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Internet of Things Grand Challenge Workshop

Forging the path to revenue generation

Summary of key findings

December 9 & 10
Tech Museum of Innovation
San Jose, CA

About this report

On December 9 & 10, Deloitte hosted over 20 business executives and thought leaders at the Internet of Things (IoT) Grand Challenge Workshop at the Tech Museum of Innovation in San Jose. The objective of the gathering was to work collectively to solve one of the more largely unexplored areas of IoT: looking beyond cost savings to forge a path to revenue generation.

This report captures what was discussed during this extraordinary event where an open, collaborative dialogue focused on advancing the field of IoT. The report's goal is to recreate the experience and capture the highlights of the content discussed at the meeting.

A note from Eric Openshaw

The second IoT Workshop was truly inspirational. The collaborative, insightful discussions and sense of purpose reflect the importance of this critical topic to business and the public sector. The knowledge shared during the workshop will advance the field as we know it.

Our meeting was not only inspirational because of its intellectual content but also due to the human experience of bringing together such diverse perspectives in one room. Many of our workshop attendees participated in the inaugural event held back in May 2014. However, we were also fortunate to be joined by a few new participants. We hope that the meeting was the beginning of new relationships and collaborations and strengthened those relationships made back in the first workshop.

To the participants in the workshop, thank you for sharing your insights with all of us and I look forward to our continued dialogue.

Eric Openshaw
Vice Chairman and U.S. Technology, Media and Telecommunications Industry Leader, Deloitte LLP

Workshop Participants

Top row (left-to-right): Elina Ianchulev, Technology Sector Specialist, Deloitte LLP; Jonathan Holdowsky, Market Insights, Deloitte Services LLP; Ken Durand, Vice President, Innovation & Business Development, Connected Car / M2M, Ericsson; Dr. Richard Soley, Executive Director, Industrial Internet Consortium; Shawn DuBravac, Chief Economist and Senior Director of Research, Consumer Electronics Association; Francesco Tinto, Vice President and Chief Information Officer, Kraft Foods; Garry Wiseman, VP Product Management, Salesforce; Tobin Richardson, President and Chief Executive Officer, ZigBee Alliance; Bruce Oberlies, Senior Director Advanced Technology Realization, Motorola Solutions; John Seely Brown, Independent Co-Chairman, Deloitte LLP Center for the Edge; Peter Marx, Chief Innovation and Technology Officer, City of Los Angeles; Peter Hoddie, VP, IoT/Kinoma Marvell; Lesley Evers, Graphic Recorder; Mike Curran, Telecom Sector Specialist, Deloitte LLP

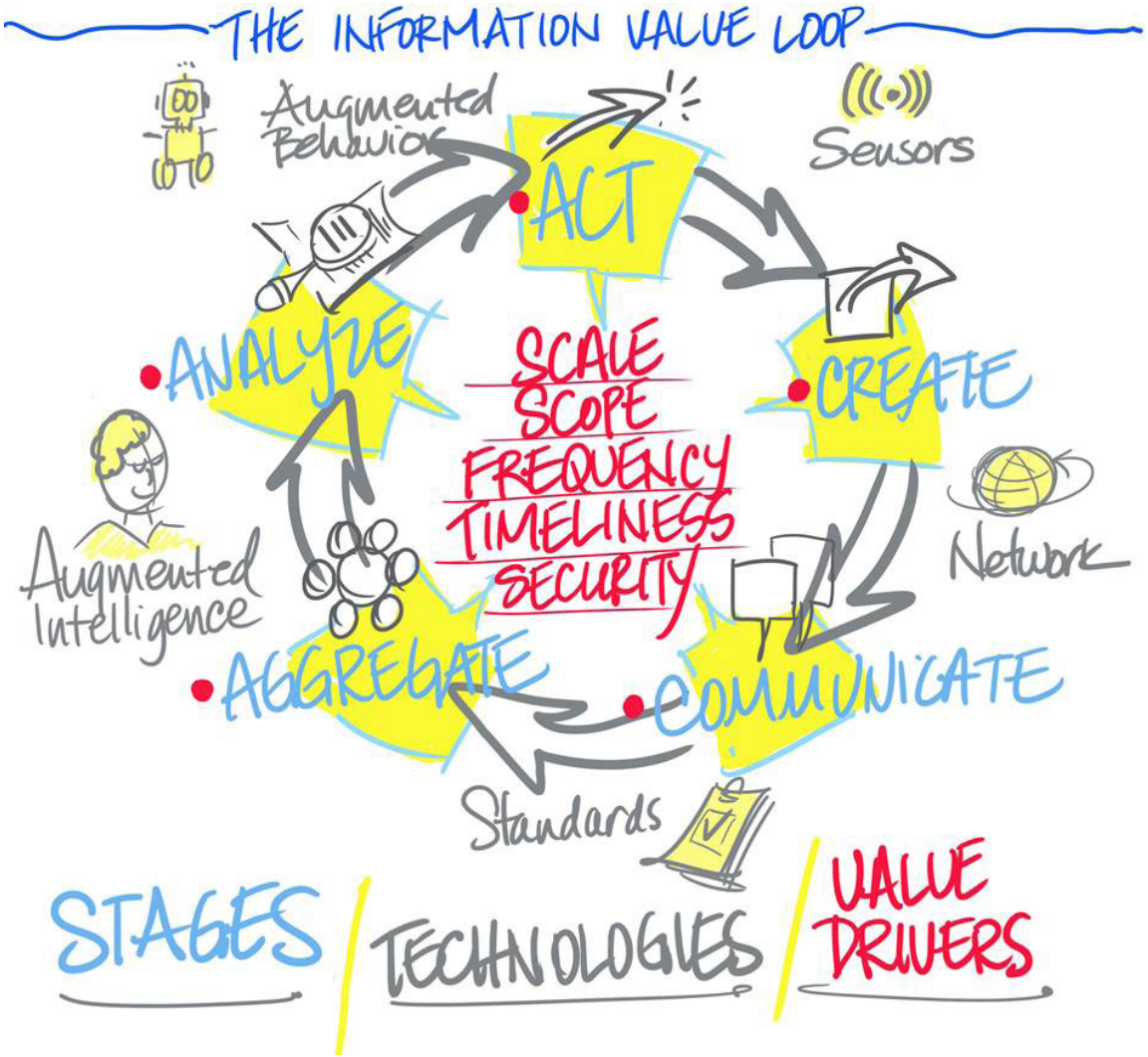
Bottom row (left-to-right): Tom Galizia, Principal, U.S. Technology Strategy and Architecture Leader, Deloitte Consulting LLP; Param Singh, Independent Advisor, City of San Francisco IoT/Smart City; Chetan Chaudhary, Senior Director of World Wide Sales Strategy and Alliances, Jasper Wireless; Craig Wigginton, Vice Chairman, U.S. Telecommunications Sector Leader, Deloitte & Touche LLP; Dan Feldman, Director, Smart Cities, Verizon; Rene Sotola, Vice-President, Global Communications Sector, Mobility IoT, CGI; Eric Openshaw, Vice Chairman, U.S. Technology, Media and Telecommunications Industry Leader, Deloitte LLP; Phil Wilson, Director, Telecommunications Strategy and Operations, Deloitte Consulting LLP; John Hagel, Co-Chairman, Deloitte LLP Center for the Edge;
(not pictured: Mark Sherman, Managing Director, Telstra Ventures)

Key Takeaways

A number of engaging discussions were held throughout the two day workshop. Over the next few pages, we've summarized some of the key-takeaways.

IoT is a continuation of the efforts to connect machines, facilities, fleets, networks, and even people to sensors, feed the resulting data into analytics applications, and automate or improve actions taken by humans or machines. However, the speed of change is so rapid that it creates a lot of complexities and noise in the marketplace. To make sense of this metamorphosis, we need new labels and new models. For although the rules of the game – in the form of the fundamental laws of economic activity – have not changed, the players certainly have. In many industries, who wins and who loses are once again up for grabs.

The Information Value Loop is one way to begin making sense of the changes we face. The Loop consists of three interconnected elements: stages, value drivers, and technologies. Where the stages and value drivers are general principles defining if and how information creates value under any circumstances, it is the specifics of today's technology that connect the Loop to the challenges and opportunities created by the IoT.



Stages

For information to create any value at all, it must pass through all the stages of the Loop. This is a binary outcome: should the flow of information be blocked completely at any stage, no value is created by that information.

Some form of action – real or virtual – is what creates information. This information must be communicated from the point of its creation and aggregated across time or across other sources of data so that it can be analyzed in ways that yield insight into how best to adapt action, which restarts the cycle by creating new information.

Value Drivers

Conditional on completing the Loop, how much value is created is a function of the value drivers. For each, all else equal, more is better.

The first two value drivers allow us to get a more complete picture of what is going on. A greater scale of IoT deployment moves us from, say, a sensor on a sample of trucks or rail cars or products to sensors on every truck or rail car or product. A great scope of deployment allows us to know, for example, not only where a truck is but also its operational state: full or empty, operational or in need of maintenance, and so on.

The next two value drivers allow us to make better use of the data. More frequent data gives us, at the limit, a nearly real-time picture of activity, and appropriately timely data allows us to do what is needed when it is needed.

Finally, secure data is essential: we must control access and use according to legitimate laws, regulations, and societal norms.

Technologies

The specific cost and performance attributes of today's technologies are what drive the incipient and potentially dramatic changes that command our attention. Sensor technology has opened the floodgates. Having reached a size and robustness that they can be embedded in everything from pacemakers to earth movers, we can now create data from all manner of activities.

Communicating those data from the point of generation to central locations for further processing has been made possible by all manner of advances in communication technology – everything from the transition to IPv6, which increases the number of addressable locations on the Internet from 10^9 to 10^38, to increases in the reliability and bandwidth of wireless networks.

Stitching together a more complete picture of any given phenomenon requires data from many and varied sensors and networks. This requires standards along two dimensions. First, and more tractable, is technical integration, for it is here that we see the merits of the "internet" of things nomenclature. Second, we require legal and regulatory frameworks that define ownership and access rights to the data that can be generated and collated by modern sensor and network technology.

Whatever the data set available, augmented intelligence technologies allow us to make more of these data than ever before. Not only has the quantity of data upon which we can draw increased dramatically, but we can also draw upon vastly greater computing resources and more sophisticated models that can uncover previously unimagined relationships. And finally, augmented behavior speaks to our generally improving ability to translate insights into behavioral changes.

