internet was not as fast and instantaneous as it could be. It also wasn’t very secure, with more and more security breaches happening through browsers. Lastly, Google was stalled with the current browser options. They couldn’t build the apps they wanted or do rich things with client-side technology.

Flash forward to today and Chrome is the leading platform on the web, but more importantly, it pushed the paradigm, transitioning browsers to cloud computing. Several cloud advantages became clear, including:

- **Multitenancy:** With the cloud, multiple people are housed under one roof, so to speak, which provides better resource utilization. Even better, it means that software is always up-to-date, with changes happening behind the scenes in real time and no upgrades or new versions of software necessary.

“All you have to worry about now is the language and can I build an app, then everything else can be managed for you. What this means and the reason why this is so impactful to businesses is you can just build an app for almost everything. And it’s happening today.”

—Rich Rao
Global Head of Devices
and Education, Google

- **Near Infinite Scale:** With a near infinite scale, you can get elastic computing. However, even better is that costs decrease over time or you get more things included for the same price point.
- **High Reliability:** When you move toward professional management of software and hardware, you get better reliability which means high uptime. Even better, there is no scheduled downtime, which is beneficial because downtime can cause enormous losses for users.
- **Automatic Redundancy:** With the cloud, you get backup, which can help your business recover from local disasters (like hurricanes or power outages). Even better, by placing data across multiple data centers, you get advanced security through encryption.

The Present

Google has expanded its cloud platforms by creating technology that has solved problems for the company. These technological breakthroughs have allowed Google to scale, and then the cloud platforms are offered as open source technology that can help other businesses grow and solve their own unique problems. This includes:

- **Management:** Google Stackdriver, Identity and Access Management (Cloud IAM), Support
- **Compute:** Compute Engine, Preemptible VMs, Custom Machine Types, App Engine, Container Engine
- **Storage:** Cloud Storage, Nearline, Cloud SQL, Datastore, Bigtable
- **Networking:** Virtual Network, Load Balancing, CDN, DNS, Interconnect
- **Data:** BigQuery, Dataflow, Dataproc, Pub/Sub
- **Machine Learning:** Cloud Machine Learning, Speech API, Vision API, Translate API

Some examples of the ways companies have used these Google cloud platforms include:

- **Snapchat:** Snapchat is a photo sharing and messaging app. Although it only started in 2011, it is now one of the top ten most downloaded apps and it consumes 1 percent of total internet traffic. The founders used App Engine to build the app. Their team has no infrastructure engineers, they simply conceived the app and figured out how to monetize it – a business model for the new era.
- **Zulily:** Zulily is a company that sells clothing for the family. They started just a few years ago and are now at a billion dollars in revenue. One way they have gotten ahead is by providing specific promotions and offers based on customers’ preferences and past purchases. They were challenged because they had both structured and unstructured data that didn’t work well together, but then they

began using Hadoop and BigQuery, which allowed them to analyze all the customer data to provide personalized and targeted offers.

- **SunGard:** SunGard is a financial service audit company that records all the transactions that happen in the market. With six billion market events every hour, there is a lot of data to sift through. However, using Cloud Bigtable they can process and run queries on the data, with the ability to identify any transaction in the last six years in just seconds.

The Future

The technology research and advisory company, Gartner, predicts that by 2018, 20 percent of business content will be authored by machines and by 2020, 40 percent of mobile interactions will be facilitated by smart agents. Google will continue to explore cloud technology and machine learning, including making Google Apps like Gmail, Docs, and Hangouts more intelligent. Google Search will include speech recognition, Gmail will get a smart reply feature, Google Photos will get a more sophisticated search function, and so much more.

As we move forward with cloud and machine learning technology, the goal will be to move beyond productivity to make applications and processes more natural, more automatic, and more predictive.

Today you can build an app for just about anything, and you can use the cloud and machine learning to build a stronger business. I suggest:

1. Do the easy stuff first. Are there some easy wins in terms of SaaS for your end users and IT?
2. Join the culture of innovation. Now is the opportunity to build exactly what you want to build. What problems could you solve if you had no technical bounds?
3. Pay attention when recruiting new team members. All major universities are now teaching about topics like cloud platforms and machine learning API. Think about that when you recruit new members, and also how your team can grow skills internally.

