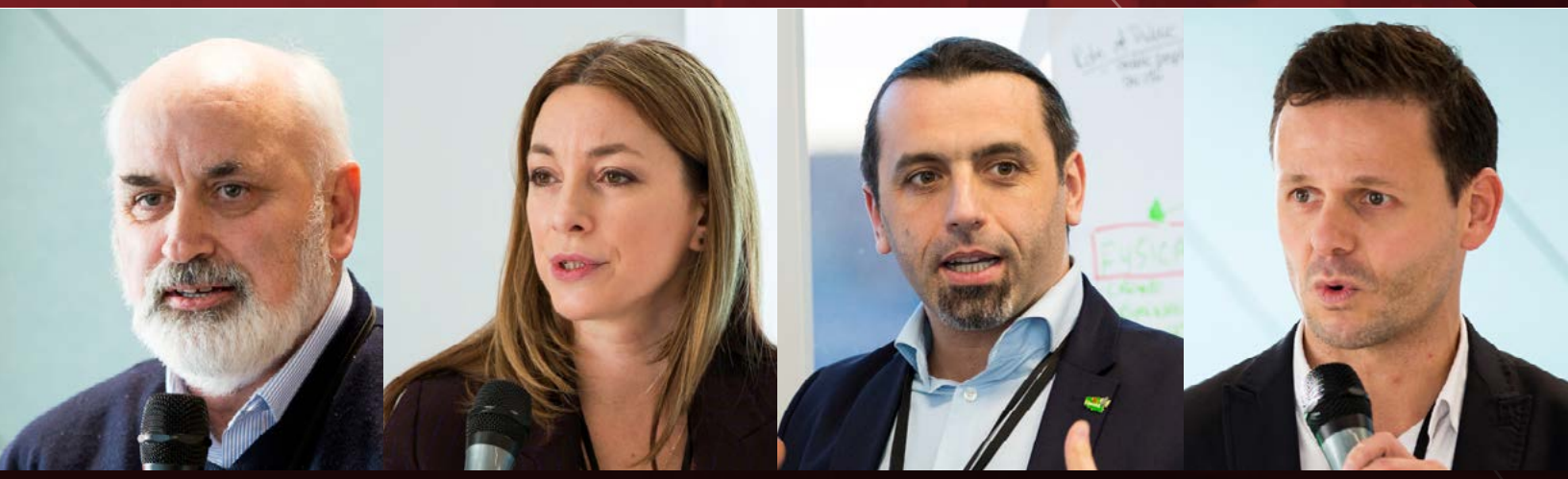
Smart Cities Innovation Accelerator San Diego, CA

April 18–20, 2018



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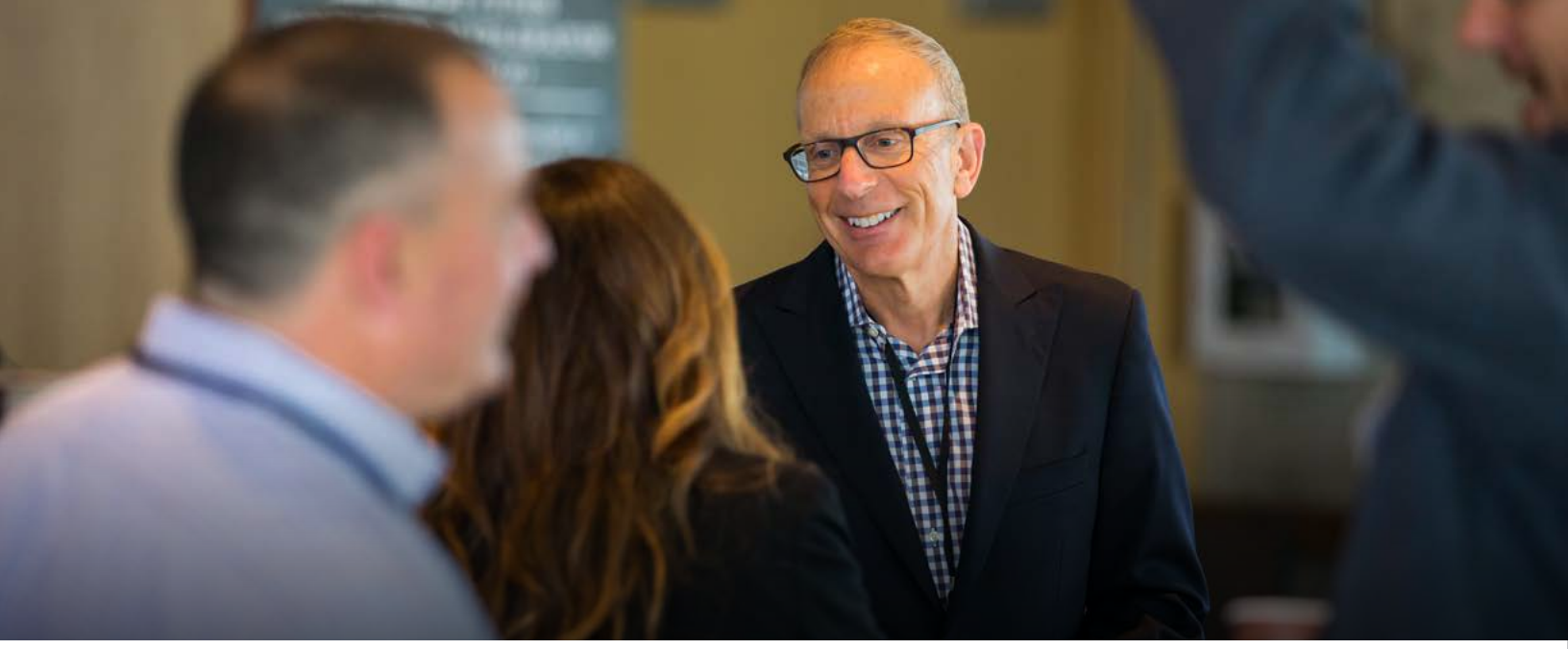

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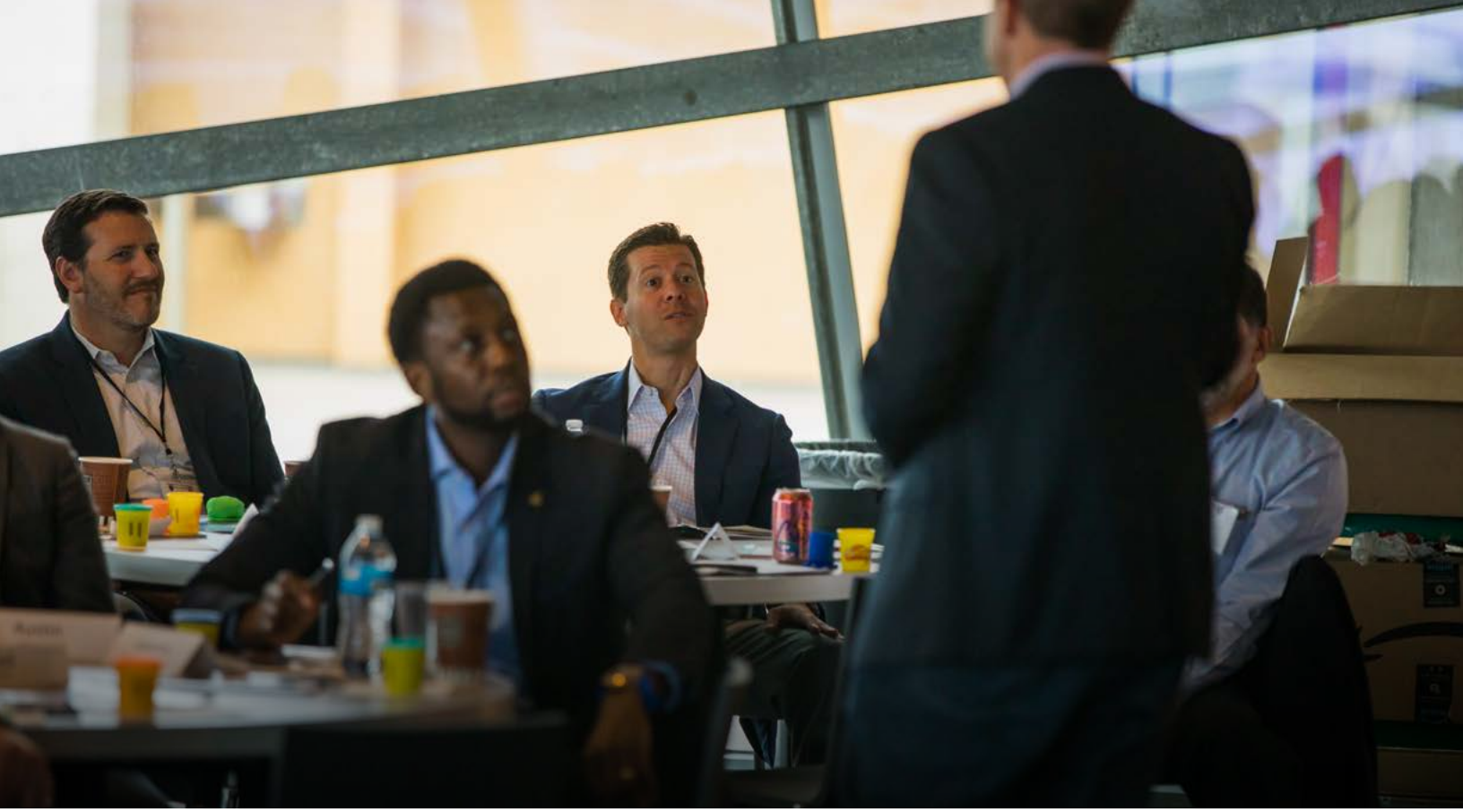