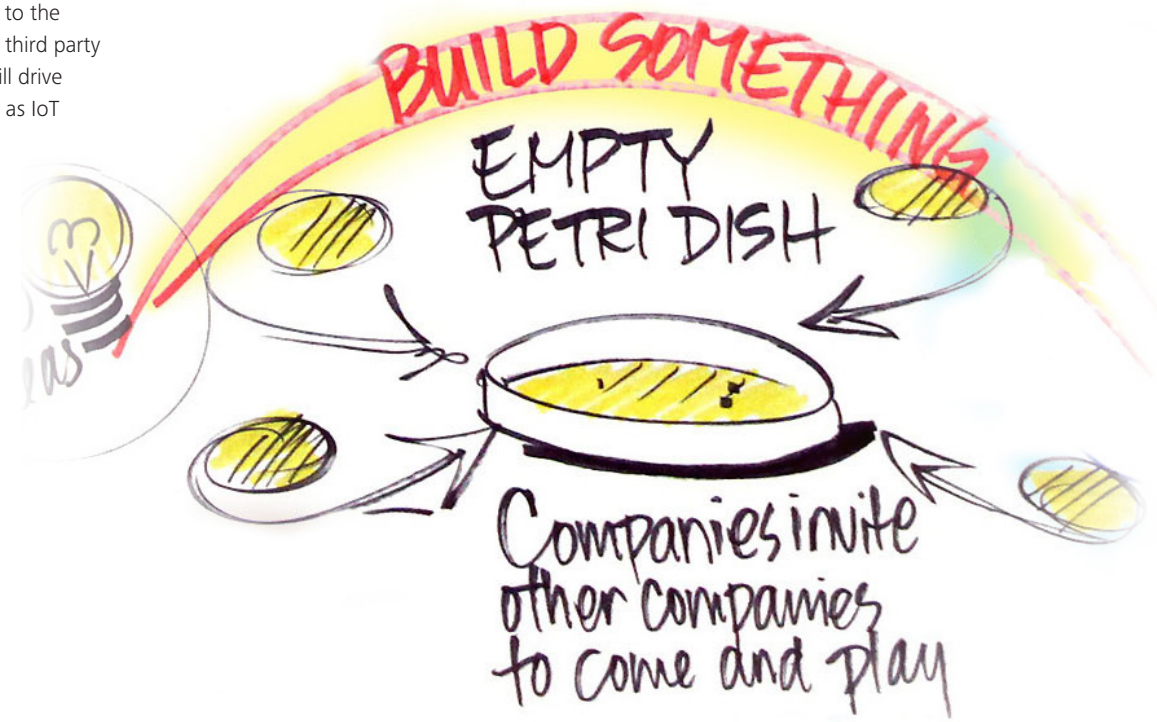
The workshop used this framework to guide the overall discussion. The key takeaways are summarized on the following pages.

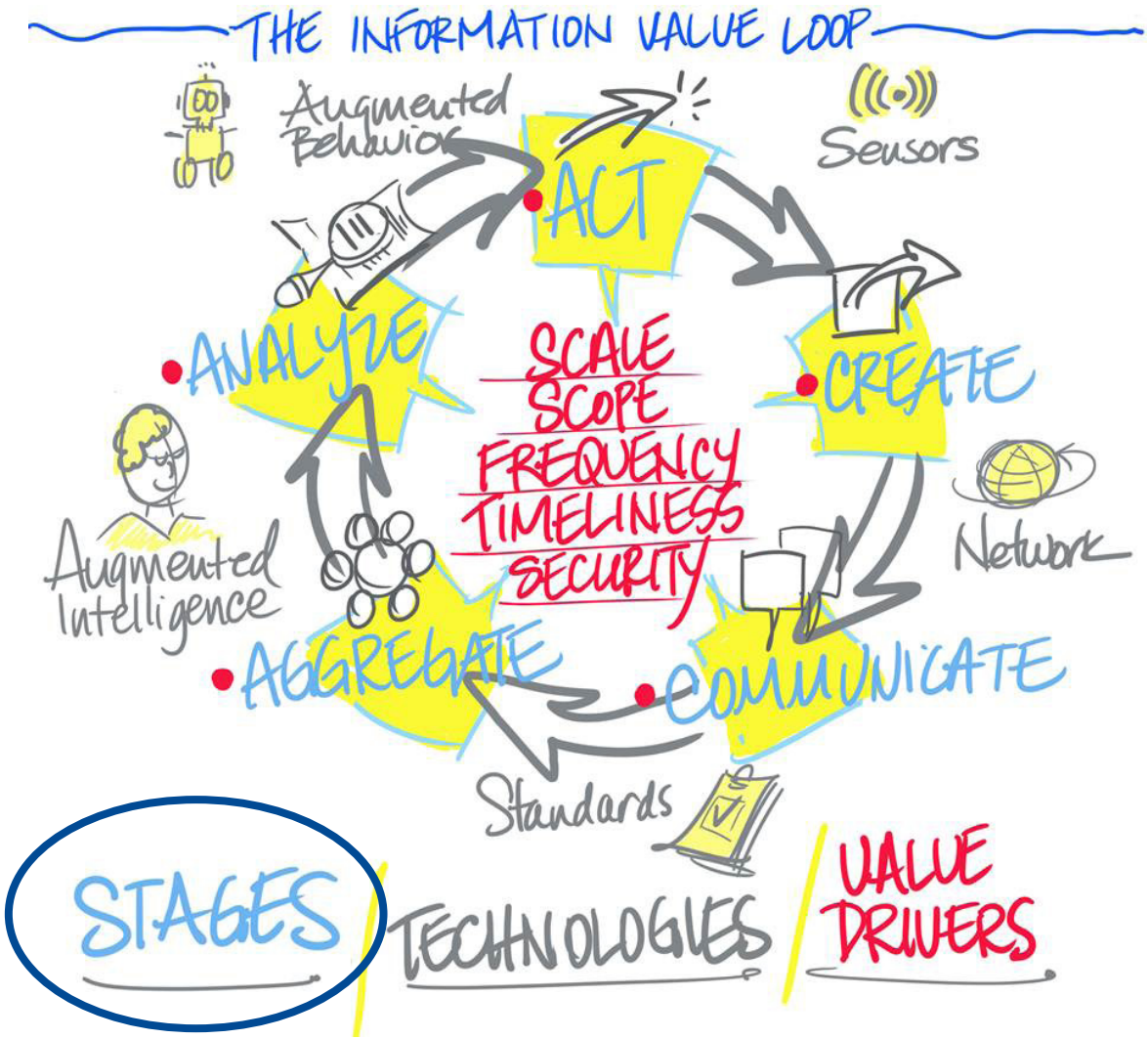
The IoT ecosystem is complex and disorganized

At this relatively nascent stage, the IoT ecosystem is fragmented, complex and disorganized. This emerging broad ecosystem provides an opportunity for companies to drive leveraged growth – connect with and mobilize third party capabilities that can add more value to the enterprise customers, reduce upfront investment and shorten the time to market. For example, companies may forge a platform for third party analytics firms to search through data for meaningful patterns of usage and comparisons and suggest third party products and services that can deliver incremental value to customers.

Over time, the IoT ecosystem should undergo a streamlining and organizing process and a "knitting together" of its individual pieces. In addition to the emergence of opportunistic relationships between IoT providers and third party suppliers, more formal, cross-functional alliances among suppliers will drive this process. Such alliances are especially key in anything as complex as IoT solutions as they serve to promote creative solutions and reduce organizational inefficiencies and myopic, insular thinking that may be present in those who adopt a "go it alone" approach. Alliances also allow niche players with limited resources to play key roles in IoT applications.

Ultimately, the mission of many alliances and consortiums should be streamlining process and including open-source platforms and the adoption of industry-wide standards.





The "Stages" of the Information Value Loop, shown in blue script, bring some order to the chaos. Participants in the ecosystem can understand their role in terms of the stages they drive – cities are natural incubators, but the private sector matters a lot.

Cities have served as early adopters of “smart” IoT solutions, but face hurdles

Cities have inherent societal challenges in place to serve as natural incubators of IoT solutions. And, as the population continues to return to the city, the call for smart city development should only become more pronounced. Early IoT applications in the city are especially focused on the issues that most obviously affect urban quality of life: law enforcement, sanitation, traffic and parking management, among others. Los Angeles and San Francisco are just two examples of cities that have begun to implement smart solutions in many of these areas, both internally as well as through partnerships with private sector players.

Still, the full promise of smart city solutions face real hurdles in being fully realized. For one thing, the procurement process in cities is often burdened by a rigid and complex set of rules and standards that extends procurement timeframes into potentially a multitude of years. Second, city budgets are currently stretched thin and any new kind of investment - especially in anything as new and relatively unproven as IoT systems - must compete with better recognized and understood budgetary priorities. Some also believe that smart city solutions present security and privacy issues that do not justify the perceived benefit in investing in IoT systems.

Consequently, the future of the smart city as a commonplace aspect of urban life may be many years away. It may require a gradual step-by-step process of implementation within “test” locations and applications where the benefit is proven. It may also require some in the political hierarchy to recognize and champion its value to overcome the voices of opposition. However, with the inherent challenges that exist, the private sector will no doubt look to capitalize on the vast needs of society, which should translate into an environment where we’ll begin to see IoT solutions as commonly as we may see a streetlight on a highway.

