zpryme

SMART CITIES STAYING CONNECTED

2022

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INTRODUCTION

The number of smart city projects has grown tremendously over the past decade due to advancements in technology and mass urbanization. However, the task of allocating resources efficiently has proven to be extremely difficult for cities and is one of the reasons over a third of smart cities fail to be properly built.

By 2030, it is estimated that 5 billion people will be living in urban hubs (Appleton, Joe). It is therefore critical that governments across the globe make sure that the needs of the people are met. To know what citizens need, civic engagement needs to be high. Active citizen engagement in smart city efforts is crucial, as it allows "governments to respond to constantly evolving situations, and implementing changes that are in the public's best interests."

More and more, cities and utilities are working together to bring about a sustainable future. Public understanding of smart city initiatives, however, may be the biggest hurdle for cities and utilities to overcome. In order to better understand the public's perception of smart cities, Zpryme surveyed nearly 500 people. This survey explored citizen awareness and engagement of smart cities, the stakeholders involved, and what role utilities play in their development.
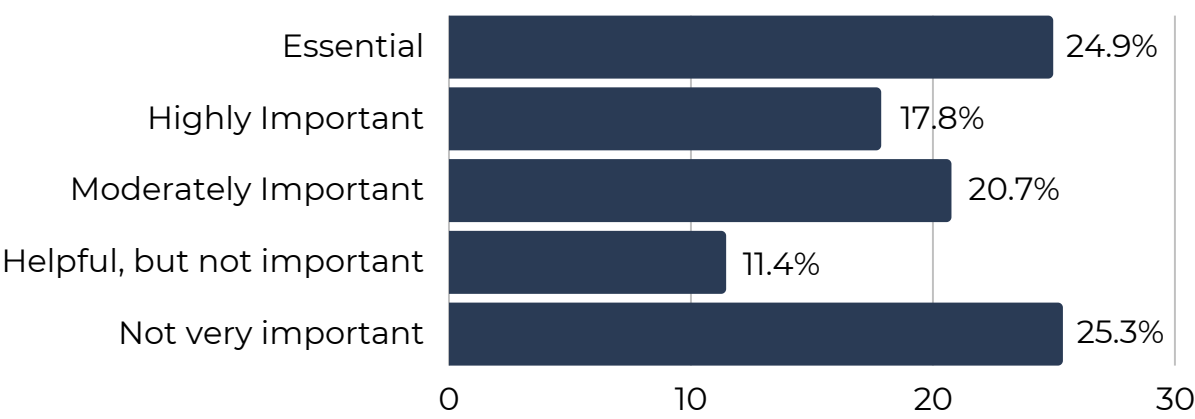
DEVELOPING A SUSTAINABLE FUTURE

The vision of a sustainable future is a driving force that is accelerating smart city developments around the world. In short, a sustainable plan is a method that can continue development at a steady rate without sacrificing an abundance of resources. It is crucial for smart city planners to build a development plan.

- 25.3% of respondents believe smart cities are not important for a sustainable future
- About half of respondents believe that smart cities are built to benefit citizens and communities
- Almost a quarter of respondents think smart cities will heavily impact the reliability of utility service