Data: What Is Important Now and What Should We Be Doing?

In the panel session 'Data: What Is Important Now and What Should We Be Doing?' representatives from Chicago, Portland, Austin and Xaqt spoke about how they are working around challenges related to the influx of data collected by smart city technology. This review of the main themes is meant to help other cities gain an understanding of what to expect as they begin to gather and organize data from smart city projects.

Resizing and Reprioritizing

The amount of data gathered from smart city ventures will often force a reevaluation of IT expenditures. Instead of spending excessively on big enterprise solutions that do not add the premium value they once did, cities may begin to move to open source technologies that have lower costs and provide more value to city departments and constituents. Spending more money on hiring high-quality individuals who can do custom coding may also be prioritized over software spending.

Increasing Data Privacy Defenses

The collection of data opens up the possibility that individuals' rights to privacy may be violated. For example, health-related and crime-related data, such as EMS visit data, often includes address information. In order to use the data safely, cities must find ways to defend anonymity. In this example, cities may transform addresses into latitude and longitude coordinates that are randomized a little to the left or to the right so the location data in the data set is no longer the actual address. This is one example that shows how governments must be thoughtful about individual privacy when handling and releasing city data.

Data Sharing

In order to get the maximum return on data coming into the city, governments must also work on improving data sharing among departments. This is the proverbial 'breaking down of silos,' but it must be handled in a useful and systematic way. Government officials must think about how to link data, bringing in data from different systems about different topics in order to get a 360-degree picture of the problems within the city.

Partnership with Research Institutions

Cities have opportunities to form great partnerships that are based around the data they have collected. They should look to collaborate with universities by making data available so that researchers and professors can research and help solve problems in the community.

Shared Solutions

Cities are looking to solve very similar problems with technology. Given the overlap, cities should work together to define what are the standards for data, and share insights and solutions in order to create common knowledge across cities.

Operationalizing Data

Cities must also think about how they will use the data in a practical sense—what sort of decisions the data can help them make and how it can be used to solve problems within the city. The question is, 'If I could tell you tomorrow everything you need to know so you could predict certain events happening, what would you actually do differently?' In some cases, you may find that the predictions can't actually cause a change in response, in which case, why try to predict it at all? For example, data may help a city predict a pothole, but the city would still just have to wait for the pothole to form and then fill it. In this case, the prediction itself was invaluable because it was unable to alter the course of events or improve the city actions.

Balancing System and Individual Optimizations

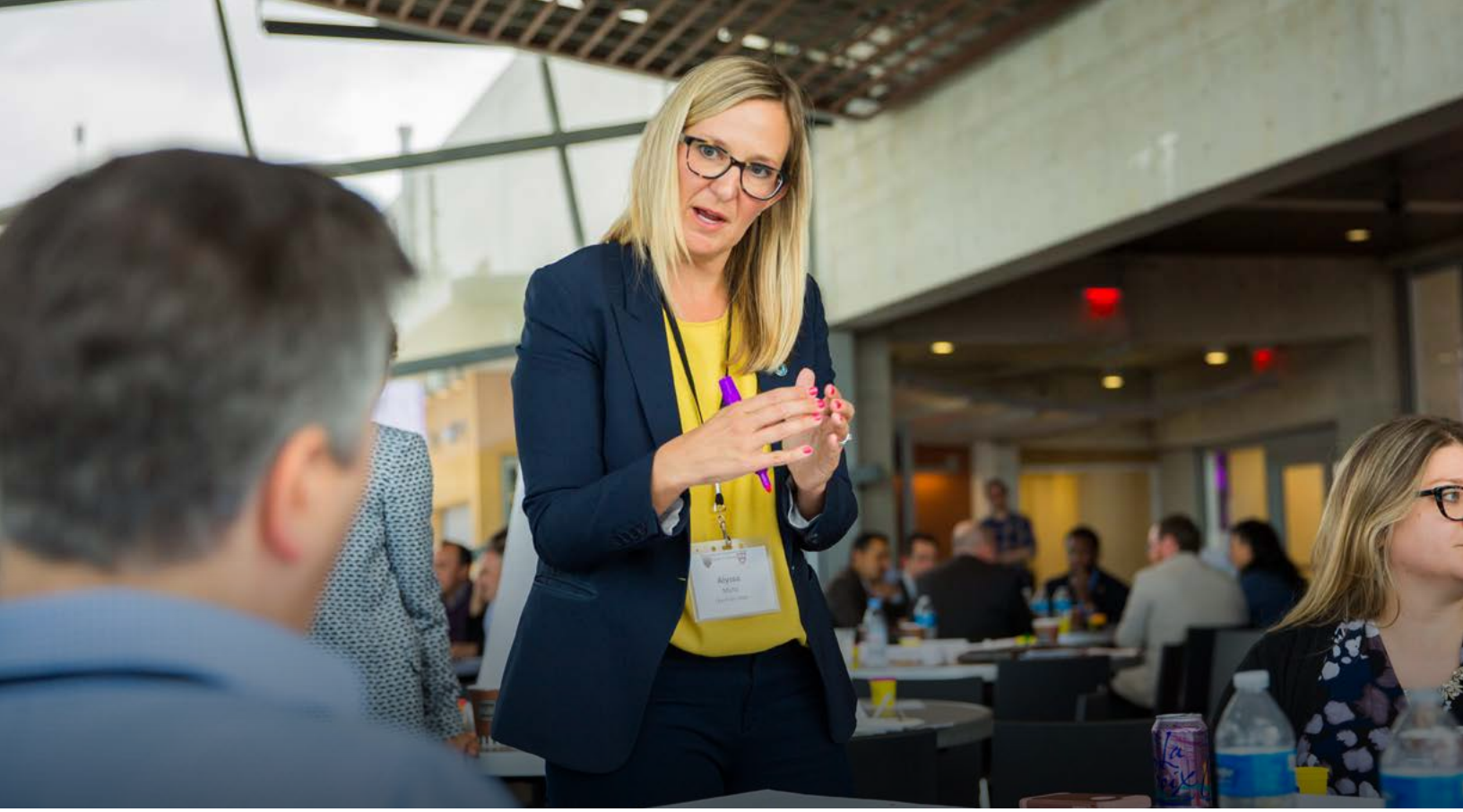
When city data is used to solve problems, cities also must be mindful of whether the data is used to optimize the individual, the system, or both. For example, if automated vehicles are optimized for the individual (to provide the safest and quickest routes), then the city could experience a form of 'automated congestion' because solutions were optimized for individuals and never optimized for safety or energy efficiency of the system. Cities have to be careful about what they are optimizing for, and run experiments to figure out the right balance.

Monetizing the Data

While some view city data as free because it belongs to the citizens and they have already 'paid' for by way of taxes, cities may also want to contemplate if there are ways to monetize data. One city is exploring a way to charge for access to a cloud mirror of the open data portal, where individuals will pay because there is value added to the data in the way of performance SLAs. Another city representative suggested the option to pay for access time (for those who want the data right away or in high volume). Representatives from other cities questioned whether monetizing the data would work at all—perhaps people would be unwilling to pay for it, and even if they do, the financial and administrative costs to maintain it may mean it is more of a burden than a benefit.