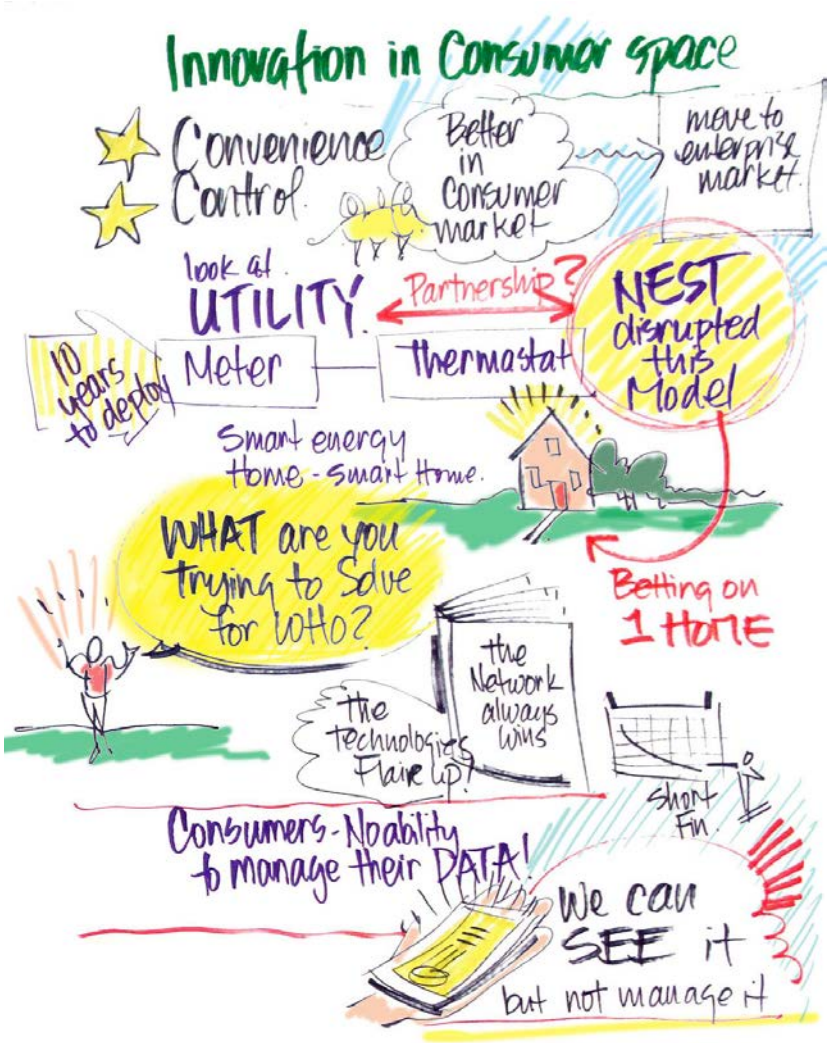
In the private sector, real innovation will be driven by the consumers, while the economic value will be realized by the enterprise sector

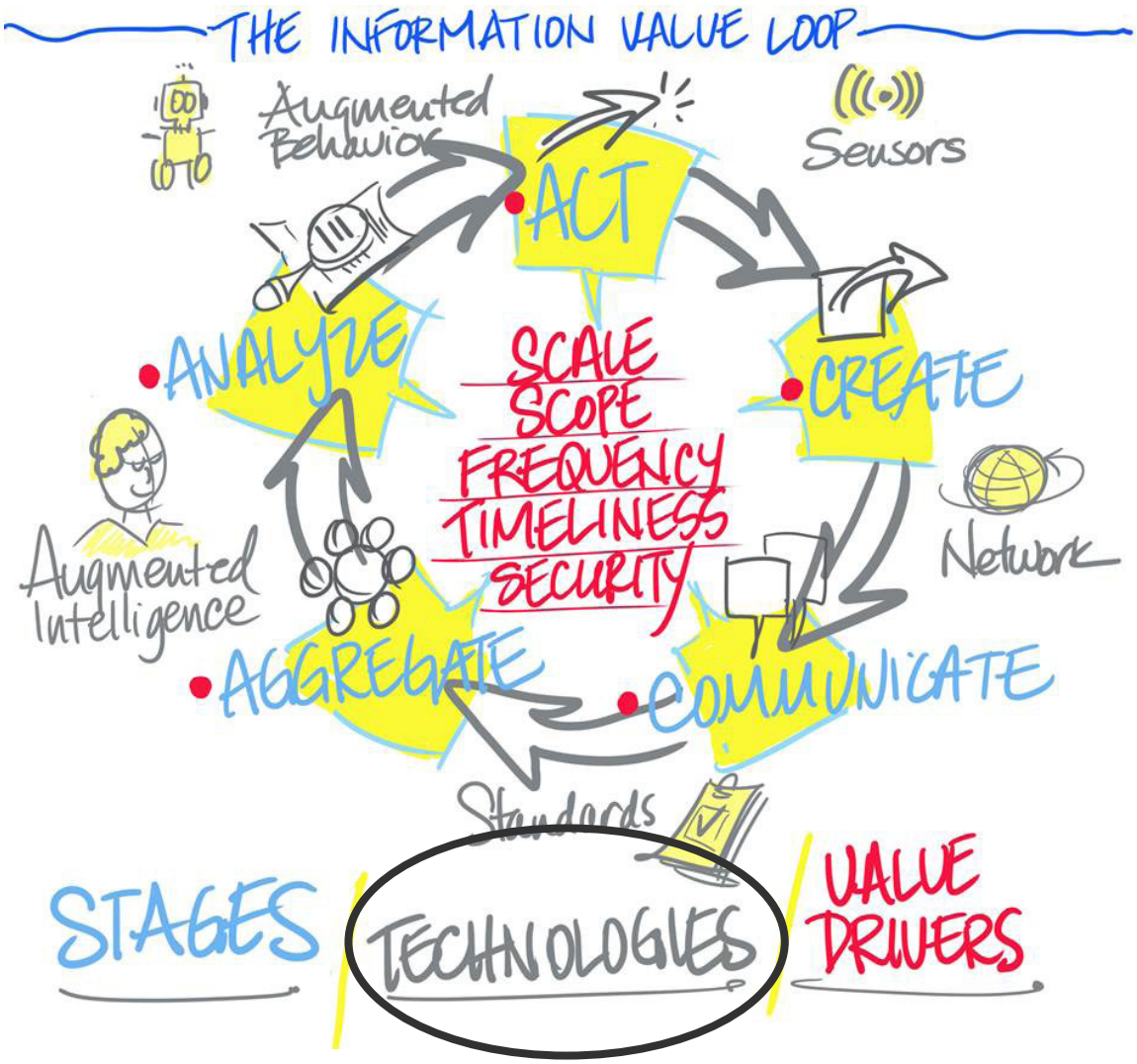
Some believe that IoT will be slow to achieve wide adoption within certain environments – settings that some believe are steeped in institutional inflexibility. The extent to which this is true is open to debate.

What seems more certain is that many enterprises are focusing heavily on developing use cases of IoT. Despite all the media excitement around consumer uses for IoT, most items are selling in the hundreds of thousands as connected devices, sensors or controllers; very few are selling in the millions. Meanwhile enterprises are buying and using tens or even hundreds of millions of IoT devices. Smart meters, smart grids, smart homes, smart cities and smart highways are just some examples. Factories, mHealth, shared transportation solutions (such as car and bike rentals) or resource industries can all benefit too. The more general belief is that to the extent IoT makes forays into the enterprise and consumer world, it will focus on relatively expensive applications.

From an innovation perspective though, some of the new technologies are first marketed at the consumers. Thus, many believe that near-term innovation in IoT applications will come out of the consumer sector - spurred by the emergence of the tech-savvy Millennial consumers as a driving economic force.

Ultimately, success in both consumer and enterprise market penetration of smart technologies will reside in how clearly consumers and companies recognize and appreciate the benefit of the connected device, its convenience of use, and the ability to control what the user wants to reveal about usage patterns.





These use cases in the private and public sectors provide an opportunity to discuss the "Technologies" that define the Loop and what each enables.

From product to service outcomes

As IoT makes successful forays into the world of consumer and industrial products, it may radically change the producer—buyer transactional model from one based on capital expenditure to one based on operating expenditure. Specifically, in a widely adopted IoT world, buyers may be more apt to purchase product service outcomes on some kind of "per unit" basis, rather than the product itself and in so doing, render the physical product as something more of an afterthought. The manufacturer would then gradually transform into a service provider, operating on a complete awareness of each product's need for replenishment, repair, replacement, etc.

Is such a scenario realistic? Even when IoT is widely adopted, product ownership is still expected to remain an indelible part of the consumer mindset, and to some extent the enterprise mindset as well. So the question is, as an example, would an airline company want to pay for an aircraft engine upfront as part of a standard lease / buy arrangement, or under a "power by the hour" model that is operated more as a "jet-engine-as-a-service"? The manufacturing and service business models are fundamentally and completely different under each scenario; any such migration by product makers inevitably faces hurdles, both known and unknown. Furthermore, buyers under the new service-oriented paradigm must consider how they can best use product usage data and whether that data is private, or available for public dissemination. Then there are buyers who will simply rebuff the idea of the smart product as-a-service altogether as unnecessary, especially in the lower end of the consumer product spectrum.

There are certainly competing viewpoints as to whether the product or the service focused market will ultimately prevail, and to what extent enterprise buyers actually have the appetite to transform to a services-first mindset. What may ultimately happen in a relatively connected product world is that many may accept the notion of the smartly connected product, but in a limited way. Such people will want to own the smartly connected product outright, but will also accept the idea of sharing the usage data to the limited extent that the sellers use such data in relatively benign ways, such as providing advice on more efficient usage, etc.

The outcome here will also rely upon a long term total cost of ownership (TCO) perspective. With any fundamental purchasing model changes (as is taking place in owned vs. cloud resources in the network / IT world), not all suppliers will be able to reap additional economic benefit under the service model. Buyers will eventually recognize the increase in TCO and revert back to the more economical business model if the economic rents are too high.

Autonomous vehicles: The way of the future… or vision unfulfilled?

Although in early development, the concept of the autonomous vehicle inspires consideration of new markets and benefits that go well beyond the vehicle itself. Some believe that the autonomous vehicle will improve energy efficiency since the very concept of connectivity implies an optimal understanding of traffic conditions in traveling from one point to another at any given point in time. Autonomous vehicles may improve traffic safety and give people greater mobility generally. Widespread adoption may spawn new kinds of delivery businesses as well as new markets for data that track driving patterns. Other benefits include the need for a wide array of professional talent specifically dedicated to the design and management of the autonomous vehicle infrastructure.

