A Vision of Smarter Cities: How Cities Can Lead the Way into a Prosperous and Sustainable Future

Moderator: Tamara Kulesa
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Tamara Kulesa: Hello. This is Tamara Kulesa, Worldwide Marketing Manager for IBM Global Business Services for the Global Government Industry. I am here today with Susanne Dirks, Manager of the IBM Institute for Business Values Global Center for Economic Development in Ireland. Susanne is responsible for the research and writing of the newly published report, "A Vision of Smarter Cities: How Cities Can Lead the Way into a Prosperous and Sustainable Future." Susanne, thank you for joining me today.

Susanne Dirks: Thank you, Tammy. I'm very pleased to be here.

Tamara Kulesa: We live in an increasingly urbanized world where it is projected that over 70% of our population will live in cities in 2050. Every minute during the next 20 years, 30 Indians will leave rural India for urban areas and India will need 500 new cities to accommodate this migration

Over the course of human history, the city has taken on many meanings to many people. In the 1800s, Jean-Jacques Rousseau said that, "Cities are the abyss of the human species." In the 1900s, Charles Abram said, "A city is the pulsating product of the human hand and mind." And most recently, IBM CEO and Chairman Sam Palmisano stated, "All the ways in which the world works comes together in cities. This makes them a unique crucible for making our planet smarter."

Susanne, can you share with us some of the global changes and the implications to our cities?

Susanne Dirks: Sure, Tammy. basically, cities have assumed a very central role in our urbanized 21st century world, and this is the result of changes in three main areas -- politics, economics and technology.

In terms of the world economy, this is now globally integrated, services based and cities act as hope. We all know this is a globalized world. The growth in goods and services is one example of that growth trend, and national companies, the extent of capital flows and foreign direct investments that we see change between countries.

Secondly, we live largely in a services economy now. All in developed countries, services are the primary economic activity of 70% of a lot of the economic activities of developed countries.

Thirdly, we have urbanization. So, in 2008, we had first year where where 50% of the population was living in cities, and we are expecting, as you mentioned, further growth, up to 70% in 2050.

If you look at cities, these are the places where the physical and the human capital really conglomerate. So, companies then locate where this capital is concentrated.

If you then look at the political side, the landscape has changed quite a bit and cities are becoming more important actors. Wellington E. Webb, the former Mayor of Denver, previously said, "The 19th century was a century of empires, 20th century was a century of nation states and the 21st century will be a century of cities."

And this is really very true, and you can see that in the move from the nation state as we had in the 20th century to a kind of multi level government at this stage. So, you have your international level, your national level, your state or federal level, and then you have your city level. And cities now have more freedom and also more power to act and make decisions.

Other examples of this political change are that the levels of vertical integration that you can see, for example, between different levels of government or collaboration and cooperation across boundaries And finally, we have the technology, basically, they can measure many more things than they could measure before. And obviously, that gives some new control and the ability to improve certain aspects of the city environment.

So, when they're setting their goals, they will translate their goals into policies. What they can do now is they can measure the adherence to those policies and the impact of those policies.

So, an example there would be an interesting example. In Europe, we have EU water framework directives. And this has set some goals about water quality. So, if you can't measure water quality, there's not very much you can do about improving it. But now, you can measure it, you can connect the various systems and you can then make a plan for improving it based on those measurements.

Tamara Kulesa: Susanne. That's a lot of changes and advances. With all of these changes, it would seem we have more obstacles to contend with. Did you find it like that in your research?

Susanne Dirks: Yes, that's true, Tammy. There are a lot of significant interrelated challenges. And what's important to realize is in many cases, these challenges are now reaching a tipping point. So, cities need to take action fast.

Also, our research has showed that cities are basically based on core systems. And these systems are central to their operation and to their development. And each of these systems has had their own challenges and threats to sustainability, but also all the challenges that are interrelated and need to be dealt with in a holistic way.

Tamara Kulesa: We don't have time to go in depth on each of the core systems, but could you give us a quick summary of each of the systems and maybe the most intriguing learning about each.

Susanne Dirks: Well, to start with, the most intriguing learning is the interconnectedness and the interdependence of the cities' own system onto another system, so between the systems. And our cities face interconnected challenges, and to address one challenge, cities need to have an awareness of the other challenges, how they relate to the challenge they want to address. So, as I said previously, they need to look at the big picture.