In my career, I have worked with large companies, small businesses, and educational entities. In the process, I have noticed that while enterprises large and small are trying to figure out how to move to the cloud, many schools have already done it. This is ironic because they typically don't have the largest budgets or a large tech staff, but they are finding a way to get it done. This demonstrates that anything is possible for your business too, despite any limitations that you think you have.

“We launched a browser, and it turned out to be a pretty good one, and now we have people using it. It's the leading platform on the web, but more importantly, it's pushed the paradigm. This is an example of the transition towards cloud computing when it comes to browsers.”

—Rich Rao
Global Head of Devices
and Education, Google



Case in Point:

Addressing the Challenges of a Consumer-Facing Logistics Ecosystem through an Innovative Technology-Based Solution

By Yogesh Dhingra, CFO & COO, Blue Dart Express Ltd.

At 7.5–8 percent GDP growth, India is clearly seen as a bright spot in the world economy. With strong economic fundamentals, large demand base, and exceptional business opportunities, India is poised to take a big leap forward. But the current logistics scenario in the country lags in terms of its capabilities when compared on a global scale. According to the World Bank, India was ranked 35th in the Logistics Performance Index for 2016. This ranking has not seen much improvement in past 7-8 years. There are issues pertaining to inadequate infrastructure, administrative delays, low penetration of new technology and poor last mile connectivity.

Having stated this, the nation of 1.3 billion people is on a firm path of transformation. Huge investments have been made by the Government of India & through public-private partnerships (PPP) to reform the infrastructure and logistics sectors in the country. There is transformation happening in governance, industry, economy and even in consumer behaviour and expectations.

With 430 million in the age group of 15–34 years, 402 million internet users (2nd largest in the world) and internet usage predicted to grow to 650 million by 2020, the profile of the Indian consumer is changing. Today's consumers are younger, urbanized and digitally connected more than ever. They demand an enhanced level of service quality from consumer-facing logistics service providers like Blue

Dart. Convenience has become the key factor in satisfying the changing needs and expectations of this new age consumer.

This paradigm shift is an opportunity and challenge for logistics companies. Due to e-commerce, there is a huge upsurge in consumer-facing businesses in India, and also the consumer-facing logistics ecosystem has become more complex. It was the need of the hour for Blue Dart to tackle the challenges such as cash on delivery, reconciliation challenges, multiple payment gateways (mobile, wallets, etc.), proof of delivery, 24/7 shipment visibility, low productivity, data security, and more that have been posed by this complex system.

To meet these levels of heightened consumer expectations and cope with the logistics challenges, Blue Dart needed an innovative solution – a solution which would address the multiple challenges aforementioned above.

As a practice, Blue Dart puts all opportunities and challenges through a six sigma process called “First Choice,” a proprietary DPDHL tool. This approach gave three options. Blue Dart zeroed in on “app-based smart devices” as the chosen solution because it was found to be capable of addressing most of the pre-requisites required for a solution that would address the stated challenges.

Since the introduction of this “app-based smart devices,” Blue Dart has deployed over 10,000 units.

Excellent results have been witnessed through this systematic deployment. Blue Dart has delivered exceptionally on pick-up control, customer engagement, SOP adherence, payment options, delivery time and overall delivery experience. Improved consumer experience, improved service quality, higher productivity, enhanced profitability and enhanced employee satisfaction have been the result of this successful deployment. The solution has proved to be exceptionally innovative.

It's Blue Dart's greatest priority to innovate and introduce customer-centric solutions based on cutting edge technology and in turn participate in the growth story of India as a trade facilitator.

“Convenience has become the key factor in satisfying the changing needs and expectations of this new age consumer.”

–Yogesh Dhingra
CFO & COO
Blue Dart Express Ltd.