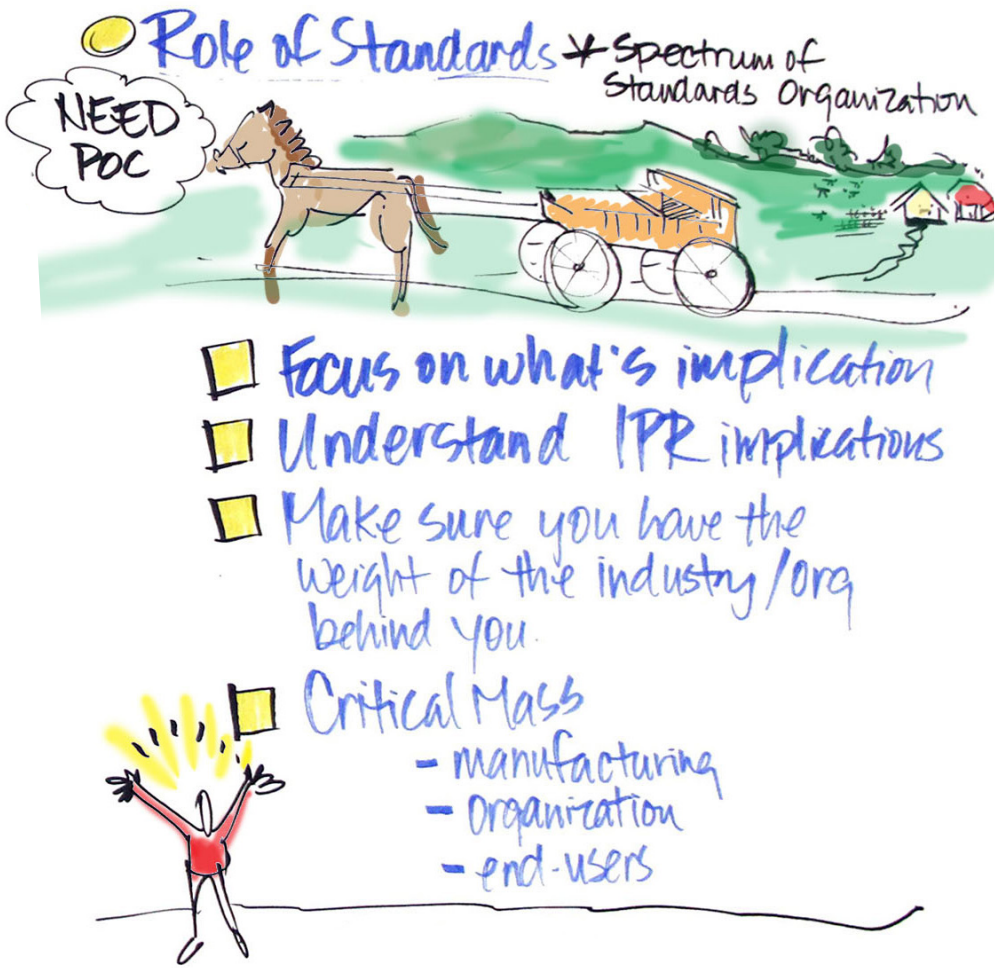
Still, widespread adoption faces many hurdles. It will require the building of a vast infrastructure that includes the development of smart highways with sensors that are able to communicate with the vehicles in a real-time sense. In large part, that infrastructure does not exist and, in any event, needs a kind of political will that may not be commonplace. Widespread adoption will also require the trust of drivers to accept a new kind of mobility that they may perceive involves a loss of control. Another challenge resides in finding a reliable way to anticipate human behavior, especially as there will almost surely be a share of the driving public that chooses not to adopt the self-driving technology. Such is essential to the safety, dependability, and predictability of the autonomous vehicle concept. The autonomous vehicle has to satisfy state and federal highway regulations. And, as with all IoT-based applications, there is an abundance of privacy concerns about the dissemination of data that reveal where and how people travel.

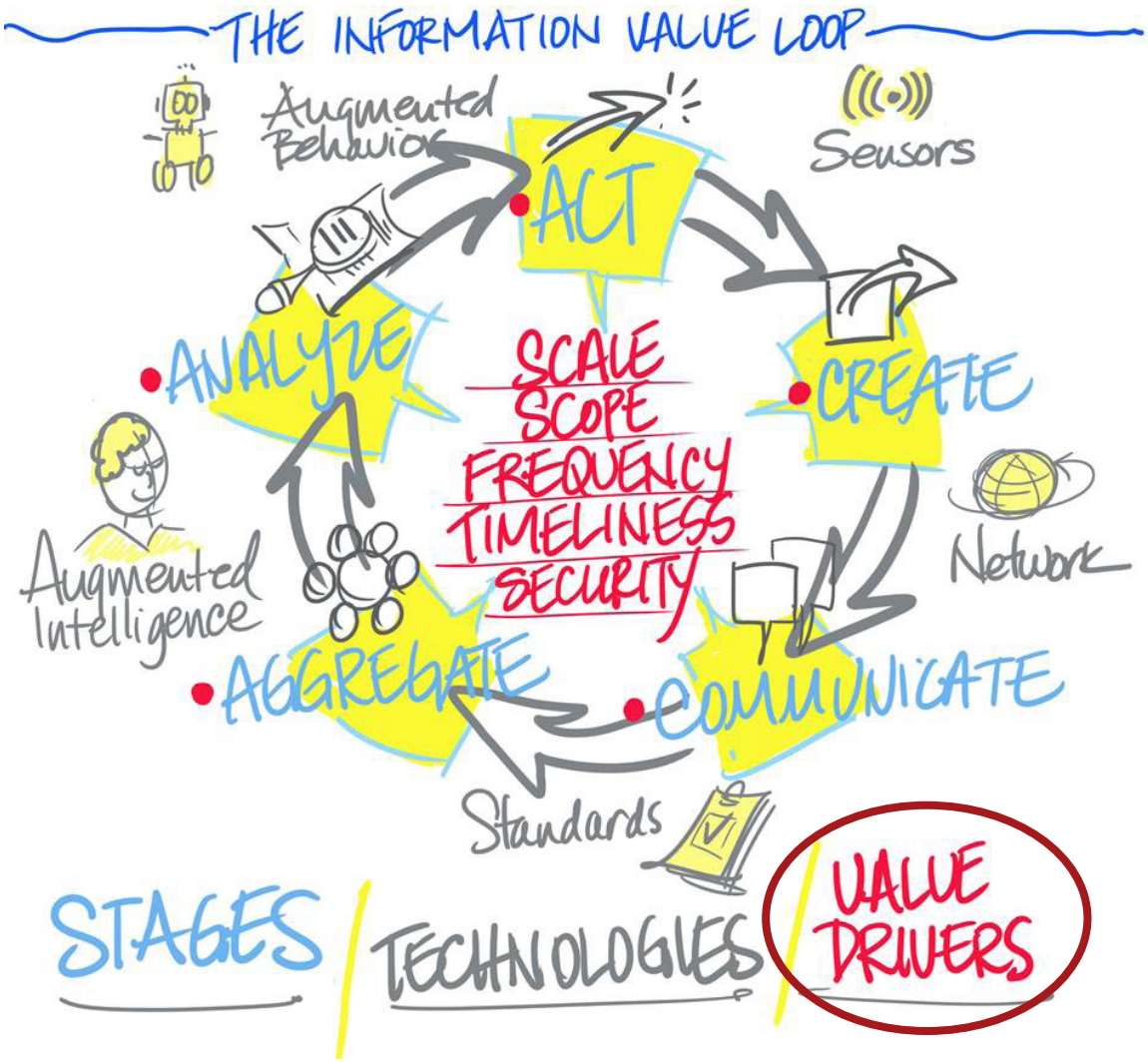
Widespread adoption of the autonomous vehicle faces a long, arduous journey, wrought not only with technical risk, but perhaps even first and foremost societal and political risk. Still, there is considerable investment activity in the development of the self-driving vehicle concept, even at this relatively early stage.

Standards: Cart before the horse?

At this early stage of development, the IoT ecosystem observes relatively few widely-adopted industry standards. But is it simply too early in the evolution of IoT to consider the development of formal or de jure standards? Certainly IoT is not unique in confronting this issue as earlier systems of technologies have tackled standards battles in their nascent stages of development. As we have seen there, market forces—shaped by early applications and dominant stakeholders—may set near-term IoT standards. What this really means is that a few large players have at hand a meaningful opportunity to drive the de facto standards that the IoT ecosystem will follow for years to come.

In the longer term, however, such de facto standards may or may not suffice however much they are followed by IoT stakeholders. The enduring success of IoT may depend on the development and adoption of industry-wide standards that will formally govern stakeholder processes and practices. Such standards will need to achieve a critical mass of providers and users in implementation and observance and generally have the weight of industry behind them. The wide-ranging interests of IoT stakeholders will also require that they address intellectual property rights implications. The process must be deliberate and transparent and, no doubt, near-term de facto standards will influence what will ultimately emerge as de jure standards. The pace of adoption, as well as pace of development from policy / standards groups, will ultimately dictate how long this process takes. Yet, if past is prologue, it would seem inevitable that standards will emerge. In the meantime, it's likely that enterprises and governments will proceed forward with their business cases, strategies and projects and utilize standards if and as they are available – but not as a necessary precursor to pursuing an IoT solution.





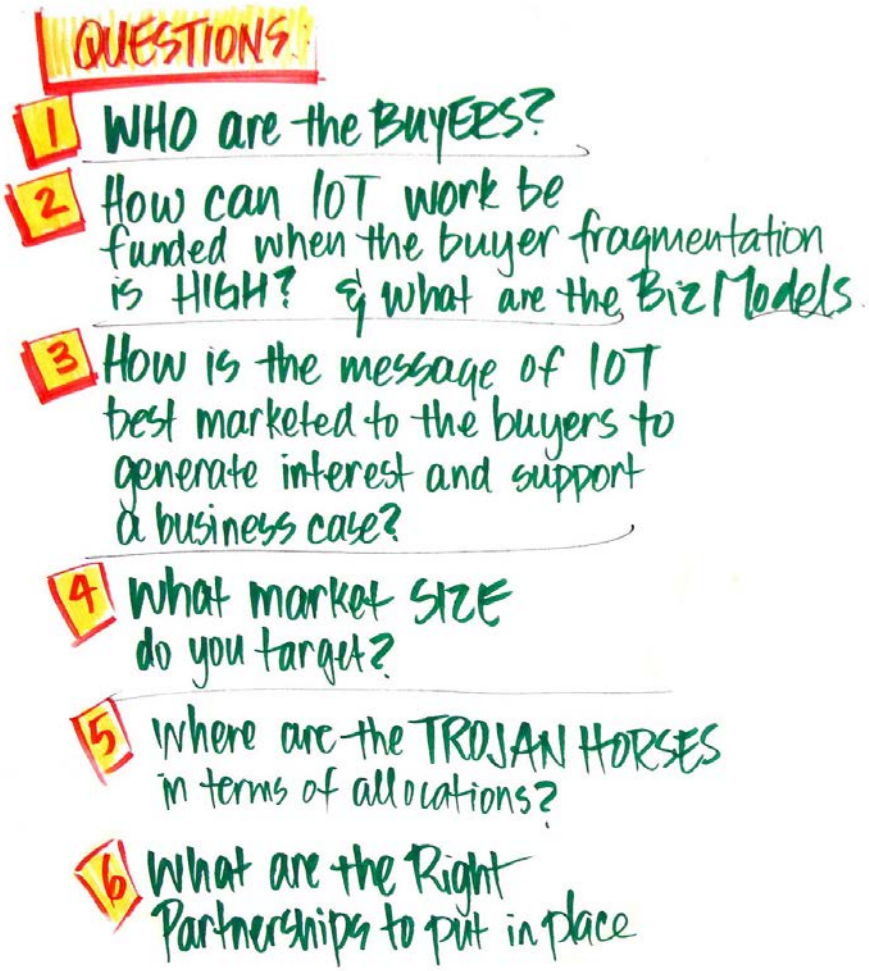
These "use cases" speak to the need to understand the "Value Drivers" – scale, scope, frequency, timeliness and security. Different use-cases will create value in different ways, and understanding which of the drivers needs to be improved will help set priorities.