Of our respondents, 25.3% of them stated that smart cities were not very important (Fig. 1). Although this was the highest-picked answer, it is important to note that the remaining 74.3% respondents thought that smart cities were important (in various increments) in developing a sustainable future. For those that picked that smart cities weren't important, it would be interesting to further investigate what they consider important when developing a sustainable future.
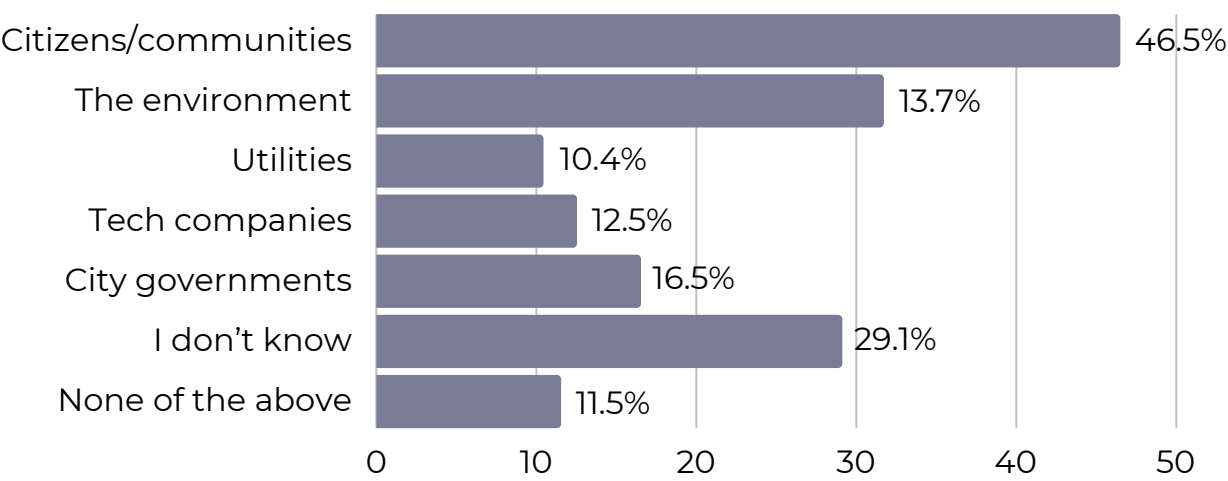
FIGURE 1: How important are smart cities to developing a sustainable future?
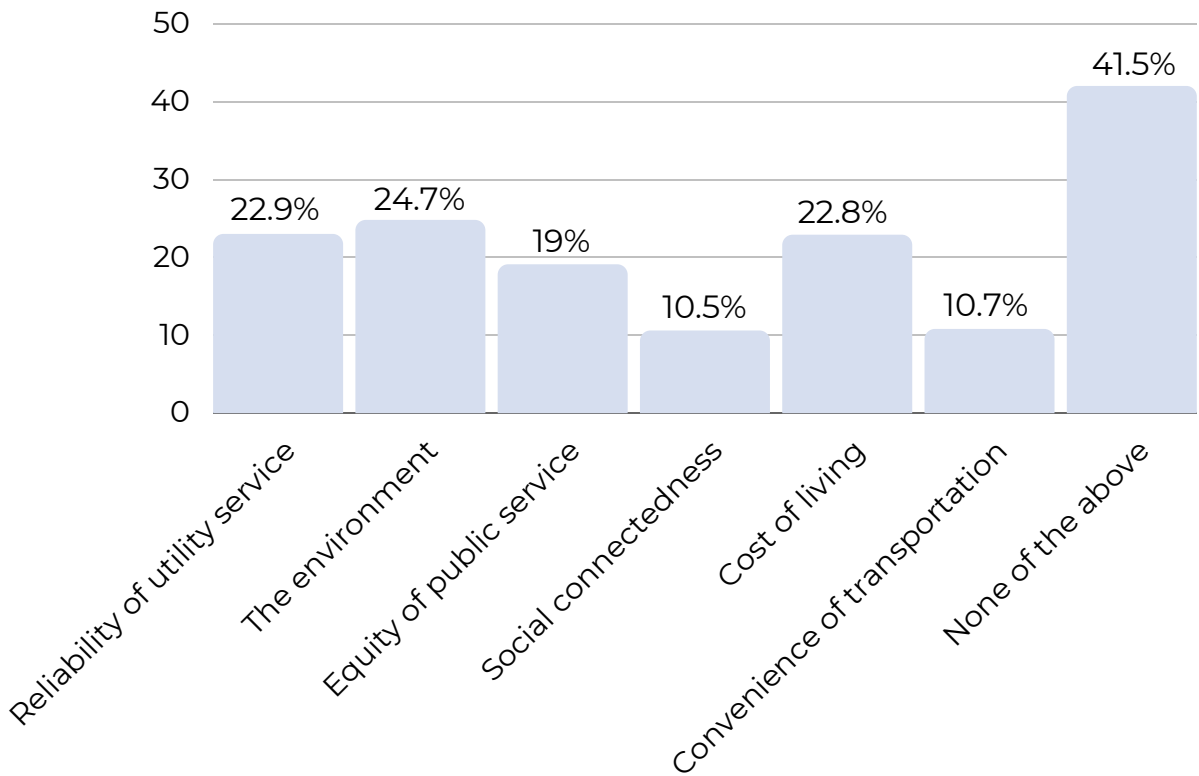

When asked who smart cities benefit the most, an overwhelming majority of respondents selected both citizens and the environment. Unlike utilities, which primarily selected that citizens would benefit the most, citizens also picked the environment. This implies that a lot of citizens believe that smart cities are beneficial in helping the environment, such as in the forms of reducing carbon emissions. The 12.5% for tech companies suggests that some citizens believe that these companies will benefit from the data collection/automation of smart cities (Fig. 2). Almost a third of respondents selected "I don't know" or "none of the above," which indicates that a lot of the general public is conflicted as to who is benefiting the most from smart cities; this might also show that many citizens aren't all that well informed on the topic and avoided guessing.