While these are all important things for cities to consider when gathering, organizing and sharing city data, the panel ended with perhaps the biggest issue of all—the question of liability. The Accelerator was ironically held just after Facebook founder Mark Zuckerberg was ordered to testify to Congress about how Facebook account data was used and whether that usage was appropriate. At the Accelerator, city representatives pointed out that governments and CIOs could eventually face the same thing if the data is not handled appropriately.

With open data, you don't know who is asking for the data and if they want to use it in nefarious ways. There is a fair amount of vulnerability as we drive toward transparency and openness with city data, and foresight is needed to avoid nightmare scenarios, such as releasing data sets that, when combined, may be used to identify individuals and violate privacy. In dealing with these issues, cities can look at what companies like Facebook are doing to reduce risk, but they also must create a new governance model that includes an emphasis on data security and integrity.



The Smart City Playbook: Deep Dive into Traffic/ Lighting Solutions

There is no single path to exploring and deploying smart city technology. In the panel 'The Smart City Playbook: Deep Dive into Traffic/Lighting Solutions' we heard from representatives from Pittsburghh, San Diego and Portland about the process each city used to get their smart street light programs off the ground. Their answers highlight three different routes that cities may take with their smart city projects.

Pittsburghh: RFP/RFI Process

Street light replacement first became a topic in the city of Pittsburghh in 2014 when a new mayor was elected. The first RFP for street light replacement went out in 2015, and although it had general standards for lighting (with the aim of replacing bulbs with LED lights), there were no references to connectivity or any other smart city applications. As proposals came in, the city was overwhelmed by the level of complexity in the marketplace and not prepared for the solutions available. Although the RFP was awarded to Siemens for their Any Com device (which, in addition to street lighting, included a camera, microphone, speakers, air quality sensors, gunshot detectors, and graffiti detectors), the city eventually abandoned the project because they realized they were not prepared to implement such a large-scale initiative.

The city did continue to explore smart cities applications though, and in 2016, Pittsburgh was a finalist in the smart cities competition with the Department of Transportation. Having learned a lot about the marketplace, they put together an RFI in 2017 requesting information about work done by other cities like Boston and Atlanta—a broad solicitation for co-creation of a smart cities marketplace. Although responses were underwhelming, the processes pushed them to create a very specific

RFP with a defined understanding of what the city was looking to do: (1) replace all luminaries with LED for energy savings, and (2) conceptualize how the city could best invest in connectivity infrastructure for both street lights and other IoT devices used in different contexts.

The RFP is currently closed. Better communication via a detailed RFP helped the city gather quite a few promising proposals. After shortlisting responses, the first round of interviews with finalists was planned for later in 2018.

San Diego – Vendor Partnership

San Diego's path to smart street lighting can be viewed as more of a partnership between the city and one specific vendor. A pilot announcement was made in the press and GE went through two rounds of city council votes and an extensive chief procurement officer review, but eventually, the company was selected, and a strong partnership was formed.

The process of running a pilot with GE helped San Diego understand exactly what they wanted and needed from a smart street light solution. The pilot started with 40 sensor-connected boxes in the corner of downtown. In addition to saving energy and money by using LED bulbs, sensors on the boxes allow the city to monitor parking and parking availability. In the process of working with GE to adjust the hardware and software during the pilot, they were able to pinpoint exactly what sort of technology they wanted to deploy on a larger scale – the type of granularity of the meter, the type of sensors, the type of LEDs, etc.

San Diego used GE Capital for financing, putting $30 million into the project for a 10-13 year payback with the smart street lights. The pilot required teamwork from many departments at the top level of city government. In an effort to break down silos, everyone was invited to the table to sit down and say "What could this look like? What do we want?" By choosing a single vendor and pressing that vendor to create the exact solution they were looking for, San Diego was able to streamline the process and get exactly what the city needed in its smart street light technology.

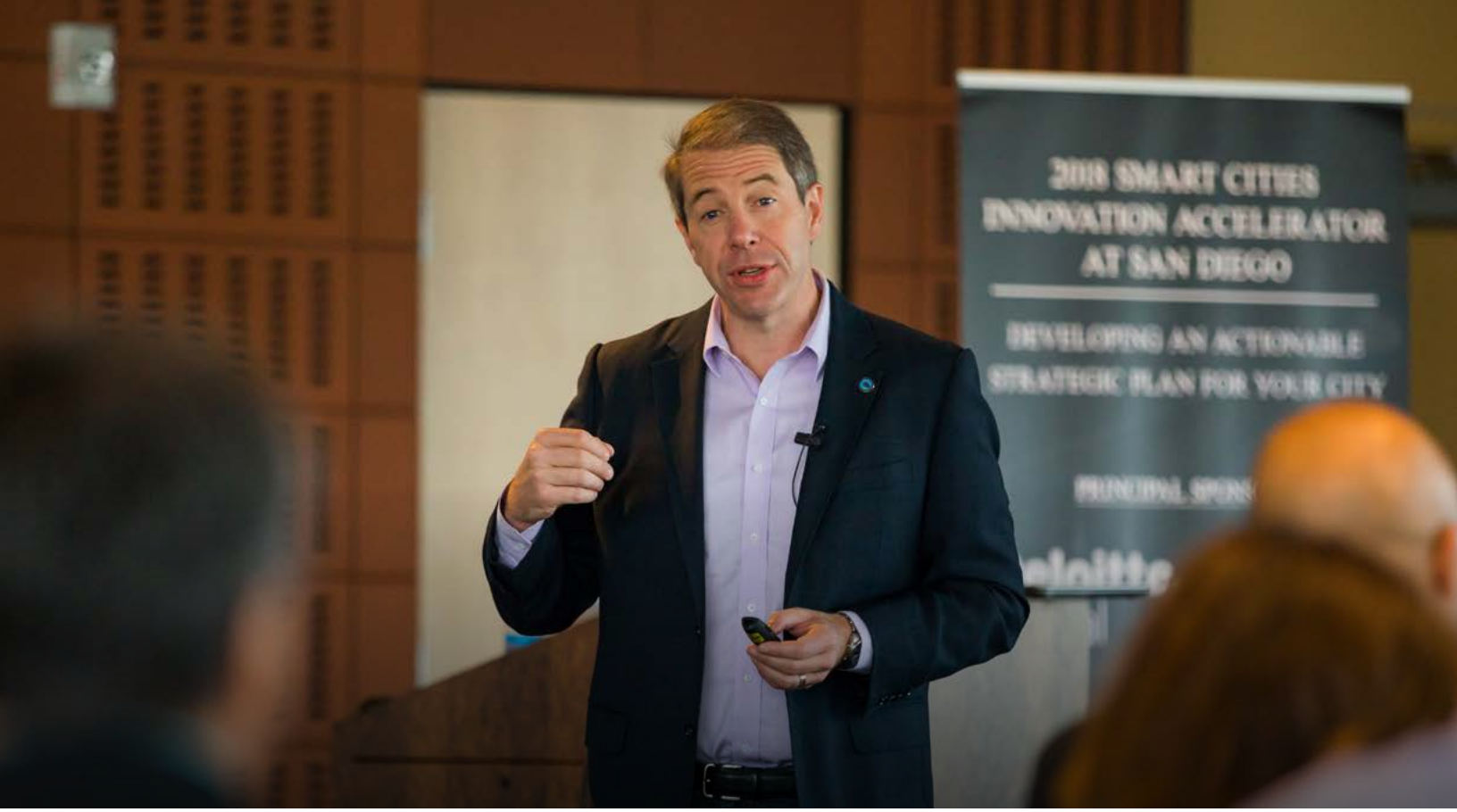
Portland – Technology First

Although city leaders in Portland admit that this is not necessarily the best way to start a smart city project, the situation they found themselves in was such that the technology was already selected and it became a matter of "Now what?" AT&T had approached the former mayor with a specific smart street light product (in fact, the same technology as GE, but lead by AT&T). Although that mayor didn't have signature authority, a letter of intent was eventually signed for Portland to use the technology. When a new mayor stepped into the job, the smart street light project was picked up formally, with proper signature authority and a planned pilot.

The experience led the city to begin thinking about a new system for procurement. What will innovation look like in the city? What does the city need for the future? How can innovation be explored without having technology lead the conversation? In 2017, systems were put in place at the governmental level, with the organization of a smart cities committee consisting of 12 bureaus, 5 city counselors, and the mayor.