Who buys… and who funds?

As the IoT develops and achieves a more sustainable track, dedicated investment will follow. Some large providers with deep pockets may choose a "go it alone" approach in developing a proof of concept. More likely, development funding will take on a relatively complex horizontal or partnership configuration. Some companies have chosen to invest in start-up companies that are focused on the development of IoT technologies.

Some developers of private sector IoT concepts are also inviting buyers to play a partnership role in the development of the concept through co-funding and other kinds of collaboration. Similarly, in public sector applications, we should see public-private funding arrangements. Put simply, although funding of the IoT infrastructure will take on many forms, there is little doubt that investment will build on successful implementation. The challenge here, tactically speaking, is that there exists a need in any IoT solution very early on in the lifecycle to develop and test a proof of concept – a stage in which companies may be more reticent to invest. Companies are struggling to figure out how to get to a viable product if they can't get proper funding to even test the design or configuration of a solution. While this is not necessarily a new challenge—in a vertically-integrated funding model at least—strategies, priorities, tolerances for investment and risk, etc. are relatively aligned. In a horizontal model, these can vary widely leading to increased hurdles in getting past the initial stages of a solution.

The larger question remains, however: Who exactly are the buyers of IoT? The answer largely depends on what a particular IoT concept is trying to achieve. Generally, the more disruptive and revenue-generating the concept, the more the decision to buy will derive from the C-Suite, especially the office of the CEO. In IoT applications that are more sustaining and focused on performance efficiencies, the buy decision will involve a larger number of players. IT may very well not hold the prime decision making authority in most instances. For IoT applications that focus on improving customer service performance, those in the corporate structure closest to the customer will likely play an important role in the purchase decision.

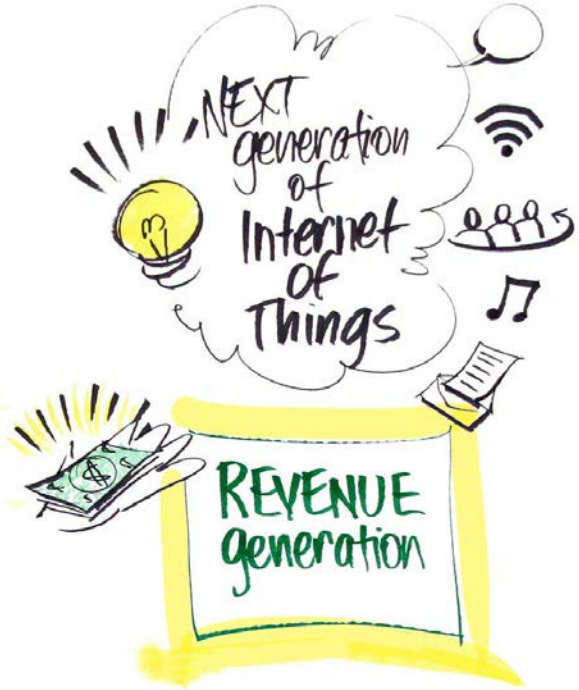


Who are the winners and losers? Does IoT really create wealth…or simply move it around?

The widespread adoption of IoT holds great promise on behalf of individuals, organizations, and society in general. But what is the net economic impact of IoT adoption? The answer to this question is less than clear. Certainly, early IoT adoption is expected to make organizations that adopt these technologies operate more efficiently and, by extension, more profitably. IoT should create demand for new kinds of sensors and other hardware as well as new software applications. Correspondingly, IoT should create new jobs across a relatively wide spectrum of skill categories.

On the other hand, there will be losers in a fully connected world. Companies that are slow to adopt IoT—or don't adopt it altogether—may become unable to compete. Some jobs will likely disappear because IoT renders them unnecessary. And, to make matters worse, some of these job losses may be obscured in what is otherwise an especially optimistic narrative. Specifically, the business case / ROI for most IoT solutions is based in operational efficiency and in many instances, the gains come from removing the human (or other) element from a process. To this end, it is reasonable to ask whether those who paint the long-term economic impact of IoT in terms of trillions of dollars in added value have fully taken into account a reduction in the need for some level of workforce. The answer to that question remains to be seen.

If this paints an ambiguous picture about the future economic impact of IoT, that's because the future economic impact is ambiguous. What seems relatively certain is that some organizations and individuals will benefit while others won't. To this end, some even view IoT as a zero sum gain. While there is more than likely to be a net-positive impact due to IoT, time will provide clarity as to the extent of this positive economic impact.



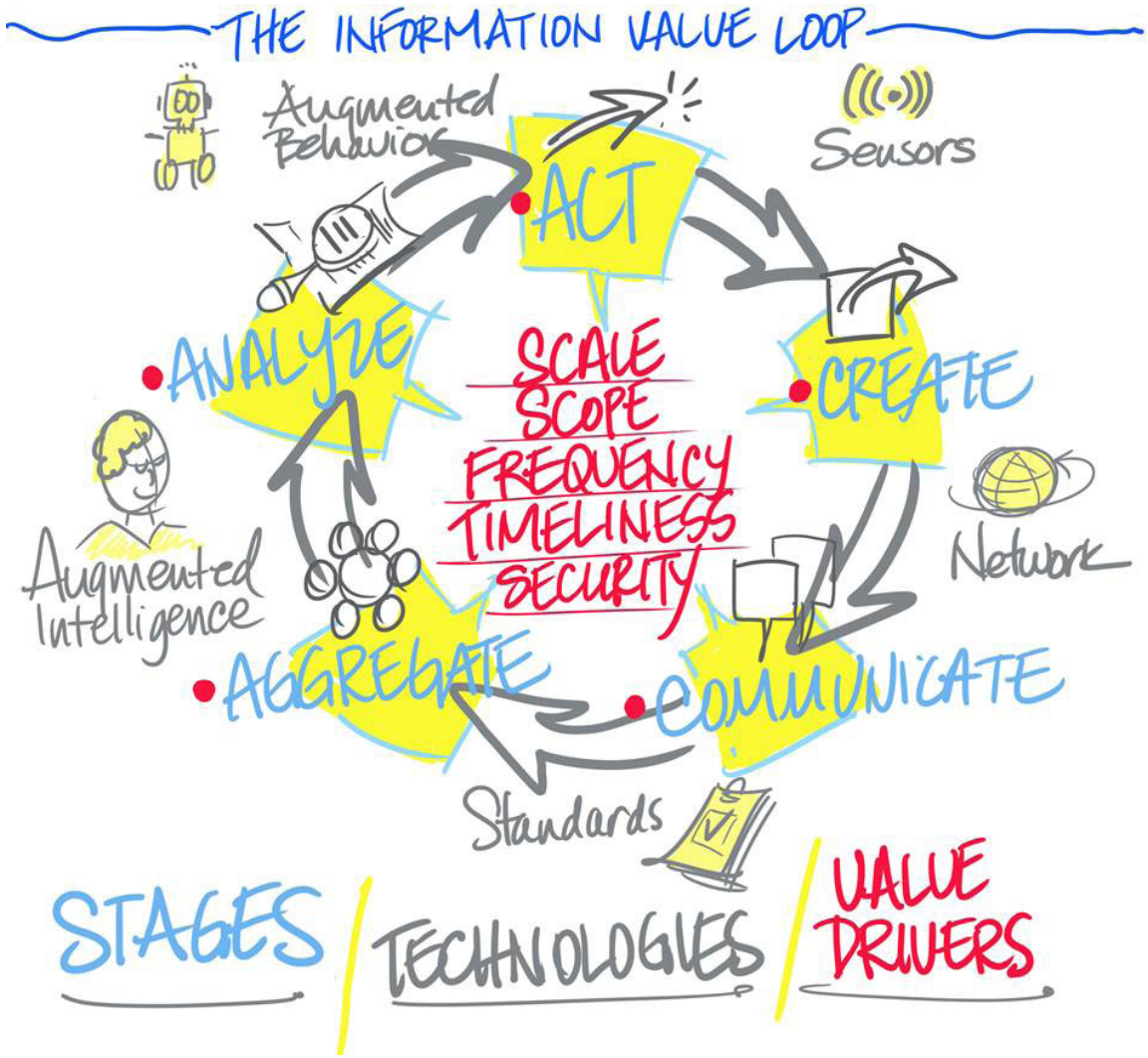
The keys to the kingdom: The IoT value chain consists of many players with specific roles. But do those who control the data collection and analysis own the keys to the kingdom?

From initial sensing to end application, the building blocks of the IoT are based on an interoperable network of enabling technologies and software platforms. Each building block plays a key role in what makes the IoT viable and drives any of several different kinds of value. But in a world of equals, are certain building blocks of the IoT network "more equal" than others?

Some have argued that the holy grail of the IoT value loop resides in the data and that those in the IoT ecosystem who aggregate and transform massive amounts of raw data into commercially useful intelligence capture the real value in the IoT environment. This notion holds that commercially useful data provide insights that drive action and ultimately represent the reason that the end user pursues a smart solution in the first place. Put another way, the end customer is more apt to pay for a more comprehensive treatment of raw data than for a better sensor.