From Better Transport to Better Cities

By Paolo Santi, Research Scientist, MIT

Urban transportation is witnessing major transformations. Advances in digital and communication technologies, the burgeoning “sharing economy” of mobility resources, and the maturing of vehicular self-driving technology will be major forces driving the (r)evolution of urban transportation. In ten years, the urban transportation landscape will be substantially different from the current state; the boundaries between public, private, individual and mass transportation will be blurred, and century-old socio-economic models related to mobility, such as private vehicle ownership and taxi systems, will be challenged.

What will be the effect of these transformations on the quality of urban life? Will the increased sharing of mobility resources reduce traffic, thus making cities “better places to live in?” Or, will undesired effects – such as the draining of mobility demand from public transportation services – prevail?

The answer to these questions is far from obvious, but an initial glimpse into the potential and societal benefits of massive, urban-level ride-sharing system can be obtained from projects recently started at MIT Senseable City Lab.

The HubCab project investigated the potential for taxi ride sharing in New York City. Starting from a dataset of over 150 million trips performed in the city in an entire year, we introduced a novel model of ride sharing opportunities called shareability network, which allowed us to unveil the immense potential of shared transportation: over 95 percent of taxi rides in New York could be shared with minimal passenger discomfort. The study inspired on-demand transportation companies to launch pooling services, and outlined how the traditional point-to-point transportation industry (such as taxis) should substantially transform its business to embrace the opportunities offered by shared, on-demand mobility.

Not only rides, but also vehicles could be shared. This is dramatically needed, as vehicle utilization is currently well below 10 percent. However, pervasive vehicle sharing is hampered by the asymmetry of human mobility flows, which implies an imbalance in shared vehicle locations. This is a major cost and logistical challenge that vehicle sharing companies are currently facing. Autonomous driving is considered as a possible way of addressing this challenge, thus contributing to a more effective usage of vehicles.

Another breakthrough in urban transportation implied by autonomous driving is better management of vehicle traffic. This has been recently demonstrated in the LightTraffic project, which introduced the notion of slot-based intersection. In a slot-based intersection, traffic is no longer managed at the level of flows as done with current traffic lights but broken down to reach the level of a single vehicle. Thanks to autonomous driving and communication technology, each vehicle will be given a personalized time-slot to cross the intersection in safe conditions, and in coordination with vehicles approaching from other directions. Our study shows that the flexibility achieved by slot-based intersections can double intersection capacity with respect to a state-of-the-art traffic light, under identical safety conditions. This is a major improvement in traffic management efficiency, which would result in virtually dissolving queues with current traffic loads.

“We know that mobility will be radically transformed by the convergence of the shared economy and autonomous driving. At MIT Senseable City Lab we are committed to making these transformations beneficial to all citizens.”

—Paolo Santi
Research Scientist, MIT

Learning Points:

- Urban mobility will be radically transformed by the convergence of the shared economy and autonomous driving.
- The potential for shared mobility is already substantial: over 95 percent of taxi trips can be shared with minimal passenger discomfort.
- There is even more potential for shared mobility with the advent of autonomous driving.
- Autonomous driving will also substantially improve traffic management efficiency.



Industry Trends and the Future of IoT

By Anders Gustafsson, Chief Executive Officer, Zebra Technologies

Using two nickel-sized sensors embedded in each player's shoulder pads, we can track and report data live, in real-time, showing how fast an NFL player is running, the distance they've traveled and their acceleration and deceleration, among other things. It's giving a whole new meaning to the fan experience, providing visibility into the NFL's Next-Gen Stats with details that have never been tracked before. It's a hint of the future we're building right now, coined the "intelligent enterprise."

NFL players have been "tagged," just as billions of people, devices, machines, warehouses, factories, retailers, hospitals and even cities will be in the not-so-distant future. Information sensors will be tracked automatically by computers or "smart machines," making our businesses and organizations more intelligent.

IoT is leading the way to this intelligent world, enabling everything from improved efficiency for global shipping networks, to devices that receive environmental feedback from home appliances to minimize energy use. The economic impact can already be felt. And the market for radio-frequency identification (RFID) devices, the underlying technology for sensors, is exploding.