The 18-month pilot will begin in 2018 as the city will test not only LED lighting but also parking sensors, traffic sensors, and pedestrian sensors. Discussions among smart city committee members and AT&T include conversations about how the technology could be expanded and improved. Can it be used to identify wheelchairs? What about vehicle types (motorcycles, cars, trucks, etc.)? Since the technology suddenly appeared on Portland's doorstep, the city is asking itself how it can build upon that technology to meet the wants and needs of the city and its residents.

Although there are several paths to exploring and implementing smart city technology, there is not one 'right' way, and each has its own strengths and challenges. Participants of the Smart City Playbook panel stress that whichever path you choose, be prepared to learn a lot along the way because, in the process, you will gather plenty of lessons that you can apply to similar smart city projects in the future.



Top 5 Wins for All Smart Cities

There are a few smart city projects out there that offer clear wins for any city. In this panel we heard suggestions from representatives of four cities, ranging in population from 45,000 to 1.2 million. If your city is looking to successfully dive into smart city projects, consider starting in one of these areas.

Develop a Robust Communication System

The city communication system is the foundation of a lot of other technologies that will enable smart city projects. Setting up a fiber optic or Wi-Fi system that is reliable, scalable, redundant and resilient will give a solid start to all future smart city initiatives and allow for better communication across the city government.

LED Streetlights

Many cities are talking about installing smart, connected streetlights, but it can be even simpler than that. Just replace outdated bulbs with new LEDs for a savings of 50 percent off the electric bill. Even a small city like Opelika, Alabama racks up an electric bill for streetlights of $1.1 million a year, so this is a great way to save a huge amount of money.

Parking Measurement

Parking is a problem in many cities, and with parking sensors, a city can get a better understanding of the current reality and possible solutions. For example, parking sensors can capture data about handicap spots to help predict how many handicap spots are needed for new buildings, and sensors combined with apps can be used to monitor parking availability in real time or to send notifications to alert people that their parking meter is about to expire.

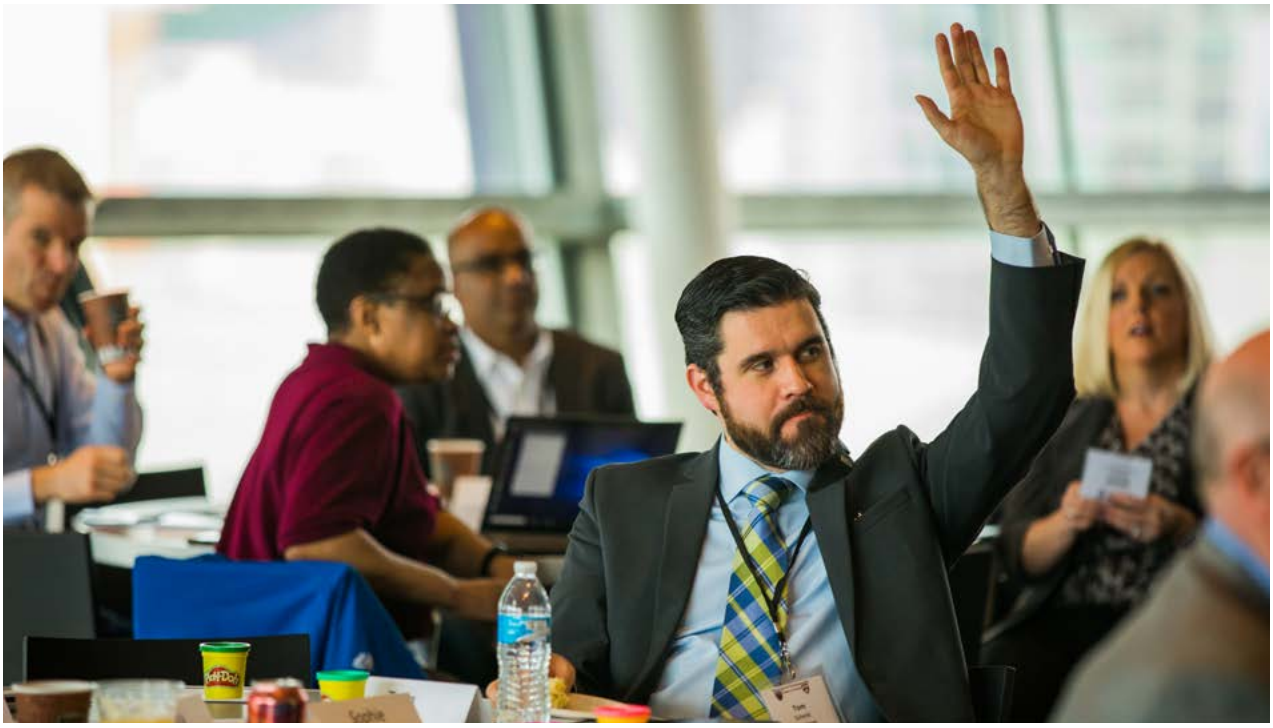
Optimize Public Transportation

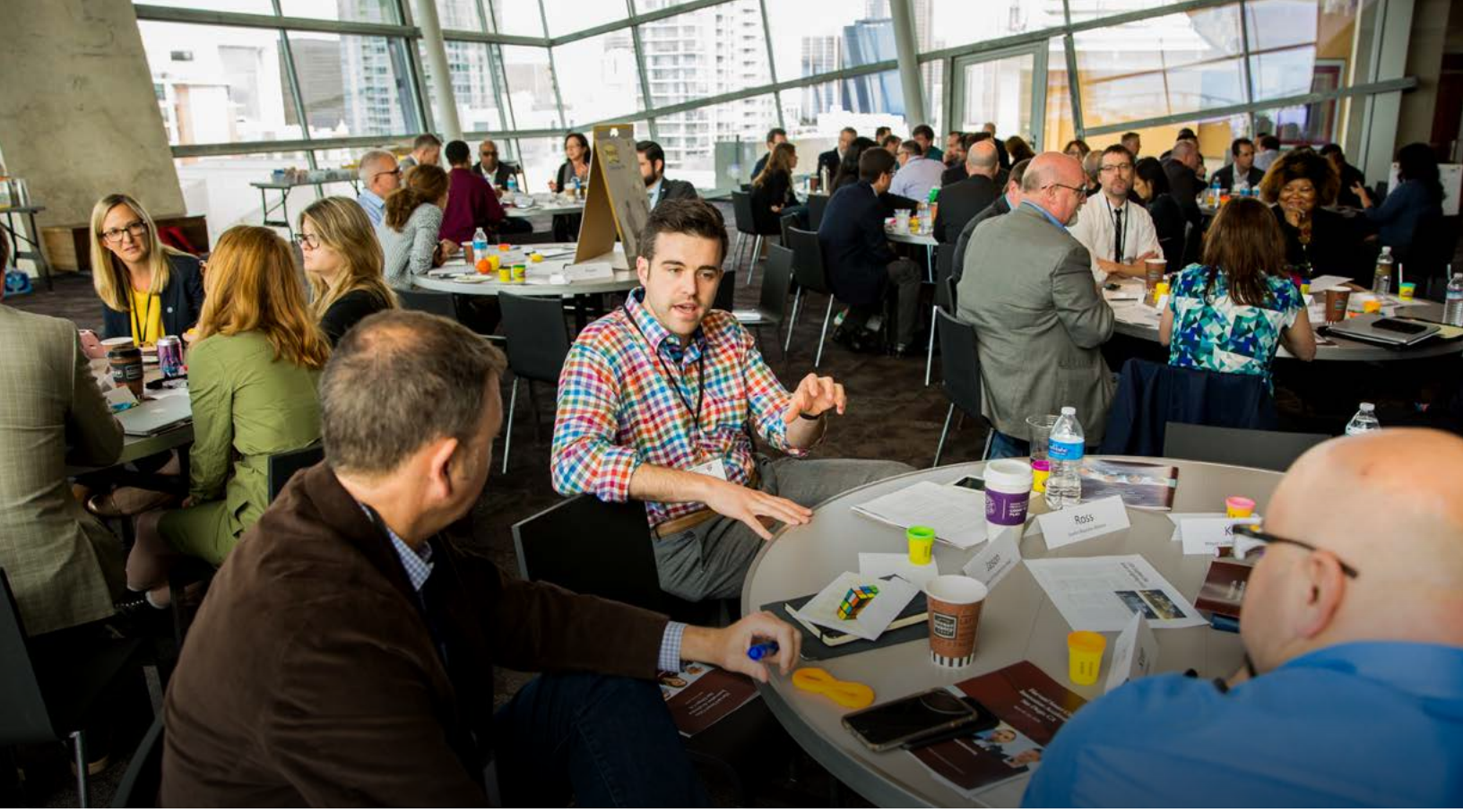
Transportation is one of the biggest concerns for city residents. Optimizing public transportation can make it more cost and energy efficient, and creating apps or offering free Wi-Fi can give citizens a better user experience.