Indeed, some even believe that as time passes, the gap in relative value captured by those who curate and analyze the data and the rest of the IoT ecosystem will only widen and that, on a long-term basis, players within the "non-data" part of the IoT ecosystem will need to develop some data analytics capabilities simply to differentiate themselves as something more than commodity providers.

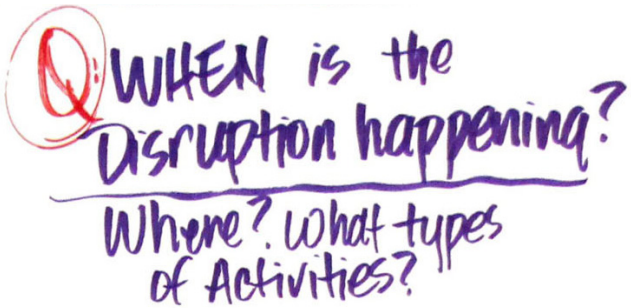
Of course, some think that the emphasis on data is overblown and argue that where the real value in the IoT ecosystem is captured depends on application. Time will tell of course. But there can be little doubt that the collection and enhancement of data is highly coveted, and analytics and the ability to make use of the vast quantities of information that is captured will serve as critical elements to virtually any IoT solution.



These discussions speak to the need to understand the impediments to the twin challenges of value creation and value capture.

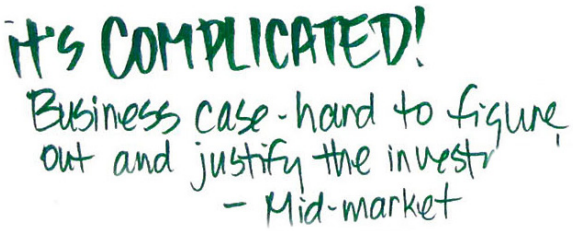
Revenue generation and innovation are where the future is, but they are difficult both from value creating and value capture perspectives

At first blush, the early IoT emphasis on sustaining innovation seems reasonable. Performance and cost improvement are seldom absent from the priorities of stakeholders; they are relatively easy to measure and their impact is likely more immediate than any investment that is truly disruptive. Put simply, the business case for an IoT application that focuses on operational efficiencies is relatively easy to make. Many decision makers are hard-wired to prefer the path of less resistance and, for many, truly innovative IoT applications seem too far-flung and abstract to risk pursuing.



Still, organizations cannot innovate from the cost side forever. Widespread IoT adoption will require focus on revenue generation and new business models that are truly disruptive. The autonomous vehicle is one example of a far-reaching IoT application that has the potential to be truly disruptive, in ways that are both intuitive (e.g., changing the way we drive, park, etc.), as well as others that are not quite as apparent. Take for example how people and products move in a local market – could autonomous driving not be used to replace taxi and car service models? What about delivery of food, groceries, or anything that comes from a local market? Boundless potential for new revenue streams may exist under such disruptive innovation.

A more immediate example of a new IoT revenue application may include the transformation of household products--such as washing machines and refrigerators—into a stream of subscription-based service outcomes. Many other examples also abound.



The larger point is that disruptive innovation is absolutely harder than sustaining innovation, but that is where multiples of return on investment are realized, and is where the hidden value of IoT really lies. Many also believe that it requires more vision and courage and that innovation that is truly disruptive may also be more expensive. None of this is new, of course. History is filled with examples in which technology is only gradually used in disruptive ways. History reveals that disruption on markets takes time. It also reveals that it is bound to happen.

Workshop Participants

Tom Galizia, Principal, U.S. Technology Strategy and Architecture Leader, Deloitte Consulting LLP

Dr. Richard Soley, Executive Director, Industrial Internet Consortium

John Seely Brown, Independent Co-Chairman, Deloitte LLP Center for the Edge; and
Peter Marx, Chief Innovation and Technology Officer, City of Los Angeles

"Because there is perceived risk associated with IoT adoption, executives should start by designing targeted deployments of the technology in strategic parts of the business so that quick and meaningful performance results can be generated with modest investment."

– John Hagel, Co-Chairman, Deloitte LLP Center for the Edge

Shawn DuBravac, Chief Economist and Senior Director of Research, Consumer Electronics Association


RENE SOTOLA
CEO
CHETAN CHA
JASPER WIRE
Snapple

Rene Sotola, Vice-President, Global Communications Sector, Mobility IoT, CGI

Francesco Tinto, Vice President and Chief Information Officer, Kraft Foods

"One of the major challenges that companies face when trying to solve for revenue generating IoT solutions is the fact these solutions often require disrupting the same business model that made them successful to date."

– Tom Galizia, Principal,
U.S. Technology Strategy and Architecture Leader, Deloitte Consulting LLP

Param Singh, Independent Advisor, City of San Francisco IoT/Smart City

"One of the challenges to creating revenue generating solutions is truly understanding and solving for unmet customer needs. Just because a device can be connected, doesn't mean it will necessarily offer value to the end-consumer."

– Craig Wigginton, Vice Chairman,
U.S. Telecommunications Sector Leader, Deloitte & Touche LLP

Tobin Richardson, President and Chief Executive Officer, ZigBee Alliance

"It's important to frame IoT adoption as a critical choice: either you disrupt or you will be disrupted. Framing IoT adoption in this way will motivate executives to take more risks and act with a sense of urgency as opposed to simply thinking about IoT as an optional opportunity."

– John Hagel, Co-Chairman, Deloitte LLP Center for the Edge

"One of the key attributes of successful revenue generating IoT use cases is C-suite adoption and sponsorship. Due to the fact that revenue generating IoT solutions are typically characterized by a higher level of risk and longer-term pay-off compared to asset efficiency and cost reduction use cases, they require buy-in from the top."

– Eric Openshaw, Vice Chairman and U.S. Technology, Media and Telecommunications Industry Leader, Deloitte LLP

John Hagel, Co-Chairman, Deloitte LLP Center for the Edge

Chetan Chaudhary, Senior Director of World Wide Sales Strategy and Alliances, Jasper Wireless

Mark Sherman, Managing Director,
Telstra Ventures

Craig Wigginton, Vice Chairman,
U.S. Telecommunications Sector Leader, Deloitte & Touche LLP

Ken Durand, Vice President, Innovation & Business Development,
Connected Car / M2M, Ericsson

"IoT technologies create an environment where the near-term future becomes more predictable than it has been in the past, reducing uncertainty and surprise in our lives."

– Phil Wilson, Director, Telecommunications Strategy and Operations, Deloitte Consulting LLP


The Tech
Museum of Innovation
BOB NOYCE

Bruce Oberlies, Senior Director Advanced Technology Realization, Motorola Solutions

Dan Feldman, Director, Smart Cities, Verizon

Phil Wilson, Director, Telecommunications Strategy and Operations, Deloitte Consulting LLP; and **Eric Openshaw**

Garry Wiseman, VP Product Management, Salesforce


PETER MAGN
PARAM SIN

Peter Hoddie, VP, IoT/Kinoma, Marvell; and **Param Singh**

Lathe Carlson, VP of Exhibits, Tech Museum of Innovation; and **Param Singh**

"The disruptive potential of IoT resides in its ability to turn businesses inside-out, transform products into services, transform services into learning architectures and make us completely rethink what the organization of the future may look like."

– John Seely Brown, Independent Co-Chairman,
Deloitte LLP Center for the Edge

Lesley Evers, Graphic Recorder

Laura Hall, Deloitte Greenhouse

Graphic Recordings

The following pages contain the output of a graphic recording artist who attended the two-day workshop and captured discussions in real-time.

Thank You for JOINING US!

Continuation of Round 1

Trends & Opportunity in the Internet of Things.

NEXT generation of Internet of Things

Where is the MONEY?

How to get it?

REVENUE generation

please SHARE IOT Revenue generation case

* Confidential
* No Attribution

SESSION ONE

Q: What strategies are driven by IoT — replacing people w/capital investment

increase utilization of existing assets.

TREND

Service → manufacturer
→ user

Proliferation of DATA — getting to information that wasn't there before!

Heartbeat Data
Streaming Data

New Analytics

Connected

TRAFFIC - Revenue opportunities are HUGE!

- efficiencies.

IoT - collecting data
- ACTIONS

Q: WHEN is the Disruption happening?

Where? What types of Activities?

Increased Convenience
Increased Security

Which industries will NOT be affected by IOT

CITIES — U.S. cities are under pressure

*officers will have video camera!

Agriculture/ Food Supply — When to Water? — When to apply pesticide?

EFFICIENCY!

Credit the yields...

Security VS privacy

LAPD - "predictive policing" = police visibility to deter people.

Smart Cities - just tell me where to look... to work...

Lack of doctors and nurses -

utilizing the technology you give up privacy.

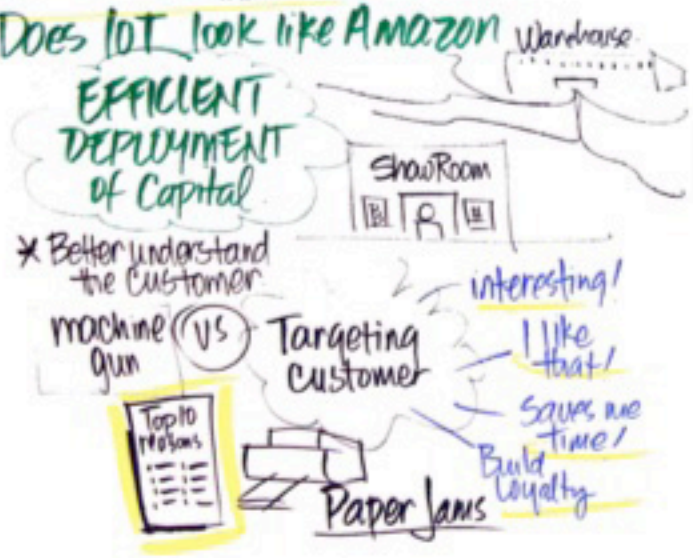
- It's still Nascent Pay as you go.
- Over reach of IT departments.

Product Sale → Product Rental

Product Sale < Ancillary Services *Subscriptions enable through IoT.

KEY FACTORS to look for where IoT would be a success?