According to IDTechEx, a consulting firm in Cambridge, UK, 8.9 billion RFID devices were sold in 2015, representing \$10.1 billion in revenue. IDTechEx forecasts revenue will hit \$13.2 billion by 2020. This includes tags, readers, and software/services for RFID cards, labels, fobs and all other form factors, for both passive and active RFID.

"It's a hint of the future we're building right now, coined the 'intelligent enterprise.'"

—Anders Gustafsson
CEO, Zebra Technologies

Three megatrends are driving this move toward a more-connected world:

1. **Data Collection and Analysis:** Being able to gather data in real time and control or act on physical processes and information is being used successfully and is closer to becoming a large-scale reality.
2. **Cloud Technology:** Decentralized data storage and access are now readily available at an affordable price point for both consumers and enterprises, ensuring that an ever-increasing amount of information is available on demand.
3. **Mobility:** Adoption of mobile technology and the number of mobile-connected users have grown so rapidly that companies are constantly finding new opportunities to leverage the connected world for innovation.

The idea of connecting the physical and digital worlds to drive innovation, efficiencies and global economic growth, is the intelligent enterprise. The rate of technological change is rapid, and our businesses need to be able to adapt quickly to keep up.

Take a look at the trucking industry, for example, where humans are loading trucks inefficiently. By placing sensors inside semi-tractor trailer trucks, workers monitoring the packing will learn how to efficiently use the space to load the truck to its full potential. If trucks were fully packed, the number of trucks on U.S. roads would drop by 10 percent, an incredible cost savings for shipping companies and a substantial reduction of carbon emissions.

With the retail industry, four percent of potential revenue is lost every year because stores aren't satisfying customer demand for specific products in their inventory. If every item were tagged and tracked and restocked orders were transferred in real time to retail employees and warehouses, retailers would be able to capture a significant amount of that lost revenue.

In the healthcare industry, the complex network of individual players — doctors, nurses, hospitals, insurance companies — makes consolidating, sharing and analyzing medical data extremely challenging. Using sensors and data analysis can improve information gathering and processing to ensure better and more accurate care for patients. By analyzing data, healthcare providers are hoping to better understand how quickly patients receive treatment, inform staff planning procedures, and provide crucial information more accurately to physicians in real-time.

These are just a few of the ways in which the intelligent enterprise is already making an impact on nearly every industry. A sensor may seem like a small device, but married with troves of data and the ability to understand and act on it brings a new wave of technological innovation and creativity to our world and improves the lives of people who live and work in it.

“The idea of connecting the physical and digital worlds to drive innovation, efficiencies, and global economic growth, is the intelligent enterprise.”

—Anders Gustafsson
CEO, Zebra Technologies



InVision Thinking™

Presented by David Ricketts, Technology and Entrepreneurship Center at Harvard University

To find the next billion dollar idea for your company, you must look for the seeds of innovation in your business. And while there are several paths to profit, there is only one that leads to great innovation. To create not only a billion dollar money maker but also a product or service that will change the world, you must start with a vision. The following pyramid explains the various ways of thinking and how vision is the sole route to innovation.

Product Thinking

Product thinking involves a focus on the product itself. Your company has a product that fills a need or provides a service, and the company focuses on making it better, so people will buy more. While this is the foundation of innovation, product thinking itself is not innovation. That said, billions of dollars lie in this area. Think of Apple and its never-ending versions of the iPhone.

Design Thinking

Design thinking, while not true vision, is sort of an introduction to thinking about value and vision. In design thinking, we try to understand customers better, so we can figure out what how they think and what they need and then develop a product to meet that. For example, consider Dyson. The vacuum cleaner manufacturer did not invent anything truly revolutionary but still has managed to design products that match customers' wants and needs.

“How do we see innovations where other people don’t? How do we find ideas, the kernels, the seeds, of billion dollar ideas when they’re sitting right in front of us?”

–David Ricketts
Technology and Entrepreneurship
Center at
Harvard University



Invention Thinking

Invention thinking involves looking at a specific problem in a different way in order to create something brand new. Inventions can be breakthrough ideas and solutions, but they stop short of innovation because there is no vision of the bigger picture. For example, once I worked with Disney to create a football that had an active RFID tag inside that could track the ball's location. This was a clever invention, but without vision, it wasn't a true innovation.