But, let me come back to the key systems and the individual challenges. The first system is what you call the people system, and this is quite a broad system. The people system would include the human and social networks. It includes public safety -- so, fire, police, disaster recovery. It includes health, education and the whole concept of quality of life. So, it's a very broad system, and really, each of its subsystems that I just mentioned has its own challenges.

But, the key for the people system is really related to the demographics of the city. So, in some cities, you have a rapidly growing population. In others, you have very much a shrinking population, aging population. And with that comes the ability to provide services for health, education and safety to the citizens.

So, the challenges varying between cities,depending on the demographics and the demographic makeup of that particular city.

So, let me give you one example. You have rapidly growing cities in the developing world. An example would be Beihai in China. They have an average growth rate of 10.58% between 2006 and 2020. And you then compare that to shrinking cities such as Detroit in the US or Halle or Liebstadt in Germany -- so, completely different challenges, but all related to the people system.

There's a second system I'd like to talk about. It's the cities' business systems. And this includes regulation and policy environment, planning regulations, openness to foreign trade and investment and labor and product market legislation, so anything that relates to the business system of the city.

And obviously, cities' prosperity is highly dependent on the economy and the ability of cities to attract and retain business. Therefore, it has a key role to play.

The third and the fourth system are about the movement of goods, services and information in the cities. So, you have the transport systems for goods, services and people, and the communication system for the information side.

The transport system includes all aspects of a city's road networks, its public transport networks, its sea and airports. It faces two key challenges in most cities. There is the challenge of congestion, and the challenge of pollution.

It also has a big cost implication. For example, the cost of inefficient transport is up to 4% of GDP in some cities. And the cost of pollution is also very high, not only in terms of the direct cost, in terms of penalties, but also in terms of the indirect cost it has in terms of the

impact on health, the impact on quality of life, the effectiveness of business. So, once again, I'm coming back to this point of interrelationships, it's important to look at each system on its own, but it's also important to look at the bigger picture.

Fourthly, let me talk about the communication system. This is about the movement of information and data. So, this includes the telecommunications infrastructure of a city, including telephony, broadband, wireless and it's all about the ability to access and communicate information, which is obviously central in the modern economy in a smart city.

There is a big need for ICT and ICT is one of the key infrastructures of a city. But, if you look at some of the data, you will see that large parts of the worldwide population still don't have access to the internet or to ICT, and that includes city populations in many cases.

Also, there are big differences between cities if you look at the broadband penetration, broadband pricing and affordability and broadband bandwidth.

The last two systems then are the two basic utilities of the city -- so, that's water and energy. Water is an essential utility of the city, and it includes the whole water cycle from water supply all the way to sanitation.

But, water is key to developing of the city, but it also has a key impact on the economy of a city. And it's getting more and more important as countries and cities become more developed and have a higher consumption of water.

The water one is quite a challenging topic because there are different flavors to it, and there are obviously differences between developed and developing countries. There's the issue of the lack of water and the distance from which the water in some cases has to be pumped to the cities. There is the issue of flooding, And many cities, in particular, and many large cities are port cities.

Then, there is the issue of sanitation, the quality of the water that is supplied to the city. And if you then start looking at a city, it's amazing to see how much water is actually used in an inefficient way. Some data we looked at showed that 35% of water on average is lost due to leakage and 18% is lost as a result of poor metering.

Then lastly, the energy system, that's obviously one of the key utilities that's essential for power generation and transmission and as well as the waste disposal aspect of energy. Once again, what you have here is that you will edge the source situation in terms of you have a resource shortage for energy and you have the pollution issue. It's estimated that about 80% of worldwide CO2 emissions is from cities in terms of resource. When you're talking about non-renewable energy resources, there is the issue of depletion and there are also issues associated with many of the non-renewable energy sources, whether it's the nuclear energy or CO2 emissions, etc.

That's really a quick summary on the six systems. They all face their individual challenges, but also their challenges are very much interrelated and need to be looked interrelation to each other.

Tamara Kulesa: Susanne, the challenges in interrelations really sound quite complex and potentially overwhelming for a city to tackle. Following your research, do you have any recommendations on how cities should begin to overcome these obstacles?