- Increased efficiency
- Visibility to Customer
- User Acceptance
- Breakthroughs - Consumer space in younger people
- Industrial - Leapfrog!
- Suboptimization → New players
- Investors - individually must see ROI - though we talk as a whole
  - * there will be Big LOSERS
  - * unintended consequences ...
- CLOUD = people losing jobs
- Does IoT look like Amazon



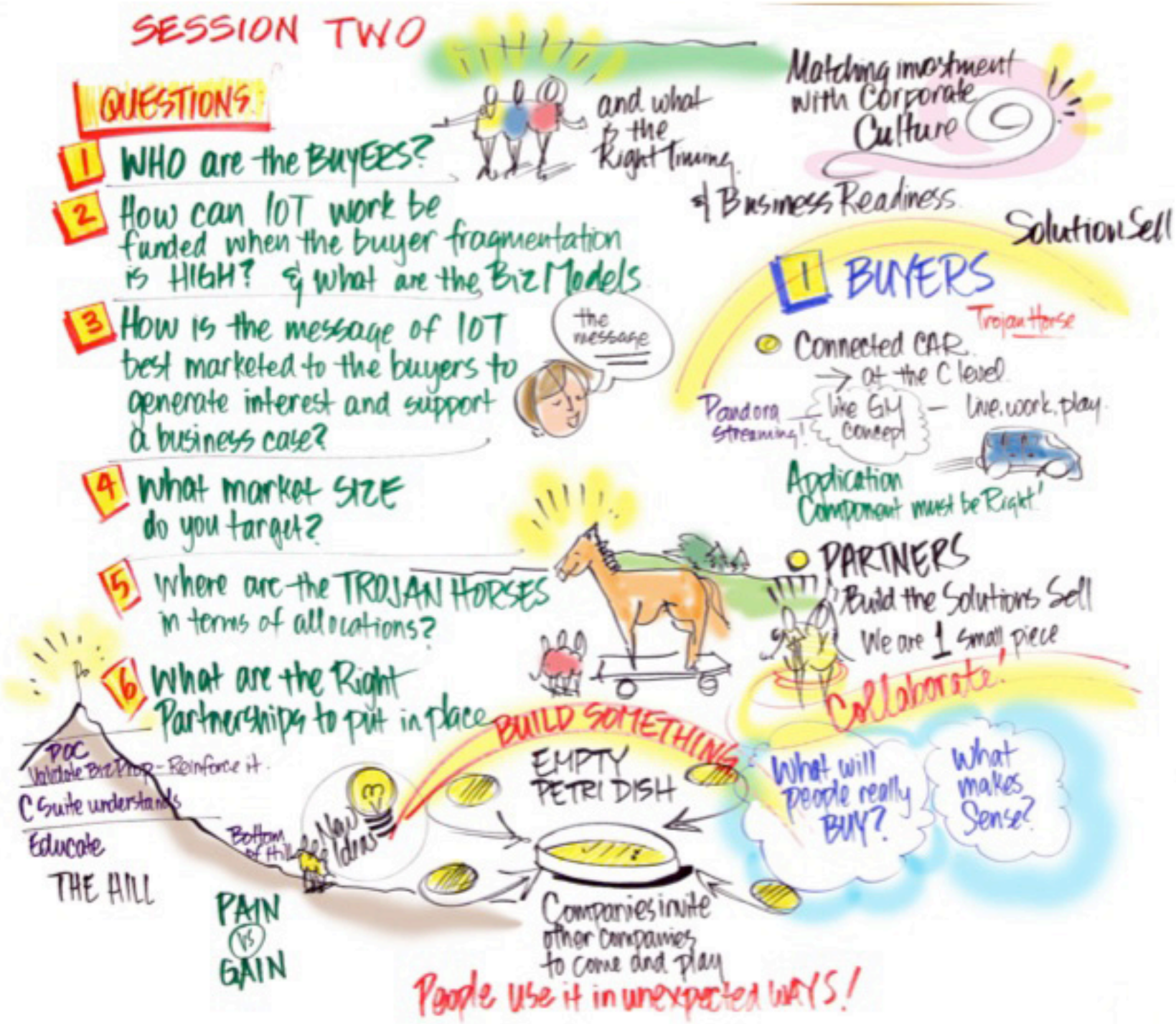
- IoT - thinking as a sustaining technology → sustain our Business Model

Businesses look at
- Efficiency
- Cost Reduction

- Disruptive Services - specific vertical

Q: where's the Balance
1
2
3

Self driven cars ... Autonomous cars
Connected Vehicles ... vehicles propogate
→ Empowers Self Selection
Car will have New Uses.


SESSION TWO
QUESTIONS
1 WHO are the BUYERS?
and what is the Right Timing
Matching investment with Corporate Culture
& Business Readiness
2 How can IOT work be funded when the buyer fragmentation is HIGH? & what are the Biz Models
Solution Sell
1 BUYERS
Trojan Horse
Connected CAR
→ at the C level
Pandora streaming!
like GM concept
Live, work, play
Application Component must be Right!
3 How is the message of IOT best marketed to the buyers to generate interest and support a business case?
the message
4 What market SIZE do you target?
5 Where are the TROJAN HORSES in terms of allocations?
PARTNERS
Build the Solutions Sell
We are 1 small piece
Collaborate!
6 What are the Right Partnerships to put in place
BUILD SOMETHING
EMPTY PETRI DISH
What will people really BUY?
What makes Sense?
POC
Validate Biz Prop - Reinforce it.
C Suite understands
Educate
THE HILL
Bottom of Hill
New Ideas
PAIN
GAIN
Companies invite other companies to come and play
People use it in unexpected WAYS!

- create Imperative
  - → WSJ
  - → Competitor announcement
- Buyer - is it
- TOP DOWN C-Suite 80% ? ← or reverse? ← 20% ?
  or Department Horizontal ?
- HBR proves its TOP DOWN
- Cost Saving customer rather than innovative customer
- Bang for Buck = DISRUPTION!
  - ☆ Ability to Predict Short term Future!
  - Can I out-perform my Competitors?
- IT'S COMPLICATED!
  - Business case - hard to figure out and justify the investment
  - - Mid-market
  - *Benefit easier to sell than efficiency
- How to measure? ROI
- Pain (VS) Gain must be Closed Sale
  - *Higher Risk
  - *leading edge metrics

Innovation in Consumer space

- ☆ Convenience
- ☆ Control

Better in Consumer market → move to enterprise market

look at UTILITY ↔ Partnership? NEST disrupted this Model

10 years to deploy — Meter — Thermostat

Smart energy Home - Smart Home

WHAT are you trying to Solve for WHO?

Betting on 1 HOME

The Network always wins

The Technologies Flair up?

Short fm

Consumers - No ability to manage their DATA!

We can SEE it but not manage it

MICRO (VS) MACRO

- Cost savings
- market share

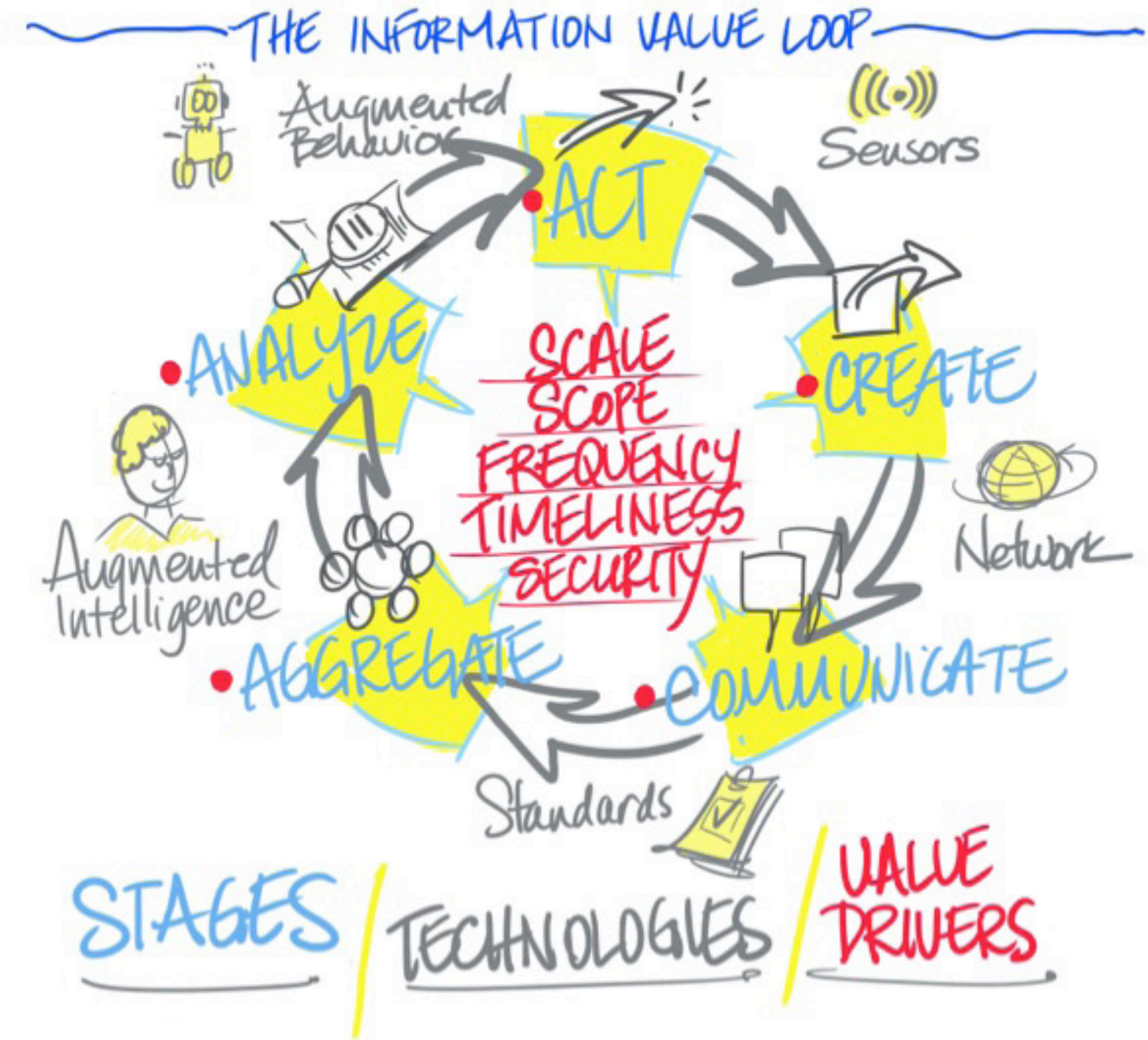
improve cost structure

- ONE SIDED
  - → sell service
  - → Collect data
  - → Consumer gets better service

FAIR TRADE?