FIGURE 2: Who are smart cities built to benefit the most? (Select up to three).

In terms of smart city impact, about 40% of respondents did not know what to answer (Fig. 3), which aligns with the previous answers to the questions. All of the other responses are spread out quite evenly, suggesting that citizens think that smart cities will impact a variety of components, ranging from social connectedness to the environment.

FIGURE 3: Which of the following will smart cities impact the most? (Select up to three).
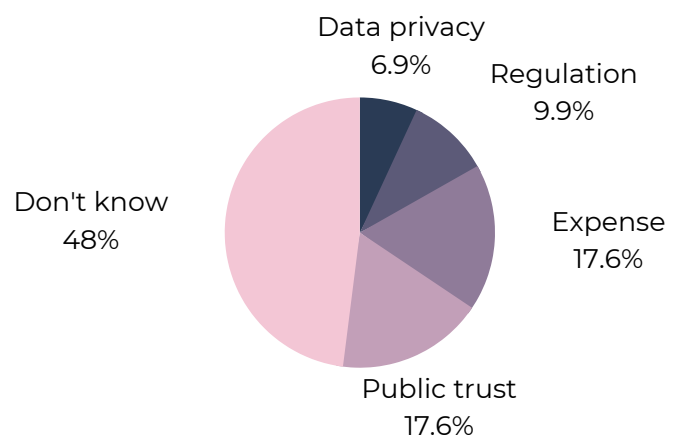
OBSTACLES & INCENTIVES

With big projects, such as building/developing a smart city, come many obstacles and incentives. Gauging citizens' perception of these obstacles and incentives will be important in recognizing how informed they might be. Knowing this information will ultimately help planners move forward in terms of altering citizen engagement.

- Almost 50% of respondents do not know what to classify as a primary obstacle for smart city development
- Nearly a quarter of respondents said the public was the primary incentive for smart cities.

Obstacles

Almost half of the respondents selected that they didn't know what the primary obstacle was for smart cities (Fig. 4). This is somewhat expected, since smart cities are a concept that the average citizen may not know a lot about (although they may have heard about it). The rest of the options were almost evenly distributed by the other half of the respondents, implying that all four of the options were, on average, viewed as equally important in being an obstacle for smart cities.

FIGURE 4: What is the primary obstacle for smart cities?

Data privacy 6.9%
Regulation 9.9%
Expense 17.6%
Public trust 17.6%
Don't know 48%

Another important obstacle development smart cities face is uninformed citizens. It would be counterproductive to include them in the answer choices, but as almost half of respondents selected the option "I don't know," the idea of uninformed citizens as an obstacle is reinforced. As mentioned previously, "the smart cities movement is often held back by a lack of clarity about what a smart city is and what it can do for citizens." As a result, many stakeholders are unaware of the smart city options that have found success already.
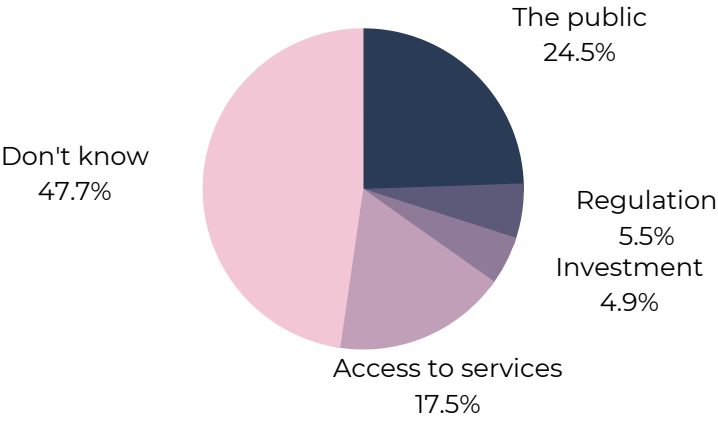
Uninformed citizens can be a big obstacle for the development of smart cities. To get citizens informed, communication between stakeholders and consumers needs to drastically improve.