Vision

Vision is the cornerstone of true innovation, and while every vision does not necessarily lead to innovation, every great innovation does begin with a vision. Having a vision means that you are able to imagine a future world that is completely transformed by your idea. It is more than just creating something that solves a problem or meets a need – it is about making something that will truly change people's daily lives. For example, at a time when nobody believed you could have a computer at home for personal use instead of business use, Bill Gates had a vision of seeing a PC on everybody's desk. That is true innovation.

In closing, innovation is not something that's going to smack you on top of the head. It's going to be a small, simple change or idea that may come after a thousand ideas that don't lead to anything. Innovation starts small and is often hard to see. However, if you want to create true innovations in your business, you should always start with a vision.

“Vision leads to disruptive innovation... vision is where the heart of innovation is.”

–David Ricketts
Technology and
Entrepreneurship
Center at
Harvard University



Digital Transformation in Healthcare: A Catalyst for Operational Outcomes

Presented by Tim Kottak, CTO, Global Services, GE Healthcare

GE Healthcare is an \$18 billion business that spans many healthcare solutions, including diagnostic imaging, mobile diagnostics and monitoring, IT and digital solutions, and life sciences. In the past years, we have seen a shift toward value-based healthcare, and that is changing the kind of solutions that our customers need.

Today hospitals are up against changes in regulation, cost pressures, competition, and higher standards for patient safety. GE has been able to use data and analytics to become a partner that provides not only medical equipment but also solutions that improve outcomes. Three industrial internet building blocks of this are Operational Integration, FastWorks, and Change Acceleration.

Operational Integration

This building block addresses the issue of integrating the technology we create with the operations within the hospital. It starts with co-creating with the customer to make sure that the technology is great and it is also simple and well-integrated with the user. After that, we use software that connects to and monitors the equipment to give us data which can be turned into insights and predictions.

A specific example is the MR machine, which has a big magnet inside that takes pictures to see what is going on inside your body so you can be diagnosed and treated appropriately. On the machine is a cold head which, if it does not work, could cause the magnet to quench. This could potentially then pose safety risks to the patient and staff, and unplanned downtime that may jeopardize other patients who may be critically ill and have to reschedule their scan. The whole time, the customer (the hospital) is in a panic because it is a million dollar machine and they have no backup.

Using Operational Integration, our software is monitoring the cold head (and all other parts of the machine) 24/7. By gathering the data, we can create algorithms that can predict when the cold head needs to be serviced. Through constant monitoring, we can predict this 2-3 months in advance, so maintenance is performed well before there are any problems.

This is one example, but data is gathered, analyzed and monitored for all aspects of the MR machine using this software. If a deviation is detected, an alert is sent to a GE remote engineer. The engineer can then decide if the issue should be monitored, if it can be fixed remotely, or if they need to urgently dispatch someone.

The Operational Integration system has allowed us to deliver valuable outcomes to customers, including fewer disruptions, less time to service, and less downtime.

FastWorks

Our FastWorks system addresses the question of how to scale quickly. It can be used to help grow our business and also to help our customers problem solve and deliver better service. FastWorks allows us to go fast methodically early in the cycle and not just have a technology mindset of “I want a prototype and I’ll figure the rest out later.”

There are five steps:

1. **Problem Statement:** Define the customer problem and the long-term vision to solve it.
2. **Leap of Faiths:** Identify assumptions that need to be true in order to achieve the vision.
3. **MVPs:** Build a series of tests to validate the assumptions.
4. **Learning Metrics:** Identify and track leading indicators to validate learnings.
5. **Pivot or Preserve:** Adjust the strategy based on the validated learnings.

*“We want to fail early,
fail often, learn from
it, and then scale.”*

–Tim Kottak
CTO, Global Services,
GE Healthcare

A case in point of our FastWorks system is something that we called MR Performance Excellence. This came about because several customers had bought equipment from us but couldn’t keep up with demand. They were turning patients away in the emergency room but because of cost pressures they were also not able to afford another MR machine. We investigated by following the FastWorks process and doing several pilots in the United States.