Waste Management

Sensors that monitor waste receptacles in real time can make waste pickup more efficient. Data from the sensors can be used to optimize routes which means fuel and labor savings for the city. Several cities have found success by setting up smart waste bin programs.

Before getting started with any of the above projects, it is advised that all cities should create a Smart City Vision. This document should be co-created by the mayor, city council, and other stakeholders in government and the larger community. The Smart City Vision will help identify city priorities, so it is easier to select the right smart city projects that will help reach city goals.





Five Biggest City Challenges

At the Smart City Innovation Accelerator at San Diego, representatives from 37 cities and companies gathered to discuss smart city strategies and initiatives. Since each city has its own unique challenges and circumstances, in the very first panel session, participants passed the microphone so each could relay what they believe to be the number one problem that their city is facing in terms of implementing its smart city plans. Although answers varied, they could be boiled down to five main themes..

Challenge 1: Silos

The most frequently mentioned problem was the existence of silos within the governmental organization, where each department works in its own 'bubble,' with its own plans and projects that do not cross with other departments. Multiple participants mentioned the need to break down these silos in order for departments to work together so smart city projects can be identified and implemented more efficiently and successfully.

Interestingly, the problem with silos goes beyond the lack of communication, coordination, and collaboration among *people* and *departments*—there is also the problem of '*data silos*.' Because departments are acting independently, the data gathered within tends to stay there. However, if data within a department is shared, it may prove to be useful to other departments as well as other end users.

Challenge 2: Staying Focused

The issue of staying focused came up in many participant responses and was summarized as the struggle to 'keep the main thing the main thing.' Other related responses demonstrate that this challenge has to do with determining what the main thing is as well as staying focused on that main thing without getting distracted. For example, participants mentioned the need to:

- Create a roadmap and a cohesive mission for the smart city.
- Plan a direction for the future and strategize how to get there.
- Figure out what specific problem the city is trying to solve then envision what the solution will look like after it is implemented in the city.
- Define 'value' and decide how to measure it so the city can assess progress toward that specific goal.

Challenge 3: Regulations/Policies/Politics

Other participants mentioned problems that fell under the general theme of regulations, policies, and politics. Some mentioned that politics can get in the way of smart city objectives, particularly if those objectives fall outside the scope of the mayor's agenda, while others noted that people working within smart city projects must be willing to challenge the status quo.

In addition, a couple participants mentioned that bureaucratic processes sometimes get in the way, preventing smart city teams from taking advantage of emerging technology and rapid prototyping because, by the time the team jumps through all the hoops, the technology has changed. Also, regulations themselves are often outdated and do not take into account all the new possibilities available and the potential risks.

While funding falls under the scope of regulation, policies, and politics, only one participant mentioned funding issues as the main city challenge. Other participants pointed out that there is a big appetite for public-private partnerships, so funding may be less of an issue than other bureaucratic challenges.

Challenge 4: Inclusivity

While there was some debate on whether this challenge should be summarized as 'equity' or 'inclusivity,' participants questioned whether equity was truly possible and decided that the real challenge was making smart city ventures inclusive and empowering for all citizens. Some of the specific issues that city leaders mentioned included:

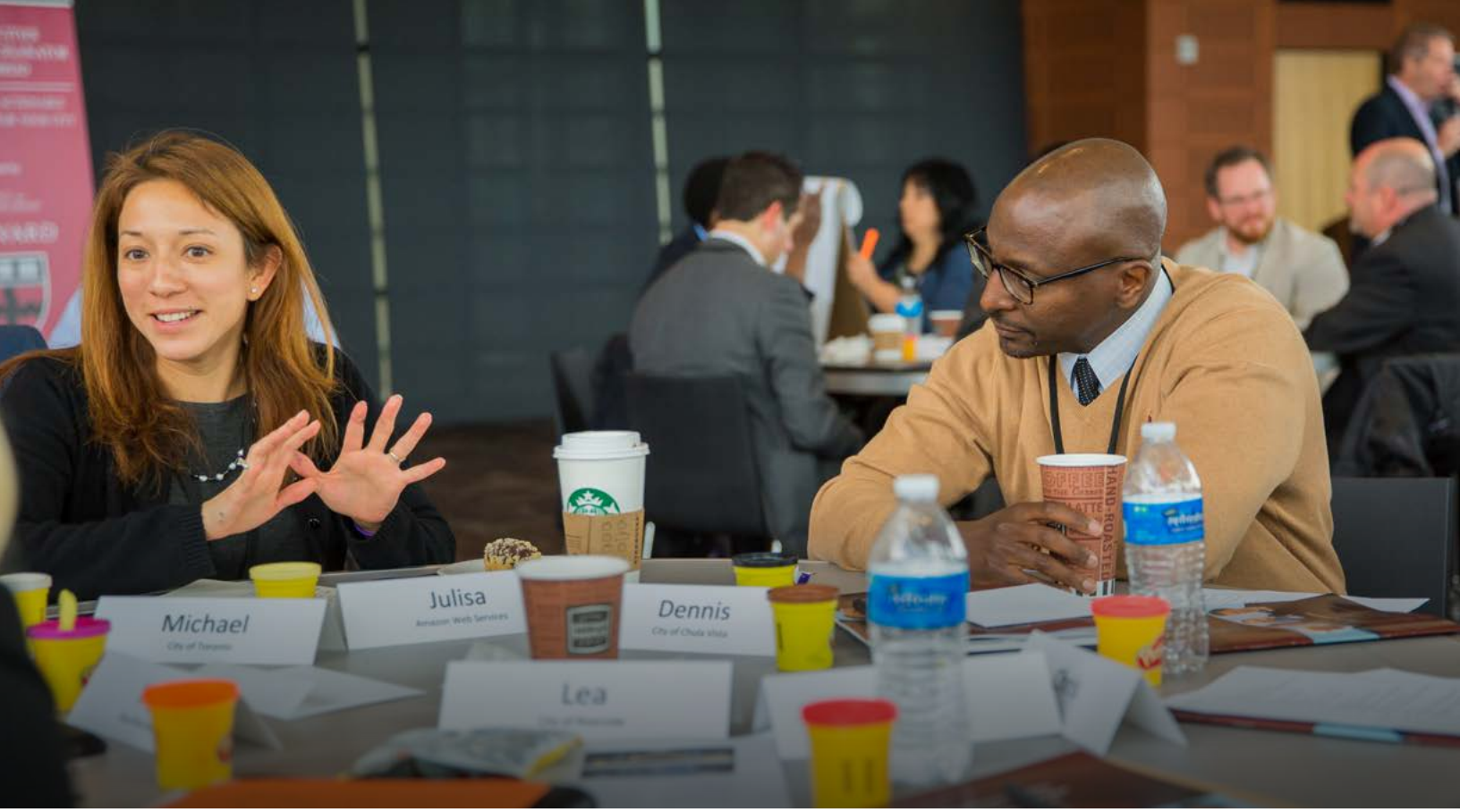
- How to get equitable input from all citizens at all levels of the community regarding the problems/challenges of the city and possible solutions.
- How to get people not to be afraid of data and technology.
- How to use smart city solutions to address the needs of low income, under-served and left-behind citizens.
- How to build a citizen-centric model where technologies can be used to predict the needs of citizens.
- How to keep people at the center of smart city plans at all stages, from idea generation to implementation.

Challenge 5: Non-Traditional/Innovative Approach

Finally, other participants identified challenges with the fact that smart city projects require a non-traditional and innovative approach that is not always familiar nor embraced among leaders, government workers, and the larger community.

Some city leaders talked about difficulties with people and resources – not having the right mix to get the job done and having trouble finding and hiring people with matching skill sets. Developing an organizational culture that can support a successful smart city program is tough too because it requires changing mindset (regarding the adoption of technologies and non-traditional approaches) and 'being comfortable with being uncomfortable' (because many people in the government want to do things the way they have always been done instead of trying something new).