Often, there is a communications issue or failure to communicate" (Smart Cities Council). An example of this is between utilities and consumers with smart meters. Many utilities did not properly explain how to use the meters effectively to their customers when they rolled out smart meters back in the early 2010s. Since citizens weren't using the product properly or at all, not only did the smart meter fail to do its job, but the notion that smart meters weren't working spread rapidly, further harming development of smart cities. This painted smart city developments in a negative light, potentially decreasing investments for future projects. Failure of communication between utility companies and consumers created a domino effect that halted smart city development.

Incentives

A little over half of the respondents (Fig. 5) said that they didn't know what the primary incentive was for smart cities, which aligns to the results shown in Fig. 4. However, out of the four remaining options, two were selected more heavily: "public benefit" and "access to services." This is likely related to how the public views the benefits of smart cities – there is no right answer here, just what the public thinks. This is valuable, as we can now see how citizens perceive smart cities.

FIGURE 5: What is the primary incentive for smart cities?

The public 24.5%

Regulation 5.5%

Investment 4.9%

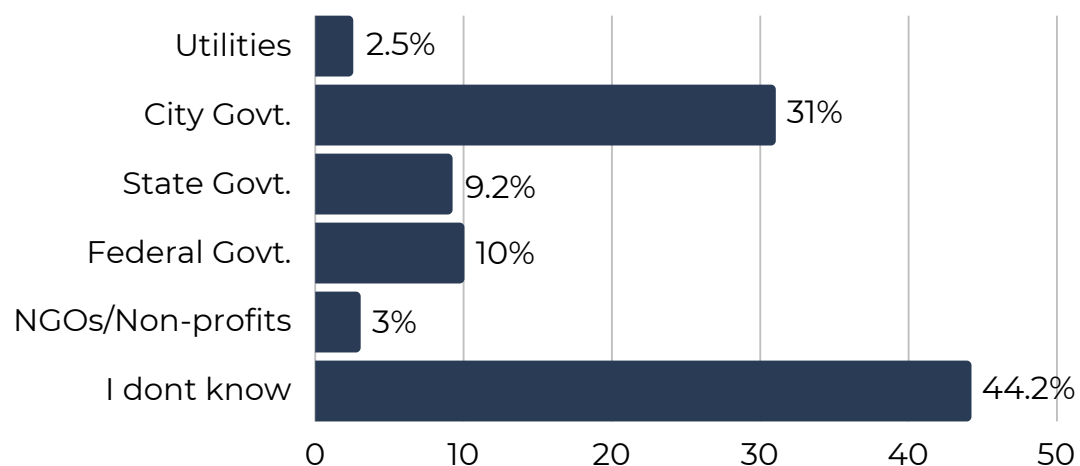Access to services 17.5%

Don't know 47.7%

SMART CITY LEADERS AND PARTNERS

- Almost half of respondents do not know who is responsible for leading smart city innovations
- The majority of respondents expect to connect with smart city initiatives using their mobile devices

There are many important moving pieces in building smart cities, given that it is a difficult and long process. City governments usually have to work together with tech companies, utilities, non-profit organizations, and, of course, citizens in order to facilitate the operation. Knowing how citizens perceive these relationships between smart city leaders will help better understand what areas need improvements in terms of communicating information.

44.2% of respondents did not know who was responsible for leading smart city innovations (Fig. 6), which implies that this knowledge isn't readily available/known by the general population. We would have to find ways to better inform citizens about how changes to their cities will be carried through in the future.