In the pilots, we used data from the monitoring software and also sent out nurses to see what the customer was experiencing. Through this process, we could identify areas for improvement in training, staffing, and so on. Our findings were delivered to the customer in a list of opportunities to operations and workflow. In fact, a not-for-profit health system saw the ability to reduce MR exam time, creating the potential for 3,250 additional cases per year across the enterprise.

The FastWorks process allowed us to use machine utilization data to analyze how to optimize throughput and advise our customers on how they could improve outcomes.

“We want to work with customers for outcomes. A bigger vision, not that I want to sell you the latest and greatest CT. I want to help you be profitable, and help keep your patients safe in your healthcare system. So it’s starting to evolve as more of a collaboration and more of an ecosystem.”

–Tim Kottak

Change Management

Our Change Management system allows us to use big data to help our customers implement changes that are better for patients and doctors. More specifically, we have used it in conjunction with our Dose Excellence Program to help doctors make changes to CT scan dosing.

In a CT scan, you get a dose of radiation to your body, but doctors say it is a necessary risk because the small amount of radiation you get is a small risk compared to the risk of not detecting and treating the cancer. However, sometimes patients get too high a dose than needed to make a clinical decision. Radiologists want a good picture but that’s at the expense of increasing the radiation, so there is a tradeoff.

GE Healthcare has a software that works with our CT scanner and monitors radiation dose given to the patient. It can provide dosage data by machine, care area, physician, referring physician, part of the body, and more. From that data, you can get automated customized reports, alert notifications, and a patient information management system that gathers detailed dosage reports for each patient. This information can help hospitals make important changes regarding radiation dosages that will help keep patients safe but also get doctors the high-quality images they need.

The problem is that nothing will change unless the customer is willing to change. Our Dose Excellence Program focuses on the acceptance to a new solution and continued adherence to that solution. We take dose management data and turn it into insights for the customer. After insights are gathered, we can determine a methodology for dose management and quality improvement, and set up a process to help sustain these improvements.

Insights are then turned into outcomes for the client and it is a win/win for all involved. Radiologists get good pictures, patients are handled in a standard way, and dosage is minimized for the patient’s safety.

Operational Integration, FastWorks, and Change Acceleration are three ways that GE has used big data and computer learning to gather insights and make changes that improve healthcare. By doing so, we are working with our customers to help increase their profitability and make their patients safer.



The Internet of Health Things: Opportunities and Challenges for the Healthcare Enterprise

By Yuri Quintana, Assistant Professor, Harvard Medical School, and Director of Global Health Informatics

Global Health Challenges

Global health is under a major transition. People are living longer but with more conditions that require multiple healthcare specialists. According to estimates from the World Health Organization (WHO), the proportion of our population over sixty years old continues to grow and will triple by 2050.

The number of the health care providers is increasing slowly due to a limited number of training centers and the high cost of training programs. There is already a shortage of four million health care providers, and by 2050 we will have a shortage of 12 million providers. The costs of health care are rising from 5 percent to over 10 percent in most countries, outpacing the GDP growth. All of these challenges will necessitate a re-examination of how we will be able to deliver health services in a more efficient ways to a larger number of people.

E-Health

E-health is the use of information and communication technologies (ICT) for disseminating healthcare knowledge, increasing access to services, and improving the quality of services. Examples include treating patients, conducting research, educating the health workforce, tracking diseases and monitoring public health. The internet and mobile apps have created opportunities to build new ways to collect patient data, diagnose patients remotely, and deliver care at a distance. E-health includes the use of electronic medical records, electronic prescribing of medications, telemedicine

to provide care via video conferencing, and more. E-health is being used to disseminate education such as in the OPENPediatrics program (www.OPENPediatrics.org) by Boston Children's Hospital. E-health is also being used for care coordination, such as the InfoSAGE project (www.infosagehealth.org) from Beth Israel Deaconess Medical Center which allows elders to share care plans and medications with family members.