In the end, participants were asked to identify the single biggest challenge for their city when it comes to smart city initiatives, but most cities will experience a mix of all the problems mentioned here, as well as other challenges related to technology, data, and security. By identifying these major issues at the start of Day 1 of the Innovation Accelerator, the group was able to continue the discussion as well as brainstorm solutions and learn about case studies throughout the remainder of the event



Smart Energy

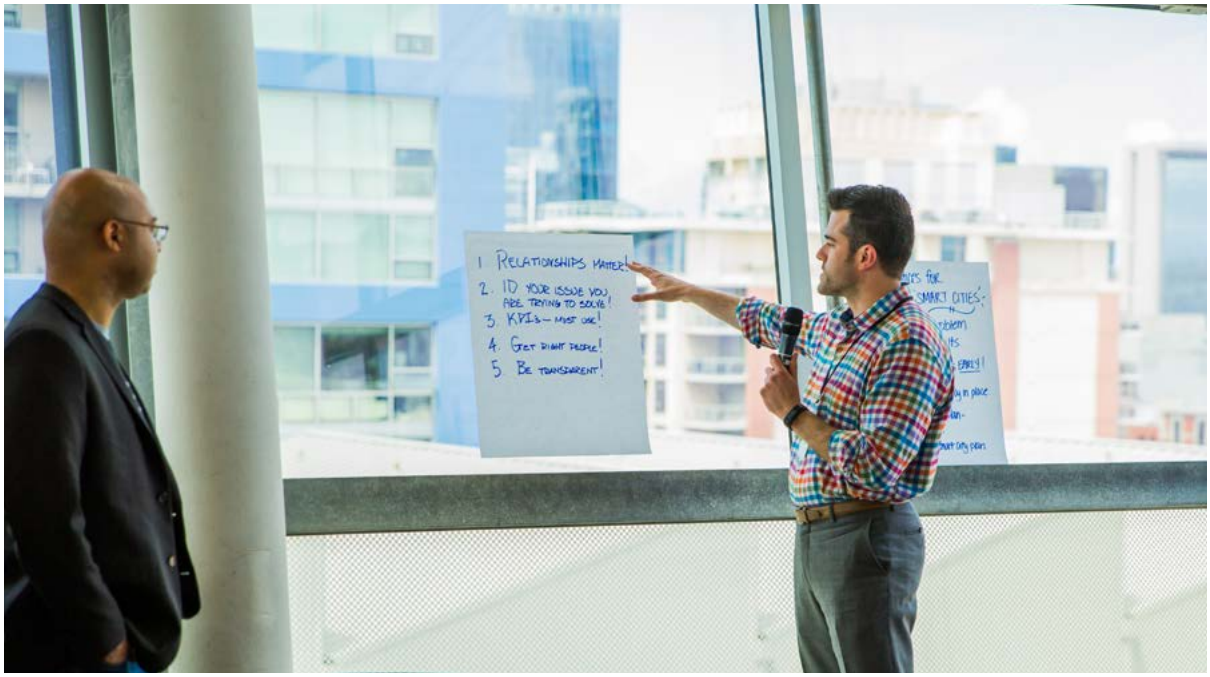
Utilities are fundamental to smart city initiatives, so if cities want to move forward with their smart city plans, more collaboration with utilities is needed. On the final day of the Innovation Accelerator, the group convened for a special panel session to hear about the benefits and challenges of cities and utility companies working closer together. The conversation focused on opportunities and obstacles, and panelists also provided current models that are working and tips for getting started.

Opportunities

Panelists gave many examples of how utilities and cities are working together to transform their communities. This includes:

- Updating lighting with smart street lights that are equipped with sensors.
- Exploring options for energy storage to ensure the system works optimally.
- Encouraging the transition to more efficient and environmentally-friendly energy sources and modes of transportation, including building infrastructure to support electric vehicles.
- Witnessing a change in consumer attitudes as energy efficiency is prioritized, and smart home technology is embraced.

One of the biggest opportunities mentioned was the switch to renewable energy sources such as solar and wind. By working with utility companies, cities can be better positioned to reach state and local environmental goals while ensuring that citizens get the services they have come to rely on. Programs such as Green Alternative are also helping to boost knowledge and acceptance of alternative energy in the larger community by installing solar panels on homes in low-income neighborhoods at no cost to residents.



Obstacles

While there are a lot of promising developments on the horizon in the area of smart energy, there are also obstacles to implementing these projects as well as challenges in forming collaborative partnerships between utilities and cities. Some of the obstacles mentioned include:

- Utilities are constrained in what they do because they have to work under strict regulations and must report to the public utility commission. The system is slow and doesn't allow utilities to be as innovative and nimble as they'd like to be.
- Cities and utilities can often be at different stages in their thinking about smart cities issues such as connectivity, requirements, how to meter sales, etc. This discrepancy makes collaboration difficult because the two parties are not on the same page in the conversation.
- There have been radical changes in the area of smart energy in regards to new technology, costs, and the business models of the utility companies.
- Although costs for technology, such as solar, are coming down rapidly, costs in some areas are still rather high (for example, energy storage).
- Technical developments must be translated into something that actually changes people's lives (and then these technical projects must be communicated properly, so residents understand how the changes will positively impact them).

A Model for Collaboration

Perhaps one of the best current examples of collaboration between utilities and cities is Cleantech San Diego, an organization that was formed 11 years ago when California started to ramp up its renewable energy goals. At the time, thought leaders recognized that, in addition to positive environmental impacts, there would also be new economic opportunities available with all the new technologies and companies that would be created to reach these goals.

To realize environmental and economic goals, the organization brought together climate scientists, the startup/business community, the academic community, the utility company, and the city government. The initial partners are still at the table today, and more people have been pulled into the conversation along the way.

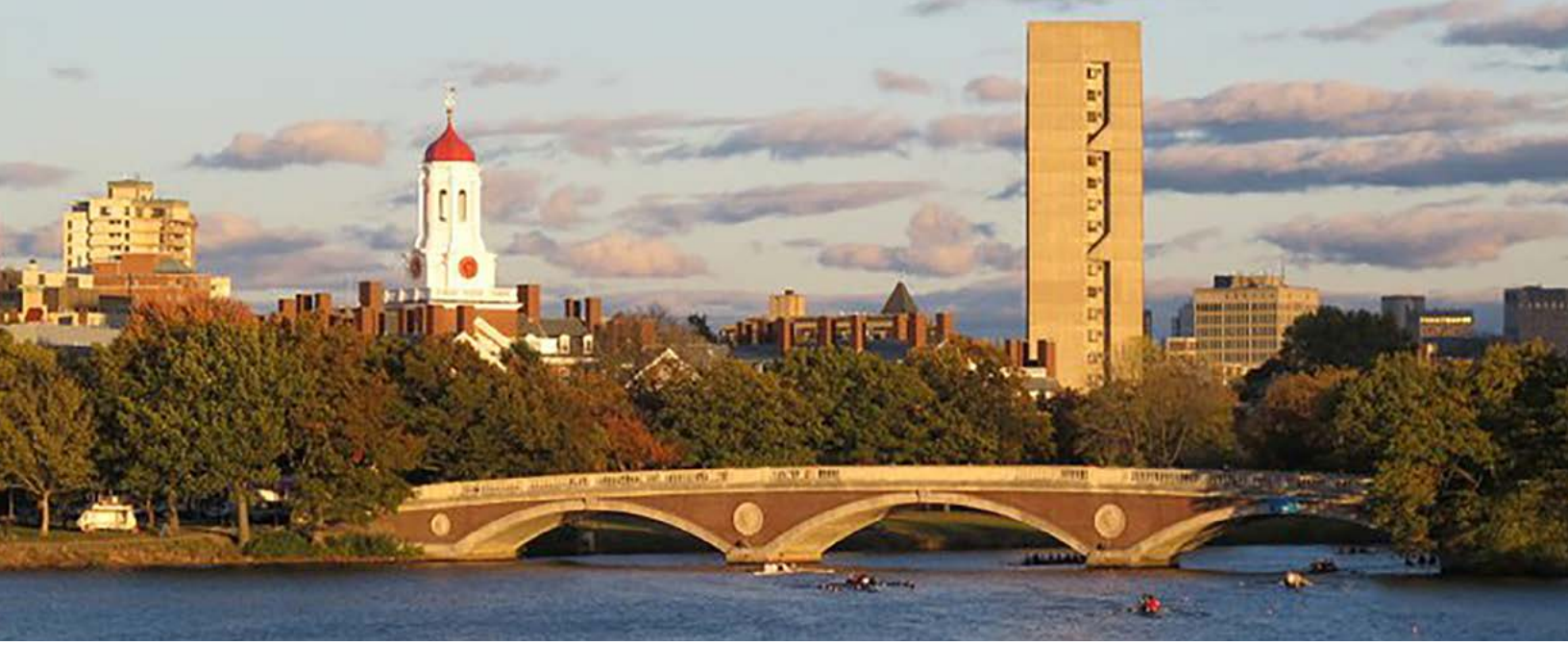
Today, the economic outlook for clean tech is $6 billion, and there are about 7,000 people employed in the industry in San Diego. Cleantech San Diego helps to shape local, state and federal policies, promote conversations with city officials, community members and students about clean technology, and support clean tech and sustainability initiatives such as electric vehicles and intelligent lighting.