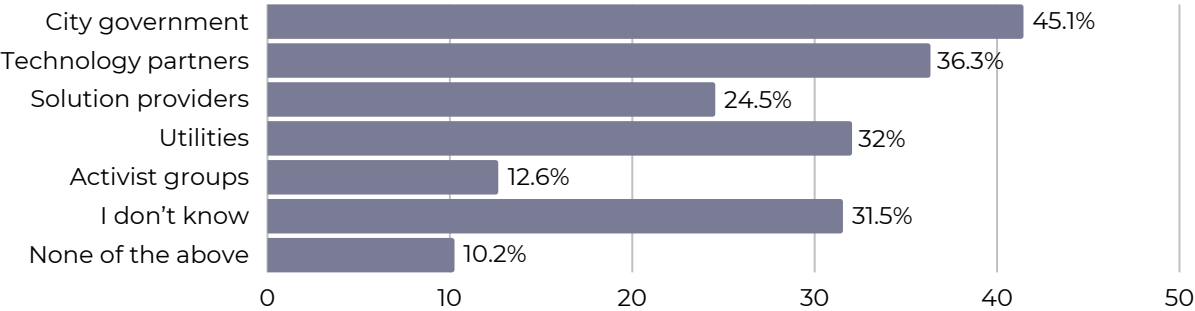FIGURE 6: Who is responsible for leading smart city innovations?

According to our research, there are a plethora of ways to give the public information (US EPA). Citizens could be informed remotely (digitally) or in-person (physically). Given the digital nature of smart cities, it would be efficient to inform through social media such as Facebook, Instagram, and TikTok, and websites rather than only holding briefings or public meetings, as you can reach an unlimited number of participants.

Regardless of the public's perception of who leads smart city innovations, there is a clear knowledge gap on the subject that could be fixed.

The general population agrees that the key partner(s) in smart city efforts are city governments followed by technology partners (Fig. 7). Although technology might not have such a huge impact, they are perceived to have made a mark through partnering with city governments. We can assume that citizens see this connection between technology and city government that is crucial to developing a smart city.

FIGURE 7: Who are key partners in smart city efforts? (Select up to three).

Partner	Percentage
City government	45.1%
Technology partners	36.3%
Solution providers	24.5%
Utilities	32%
Activist groups	12.6%
I don't know	31.5%
None of the above	10.2%

Research indicates that utilities are vital partners in smart city efforts. If steps were not taken to reduce our carbon footprint, "the use of energy in cities will more than triple by 2050," especially since major cities emit between 50 and 70 percent of total greenhouse gasses (Stefanini Group). Utilities companies have the power to control and mitigate energy consumption and find alternatives to avoid the future that awaits us. There are many ways they can do so, such as utilizing smart grids. In part, smart grids allow citizens to track how much electricity they consume through a dedicated application, usually on their smartphones.

This smart grid example shows how utilities, technology partners, and citizens – all stakeholders in smart city efforts – can work together. If civic engagement were improved, citizens would be more likely to see the importance of smart grids and help reduce our carbon footprint. Educated/informed citizens would know how to utilize their smart grids efficiently, "minimizing environmental impact, reducing costs, and improving overall efficiency" (Stefanini Group). In the long run, small efforts by smart city stakeholders could make a big difference.

It comes to no surprise that the majority of respondents selected that the primary method of connection was with their mobile phones (Fig. 8). This is likely due to the shift of media consumption to mobile devices over the last decade, where consumers use mobile devices to browse the internet, use email, navigate social media, etc. It's clear that most citizens correlate smart city development with something almost all of them possess in their pockets. Additionally, respondents answered that they'd connect through their city government or incidental interactions in public. The former suggests that many citizens are open to communicating directly with their city government to discuss/connect with initiatives related to smart cities. The latter implies that respondents are likely to engage with initiatives if prompted by interactions in public, showing how willing citizens can be.

FIGURE 8: What is the primary method citizens can use to connect with smart city initiatives?

THE ROLE OF UTILITIES

Since the concept of a smart city is highly tied to the idea of "smart infrastructure" – infrastructure that is connected to technology – utility companies will play a large role in their development. Utilities, whether focused on gas, water, or lighting are vital and the right conditions can allow them to "interact and connect with relevant city services to provide extraordinary new applications" (Smart Cities Connect).