Internet of Things

More recently, small devices are being used as sensors in healthcare to collect and send data via the internet. These devices are called wearables if they can be attached to person via their clothing or a patch attached to their skin. Even smaller devices can be implanted or ingested as pills. These devices will be highly useful for the remote monitoring of patients. These devices are known as the Internet of Things of Healthcare, and this area is one of the most rapidly growing sectors of e-health innovation. Regulations of these devices are likely to follow from government agencies.

Creating the Ecosystems

The full potential of e-health will only be reached when it can be integrated into routine care. While many technologies for interoperability and data sharing already exist, selecting the correct integration strategy is critical so that systems are scalable and cost effective. Developing these strategies remains a challenge due to a large number of systems, and the speed at which new hardware and software are being developed. Security of these systems will remain a challenge as it is for any electronic system or network. Data overload will also be a challenge for healthcare providers as most providers already have too much data and not enough time to identify which are the most urgent data sources to respond to. We will need better data filtering systems so that alerts to providers are relevant to that patient. We will also need better evaluations of these systems to understand the integration strategies, patient outcomes, costs and sustainability models.

Despite these challenges, there are great opportunities for innovation. With proper system designs, we will be able to have a new health system that allows healthcare providers to detect changes in medical conditions sooner, provide better treatments, and achieve better health outcomes at a lower cost.



Case in Point:

Leveraging Technology - Using Asset Visibility to Drive Operational Effectiveness

By Alison Jones, Senior Director of NAR Logistics, Whirlpool Corporation

The finished goods distribution network for Whirlpool Corporation's North American operations region consists of eight factory distribution centers, ten regional distribution centers, and 90 local distribution centers. The finished goods distribution network for Whirlpool Corporation's North American Region- U.S. operations consists of eight factory distribution centers, ten regional distribution centers, and 90 local distribution centers. To compensate for seasonality and promotional activity, several temporary locations also get established throughout the year. Inventory movements in and out of a facility, as well as movements within a building, are all tracked electronically through a series of barcode scans using mobile computing radio frequency (RF) devices. Because there was not the necessary network visibility of the hardware and software being used at each site, sites were independently bringing on a variety of devices.

Over time each site became more and more customized, to the point that equipment could not be used at the other sites. Audits performed in 2014 determined that the median age of the equipment in the network was approaching eight years old, and some sites were operating devices that were over 13 years old. With a typical life cycle being five years, repair parts were becoming increasingly more difficult to procure as well as progressively more

“With a typical life cycle being five years, repair parts were becoming increasingly more difficult to procure as well as progressively more expensive.”

—Alison Jones
Senior Director of NAR Logistics,
Whirlpool Corporation

“A significant benefit of the monitoring and visibility system allows firmware updates to be pushed to the devices, eliminating onsite support calls.”

–Alison Jones
Senior Director of NAR
Logistics, Whirlpool
Corporation

expensive. When firmware updates were needed, IT personnel would be required to travel to the sites in order to deploy the changes. A complete overhaul of the RF ecosystem was needed; not only did hardware, software, and business processes need updating, but a means to gain operational visibility into the system was required.

Early in 2015, Project Pterodactyl was chartered to address all of the issues identified during the audits of 2014. Site surveys and labor management studies were conducted in order to properly right-size the device pool for each location, as well as identify the correct type of equipment best suited for each division of labor. Additionally, industry benchmarking took place to identify potential solutions to gain device visibility, both by site and at the network level.

The studies concluded that two types of devices -- a handheld device, and a forklift mounted device -- could cover 100 percent of the needed RF functionality compared to a previous quantity of nine unique models. All models have standardized firmware which allows units to be transferred between sites as demand dictates. Instead of laser scanners, the devices were equipped with imagers. Imagers can scan 2D barcodes which essentially doubles a user's productivity all while reducing errors during the scanning process. A spares pool was also established to support promotional and seasonal upticks in demand. Lastly, a centralized monitoring and visibility tool was deployed. Metrics, such as but not limited to utilization, uptime, battery life, and number of scans, are now available data points. Such metrics can be reviewed site by site or at a network level with both standardized and ad hoc reporting available. A significant benefit of the monitoring and visibility system allows firmware updates to be pushed to the devices, eliminating onsite support calls. The elimination of onsite support during the first 60 days of startup recouped 63 percent of the total cost of the system. Looking ahead, the next device refresh cycle will be more accurate and shorter in duration now that historical data is available.