How to Start a Partnership

Some cities have had great success in collaborating with utilities, and with so many opportunities available in the area of smart energy and clean technology, it makes sense to partner with utilities as part of the broader smart cities plan. At the end of the panel session, one member of the audience asked how a city may spark up conversations with utility companies in order to form a partnership. The panelists offered these tips:

- Go into the conversation as equals.
- Be upfront and candid about what the city is looking for (wants and needs).
- Seek a win-win situation where the utility company helps the city, but the city helps the utility company too (such as via permitting and helping the utility through the regulatory process as a partner).
- Pose ideas for how both parties can work together to create that win-win scenario, but also be open to suggestions..

Participants of the Innovation Accelerator envision that in ten years from now, cities will be getting even more energy from renewable resources, smart technology will change the home, sustainable transportation (such as electric vehicles and efficient mass transportation) will be a priority, and there may even be a convergence of the telecommunications industry. Leaders also predict that cities will have better partnerships with utilities, where improved collaboration and communication will bring about solutions to many of the challenges and problems discussed at this Accelerator.



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.

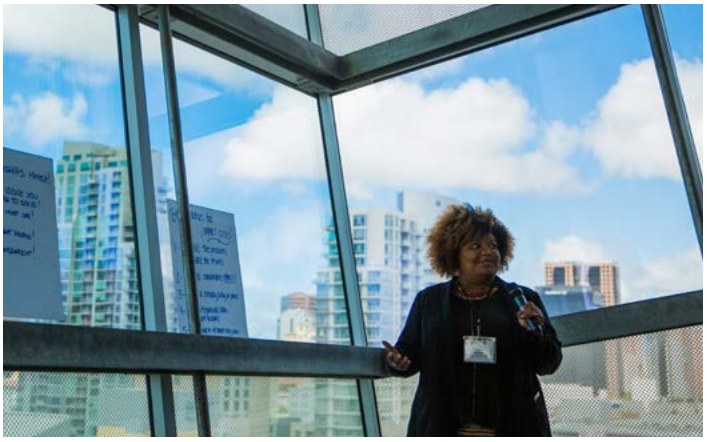
The Summits and Symposia provide three important benefits to participants:

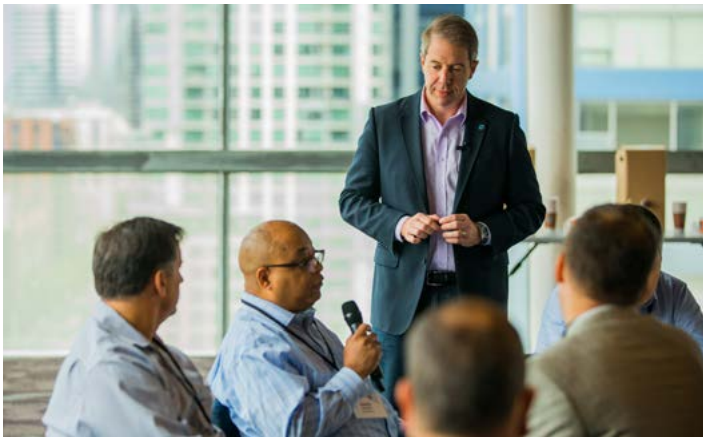
1. Education – As experts in their fields, participants learn from one another through interactive sessions and dedicated talks. These aim to educate, raise important questions, and present the latest data on trends and the current state of the Summit topic.
2. Multi-disciplinary Engagement – The Summits 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.

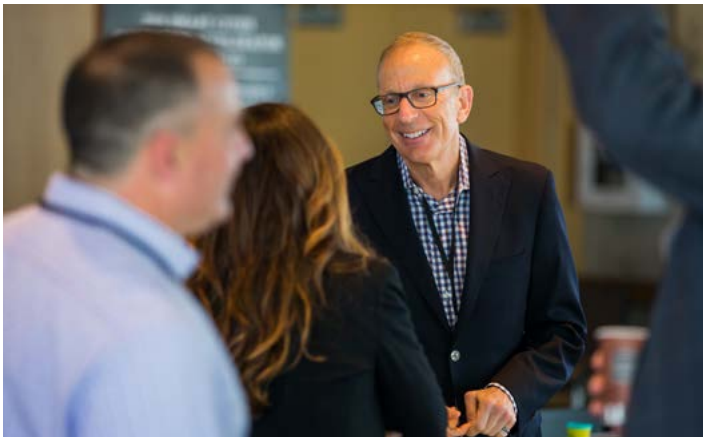
Attendance is by application only, and senior leaders from any discipline that is relevant to the topic are encouraged to apply. Summits are generally convened on the campus of Harvard University; however off-campus Summits do occur when the topic and location enhance the opportunity for conversation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

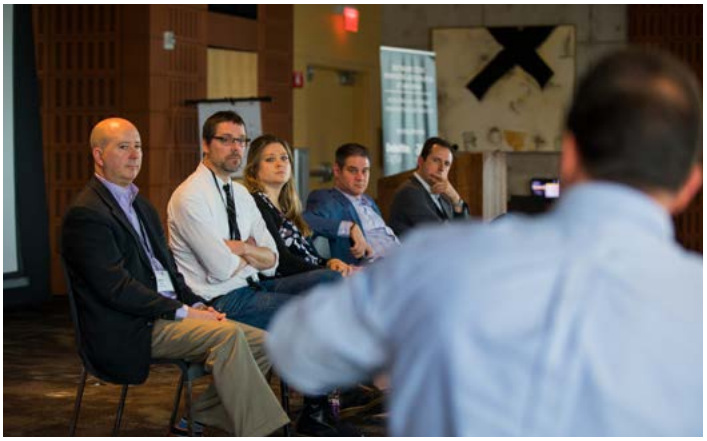
Topics are proposed by participants, senior leaders in industry and government, and the Fellows in TECH. Topics are chosen based upon relevance and potential for impact in a broad sense, to include economic, societal, and environmental benefits.

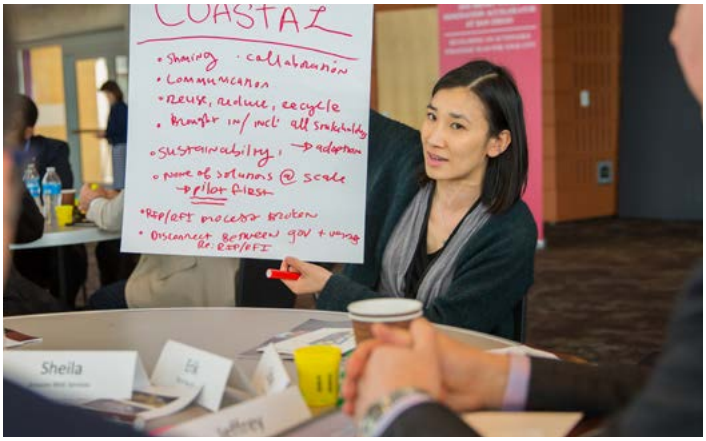
For more information about the Strategic Innovation Summit series, please contact the Program Chair, Dr. David S. Ricketts (ricketts@seas.harvard.edu).