Deliver House Key!
Digital Platform for driverless vehicles.
* will probably look like UBER.
these departments weren't Buying:
• Facilities
• Operations
ENLIGHTEN!
Building lighting Automation.
Reduce usage by 40% in LA.
250,000 street lights.
LED.
Charging Station.
Access point
Cellular provider
APP - reporting street light outage
Light changes based on NEED
Connectivity
Enterprise example of IOT.
Driven by efficiency
FUNDING
Federal Grant
Los Angeles
San Francisco
San Jose
Partners
License Dollars
Co-Selling
Put joint Funds together - set up the Value chain.
POC
CITY INFRASTRUCTURE
At Enterprise - the MASHUP!
Companies that do really well leverage other companies leveraging your return.
CONSUMER Applications.
COIN-OP in my HOUSE!
the washing machine
give away Device for free!
LENS
$600 - Big Deal! Do I have to replace the Operator?
the one time cost is nothing - it's the BEST
C-Level Strategy
OR
Bottom Up
People leaving - Aging Workforce
- are they the EXPERTS?
→ EXPLOIT Assets of Others.
Hard to measure ROI.
Role of Standards
* Spectrum of Standards Organization
NEED POC
Focus on what's implication
Understand IPR implications
Make sure you have the weight of the industry/org behind you
Critical Mass
- manufacturing
- organization
- end-users
THANK YOU!


GOOD MORNING!
Thank You for Sharing
RECAP
where we are going
No one had difficulty coming up with USE CASES for IoT.
SPEED of ADOPTION
open things up!
Open up My Data.
Consumers will LEAD
How can enterprises put together POC?
How much inertia do we need?
How to Assess PRIORITY
and connect to Biz Model?
1.=
2.=
3.=
The Details -
- Unlock the Value
- How to shape Biz Models.
How do companies behave outside the algorithm?
Do we need to consider ETHICS?
THE CITY
provides all the layers
the TAKE AWAYS
ECOSYSTEM
Security/getting hacked
Networks deployed
Reducing Complexity
Barriers of Entry
NYT: Copenhagen
Bike lanes & Street lights
Cities - collections of things.
IoT: CONTEXT AWARE
Partnerships
Very dynamic nature.
CAP x VS OPX
CONSUMER - easier to get & generates Revenue.
Consistent VALUE of IoT
* Risk Profile Initiative
Cost of Ownership
Network Sensors
Revenue, Biz Case
Today - Hoping for Concrete USE cases
to help w/endeavors
Opportunity for ALLIANCES
~ spreading the Risk
STANDARDS
Huge Opportunity in the IoT space
USE CASES & END goal
SUBSCRIPTION
interesting to think about
PREDICTIVE
Component - short term
Consider the Cost Involved.
Building IoT VS Consuming IOT
Keep the Buyer in Mind
Increasing Portals of Data & Data Analytics & Insights
3rd Party to do Insights?


THE INFORMATION VALUE LOOP
Augmented Behavior
Sensors
ACT
ANALYZE
CREATE
SCALE
SCOPE
FREQUENCY
TIMELINESS
SECURITY
Network
Augmented Intelligence
AGGREGATE
COMMUNICATE
Standards
STAGES
TECHNOLOGIES
VALUE DRIVERS

PUBLIC SECTOR

Priorities

- → livable — Better life, longer life
- → managable
- → Cost
- → Safety — Vision Zero Project

*Inter-operability is KEY and daily Data Sets

Revenue? OR Social Value?

CONSTRAINTS in CITIES

- Transportation – Basic infrastructure
- Parking - Rev. generator

- Lighting (Buildings)
- Sanitation/garbage Recycling
- Public Safety
- Port Service
- Aging/Disability Public Services
- Health Care
- Welfare
- Airport – mapping – drive people to certain places.
- Air Quality
- Labor

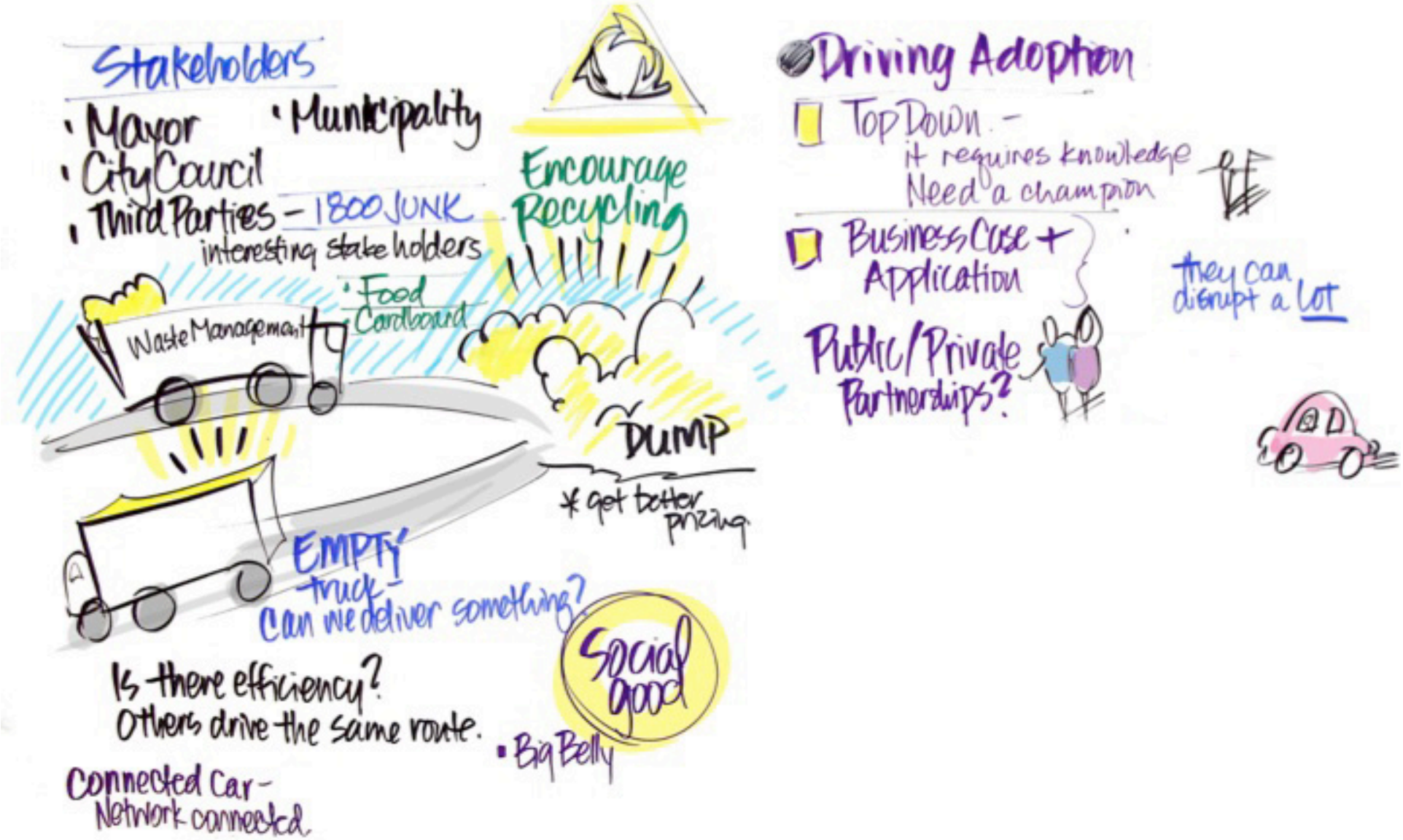
How Can IOT influence?

How to Balance USE CASES?

Trade Offs


CONSUMER
What Retail looks like...
Preferences -
How does IOT fit in?
What Parts get automated?
Self Selection Shopping
vs
Automated Shopping
STORE
Store does Not exist
Evolution of Services
IOT to enhance CHOICE!
Consumer is in CONTROL
CHOICES!
FOOD
Guided experience in the kitchen.
How to understand WHAT they want?
Make them better customers - give them what they need
migrate them!
Shopping for Food
Preparing Food
accomplishment
Better Customer
Life experience
MAKER movement


ENTERPRISE
ROI
Cost efficiency
Reduction of errors
Net New Revenue
Selling to Enterprise Customer
1. Maintenance
2. Customer Service - Proactive
3. Sales and Marketing.
Take to RIGHT BUYER!
Waste Management
Offering - Early Pick Up?
Calling Customer When truck is late
Measure Hydrolics
TRASH MAN
Sales Consultant!
I know your trash.
I know your purchasing habits
$
incremental investment
Savings down the Road.
Environmental?
Decrease Waste
Increase Recycling.
Automatic Subscription
Printer Ink...


Stakeholders
• Mayor
• Municipality
• City Council
• Third Parties – 1800 JUNK
interesting stake holders
• Food
• Cardboard
Encourage Recycling
Waste Management
DUMP
* get better pricing
EMPTY truck –
Can we deliver something?
Is there efficiency?
Others drive the same route.
Social good
• Big Belly
Connected Car –
Network connected
Driving Adoption
Top Down –
it requires knowledge
Need a champion
Business Case + Application
They can disrupt a LOT
Public/Private Partnerships?


CLOSING REMARKS
Thank you for being here!
Drive Revenue - Challenge I appreciated the discussion.
We looked at the HEART of the matter!
Complexity of WHAT We've talked about! the pieces snap together!
I like that it was tangible! Last time it was higher level. More granular - good.
We have to Collect the Data leap of faith. - within City
Boston was Aspirational this has been Pragmatic. We have a long way to go.
I appreciate the Focus on REVENUE the Value is tremendous. Lots of Room for Disruption.
New Products and Service - Key is to understand the economics
This felt like a Support group - you helped me to pitch it, frame it
IOT
Cost savings
efficiency
lots of Complexity - you have to knit together so much.
get in the Door!
Revenue
Next time include Legal Regulatory Point of View
Merging the 2 would be Powerful.
Scenarios
Workshop Environment
What are the DISRUPTORS?
Radical Innovation!
Thank You!
to Eric - your brainchild.
to Elina and supporting cast.
Let's Continue to EXPAND the group!

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