Many changes were made over the duration of Project Pterodactyl, ranging from simple hardware upgrades to significant business process improvements. The capstone of the project was the ability to finally monitor the overall health of the RF layer of infrastructure, which has led to both immediate and long-term cost savings and productivity improvements.



The Intelligent Enterprise and the Future

Engaging and leveraging the tremendous advances that IoT brings to enterprise solutions can be challenging. The *2016 Strategic Innovation Symposium: The Intelligent Enterprise* at Harvard brought together leaders from across industries to discuss the opportunities and challenges in engaging in the Intelligent Enterprise. The following are the key actions that the leaders at the Symposium felt were paramount to a successful adoption and deployment of IoT solutions.

- IoT Vision?**
Driving disruptive and transformational innovation in your company and industry starts with a vision of how and why new solutions will change the way you and your customers generate new value. Is your IoT strategy simply reactionary, or have you developed a vision of how IoT will drive new value?
- Business Unit Engagement: Is there an ROI for the IoT program?**
Unlike internal programs where the ROI on IT projects can be well understood, launching complex IoT initiatives often requires a clear business case for both the investment in infrastructure and also the greater investment in change management, education and process re-engineering. Most successful IoT initiatives have a clear ROI and business case, often lead by the business unit itself.
- Technology Solution Partner: Who will provide sensors, RFID, software and integration solutions?**
Intelligent IoT solutions require a holistic, or ecosystem perspective. Does your plan have all of the key pieces integrated: sensors, software, and integration? Have you considered “co-competition” related to core technologies and partners? Without a high-level perspective, many projects fail to yield the expected benefits.

For additional information on the Intelligent Enterprise Checklist from our sponsor, please see www.zebra.com/visibility



About the Strategic Innovation Summits and Symposia

The Strategic Innovation Summit and Symposia series was convened to enable multi-disciplinary discussions of senior leaders on relevant topics of the year. Unlike conventional, discipline-specific conferences, where topical content is narrow and participants are generally from the same discipline, the Summits bring together people from many sectors. These include government, business, education, non-profit, and the arts and sciences.

The goal is to create and stimulate conversation that would normally not take place elsewhere, between senior leaders on important topics related to innovation and society.

The Summits and Symposia provide three important benefits to participants:

1. Education – As experts in their fields, participants learn from one another through interactive sessions and dedicated talks. These aim to educate, raise important questions, and present the latest data on trends and the current state of the Summit topic.
2. Multi-disciplinary Engagement – The Summits are sized such that even during the main session, a conversation can occur amongst all participants. Questions and answers are not only between the speakers, but also the participants. Facilitators and moderators from HBS, TECH, and other centers are brought in to ensure engagement and to be a catalyst for the conversation.
3. Action – The ultimate goal of the Summits is impact. For this to happen, action is a critical component. The summits dedicate approximately 25 percent of the time to action sessions with the participants. That format drives the discussion and ideas presented into an action set for both the participants and the broader community.

Attendance is by application only, and senior leaders from any discipline that is relevant to the topic are encouraged to apply. Summits are generally convened on the campus of Harvard University; however off-campus Summits do occur when the topic and location enhance the opportunity for conversation and engagement of the participants.

Topics are proposed by participants, senior leaders in industry and government, and the Fellows in TECH. Topics are chosen based upon relevance and potential for impact in a broad sense, to include economic, societal, and environmental benefits.

For more information about the Strategic Innovation Summit series, please contact the Program Chair, Dr. David S. Ricketts (ricketts@seas.harvard.edu).



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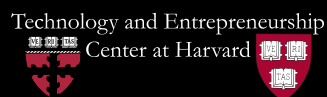
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Contact Information

theinnovatorsforum.org/2016summits/intelligent-enterprise
ie2016@theinnovatorsforum.org