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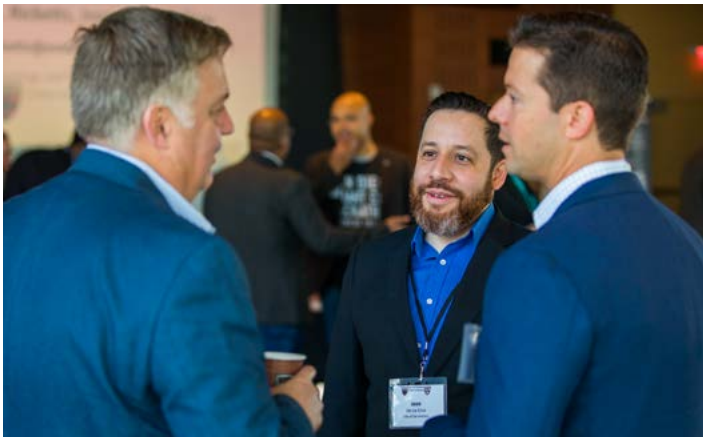

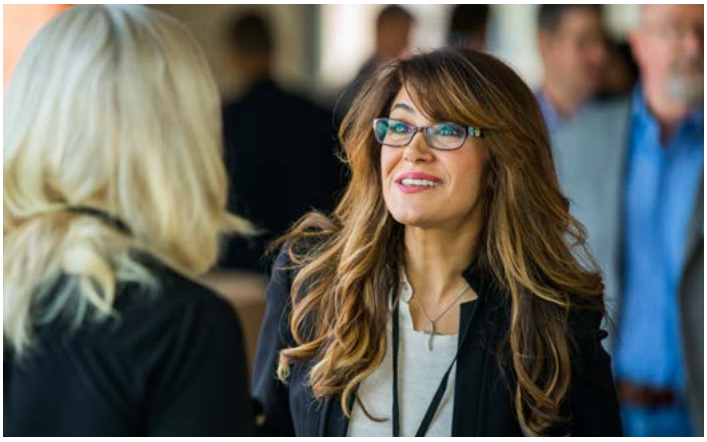

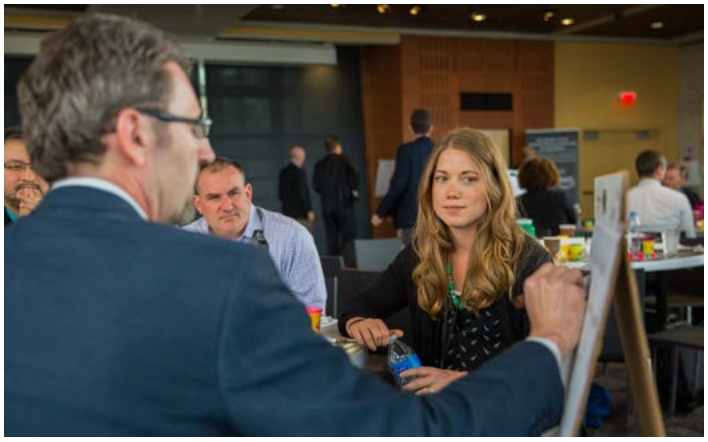

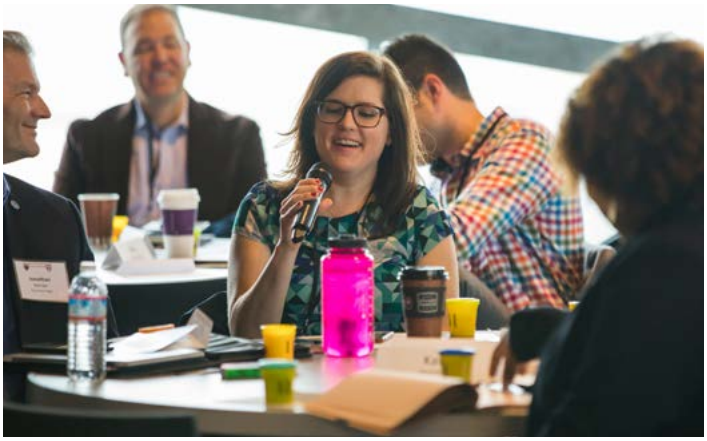

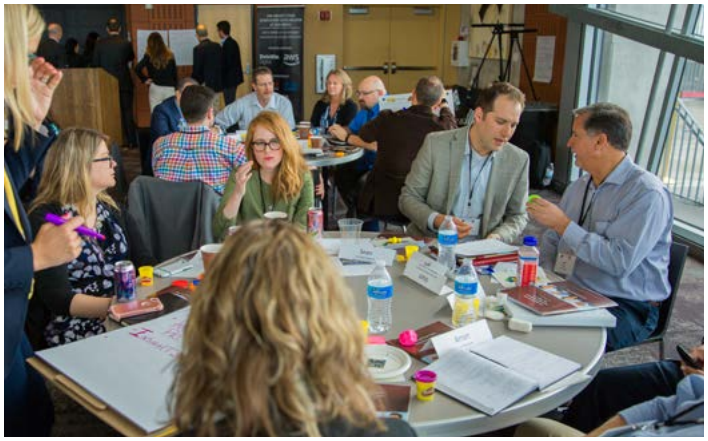

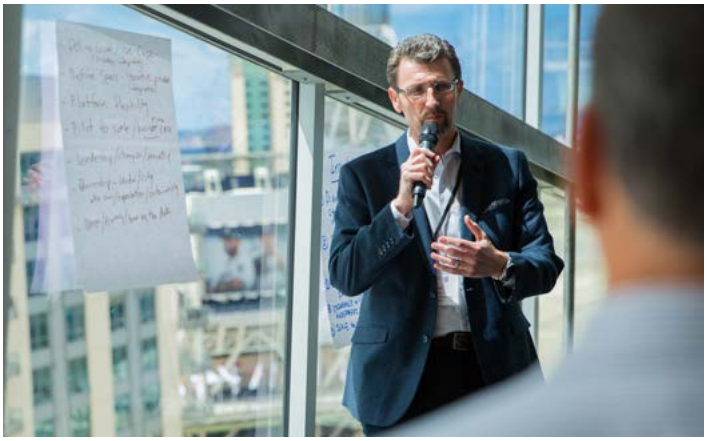

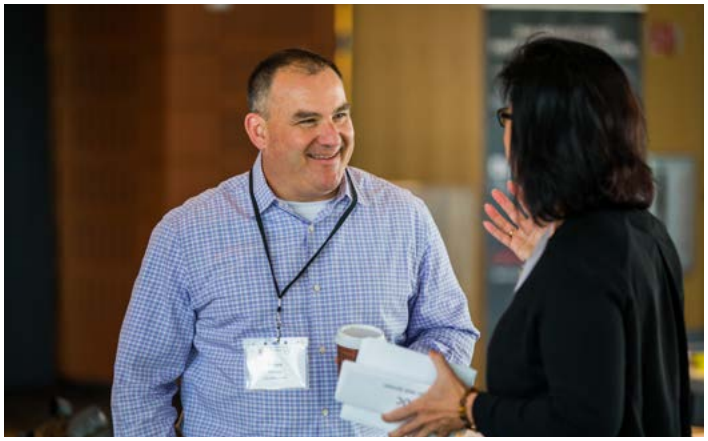

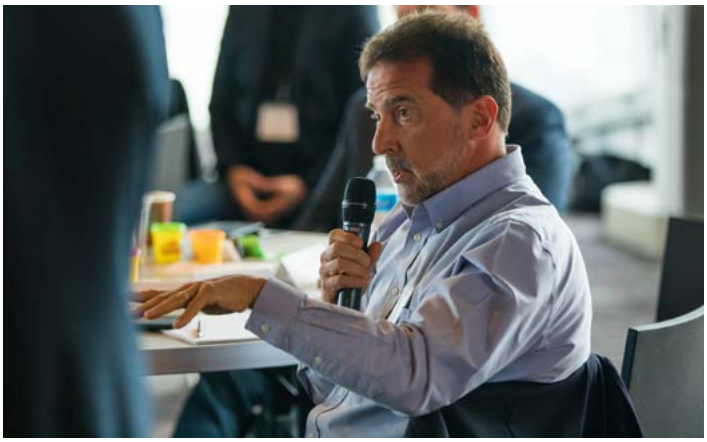

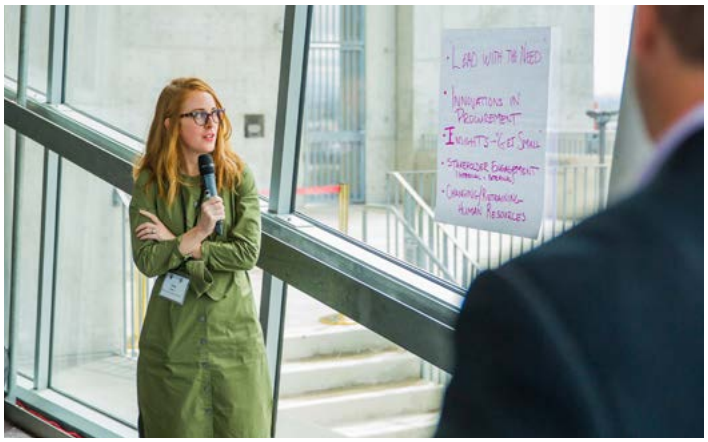
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