- A majority of respondents would be willing to pay an extra $10 on their utility bill if it could satisfy certain criteria
- Almost a third of respondents think that utilities are investing in smart city technology to optimize operations costs and improve environmental damage

The lack of options selected for the question in Fig. 9 suggests that the average citizen is not all that informed regarding the role smart cities play in the actions of their utility. For those who were informed, they primarily selected "to optimize operational costs" and "to improve environmental effects." The former implies that citizens think that utilities, like all businesses, are interested in optimizing costs whilst getting the best results, and that smart cities are a way to do that. The latter suggests that respondents are informed and know that smart cities have massive potential in helping the environment.
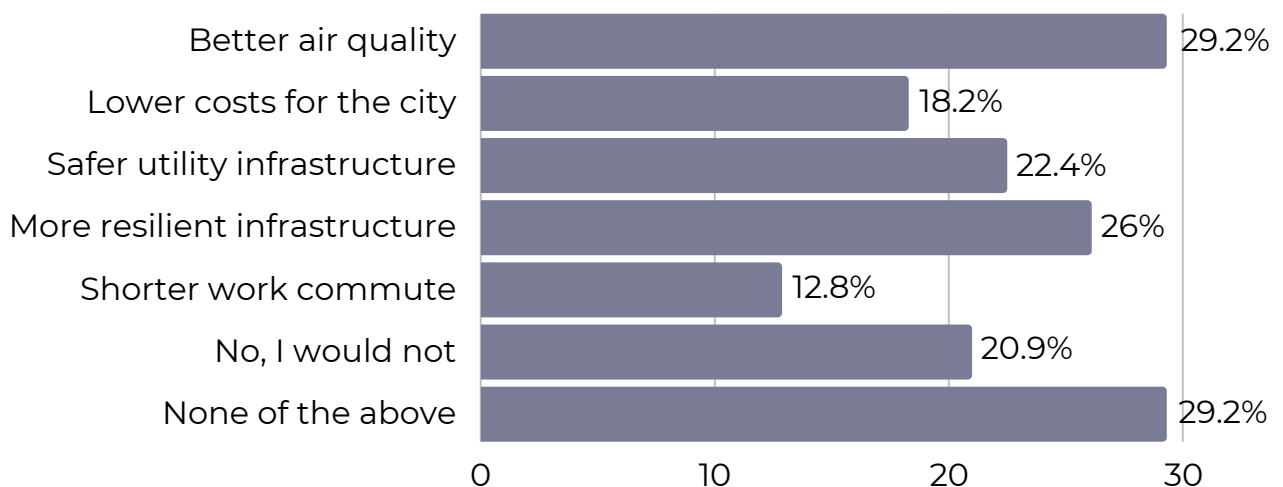
FIGURE 9: Why is your utility pursuing smart city initiatives or investing in smart city technology? (Select up to three).

To accelerate INNOVATION and adoption of new technologies	14.4%
To leverage available DATA sources & enhance collaboration	18.2%
To reduce total COST of ownership to maintain affordability for customers	22.4%
To improve ENVIRONMENTAL performance & livability	26%
To accelerate adoption of RENEWABLE energy sources & sustainable solutions	12.8%
To optimize OPERATIONAL costs and create internal efficiencies	20.9%
I don't know if my utility is pursuing smart city initiatives or technologies	29.2%

A fifth of respondents would not be willing to pay $10 more on a utility bill (Fig. 10); this may be because they cannot afford to pay, not just because they don't believe in the changes. Those who would be willing to pay primarily chose better air quality and safer/better infrastructure. Choosing improving air quality shows that citizens see that the air quality is not optimal right now and that there is room for improvement. The same applies to safer/better infrastructure. These are visible concerns that a lot of consumers are willing to pay to fix. More data would have to be gathered to see if paying $10 more is feasible.

FIGURE 10: As a citizen, you would be willing to pay $10 more on a utility bill if it included the following? (Select up to three).

Better air quality	29.2%
Lower costs for the city	18.2%
Safer utility infrastructure	22.4%
More resilient infrastructure	26%
Shorter work commute	12.8%
No, I would not	20.9%
None of the above	29.2%

The data shows that the majority of respondents are willing to pay $10 more on a utility bill if it could satisfy certain demands. This proves that if there were more communication between citizens and utility providers

Despite a small burden on consumers, many are willing to pay extra in their utility for safety, quality, and efficiency This would only be possible through better communication between the consumer and their utility provider.

CONCLUSION

The response from citizens shows that there is still a lot that needs to be done to inform the average consumer about smart cities. As discussed, informing citizens is vital in developing smart cities as good communication between utilities, city developers, and citizens will facilitate growth over the long term. The results from respondents also show that there is willingness from citizens to take action, either by engaging in smart city initiatives or paying a bit more on their utility bills. Although there is work to be done to inform citizens about smart cities and the intricacies that come with them, there is hope for a sustainable future.

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