Susanne Dirks: First of all, it's important, Tammy, not to be overwhelmed by these challenges. And indeed, it's possible to tackle these challenges, and in some cases, to turn these challenges into opportunities. So you're right. It's not going to be easy and it needs a well thought through approach.

But, let me look at our situation, at the situation where we are now first, we live in a world of finite resources -- so, it's water, land, energy, skills So, that's the kind of bad news.

But, on the other hand, there's also good news because we live in a world now full of pervasive technologies such as sensors or networks, so technologies that allow us to measure, to monitor, to manage and to optimize our use of finite resources. And technologies that allow us to understand the interrelationship between systems

This is really opportunity for cities' lies today in terms of cities can use this technology to transform their core systems and maximize the use of finite resources. And that's what smarter cities do. Smarter cities use the possibilities of new technologies, - such as data collection and modeling and create new insights and help decision making for the city.

It's not going to be easy, but the possibility is really right in front of our noses here. And it has been done by many cities. That's important, as well, not necessarily across all systems. That's a challenging task and still lies ahead for most of the cities, but for some of their systems.

IBM has actually collected a wide range of many exciting examples in this space. But, let me give you one example about transport because transport is one of the challenges that's easiest explained and most graphic in many ways.

Here we have the example of the city of Stockholm. And they had a big congestion problem some years ago. And congestion, as we heard earlier, is a major problem not only in terms of the economic impact of loss of productivity, wasted hours, cause of pollution, but also as a life quality impact such as polluted air, road rage, etc., and then obviously, also the impact on finite resources and the environment.

And in the case of Stockholm, they introduced a dynamically priced congestion charge for cars to enter Stockholm. And as a result of that, the city benefited in several ways. First of all, the city reduced the inner city traffic by 25%, they reduced emissions by 40%, and at the same time, they boosted the inner city retail by 6%, and then obviously, they created new revenue streams as a result of that charge.

In summary then, the congestion charge that was introduced in Stockholm was self financing, it generated 84 million euro, and that money now can be channeled into further initiatives around reducing congestion. So, the bottom line is that smarter systems can help a city improve its sustainability and deliver its broad goals - that's financially, economically, environmentally and socially.

Tamara Kulesa: Susanne, what are the immediate next steps a city needs to take?

Susanne Dirks: Tammy, becoming smart really requires a focused strategic approach with a clear focus on the core competencies and looking at what you have versus what you need. So, our paper, "A Vision of Smarter Cities", basically explains some of these core competencies in more depth. IBM's IBV Institute for Business Value is also happy to have more in depth conversations with clients that are interested.

In addition, it's worth noting that our consulting and practice business in GBS has developed an assessment tool for assessing and benchmarking cities. The topic of our next study is about the value of measuring how smart a city's systems are and also about the broad principles of the methodology for measuring how smart a city is. We are planning to publish that at the next IBM Smart City event in October, and we are working very closely with the consulting practice on that particular project so that we can bring the theoretical and the practical approach together.

Tammy. Just to come back to your questions in terms of what are the next steps, there are three final pointers I can give. The first one is assemble the team, and this goes really back to the need for collaboration. And we have already outlined that in our "Government 2020" paper.

There is a need for tighter, better, more pervasive collaboration for governments. And this includes local government level, as well, to react in today's environment.

Secondly, our recommendation is think revolution not evolution. And what I mean here is don't get bogged down by all the problems that are there. You have to have a vision. How do you want to see your city in the future? That's what Stockholm did. They stepped away from their issues and said what is it we want to achieve, what would be the ideal scenario, and then go back and map that into a plan.

Lastly, and that's an ambitious one probably as well, is target all, not just one, and I mean target all systems. Bear in mind, these six systems. They're interrelated. You can start with one system. That makes perfect sense. You can start with it all together. But, you have to bear the bigger picture and the interrelatedness of the systems in mind to really turn this challenge into an opportunity.

Tamara Kulesa: Susanne, thank you so much for the enlightening and intriguing conversation about your research and findings from the IBV report, "A Vision of Smarter Cities." Your research indicates that cities on smarter systems will be positioned to survive and prosper in our new global environment.

To read the full report, please visit ibm.com/gbs/smarter cities. And for more information and discussion around building smarter cities, please visit ibm.com/smarter cities. Thanks again, Susanne.

Susanne Dirks: Thank you.