Smart Cities are coming and they bring the promise of big data accessibility, data input from virtually every corner of a municipality, and many more benefits to both the public and the government. Vast quantities of raw data pervasive across the landscape mean the potential for greater knowledge and smarter decision-making. In the face of this data wave, is the Emergency Management industry prepositioned for success or ultimate collapse?

Supporting Smart Cities: Tomorrow's Emergency Management

RESILIENCE DESIGN

May, 2019

Introduction

While not a new concept[1] by any means, the Smart City initiative has become a standard[2] by which metropolitan areas are measured given that climate change, urbanization, and a growing population have made natural and manmade disasters business-as-usual. A Smart City utilizes the Internet of Things (IoT) as "an intelligent network[3] of connected objects and machines that transmit data using wireless technology and the cloud. Cloud-based IoT applications receive, analyze and manage data in real time to help municipalities, enterprises and citizens make better decisions in the moment that improve quality of life."

This wave of data associated with a Smart City is growing, and when it breaks, tomorrow's Emergency Management Department will have either embraced it, or will collapse under its force. A collapse will results from today's Emergency Management Department failing to recognize the need for maturity in a number of different characteristics that are currently in their infancy. Conversely, embracing tomorrow's data wave indicates changes made today. This article details a few of those necessary changes.

Embracing Resilience throughout the Disaster Management Lifecycle

The concept of resilience (indicating one's ability to 'bounce back' after an incident), while discussed for the past 50 years[4], has finally started to come to fruition[5]. This is evident in the way cities and other entities are refusing to re-build according to past designs, but are instead innovating to accommodate a disaster-ridden environment.

However, tomorrow's Emergency Management cannot wait to consider resilience only during the recovery phase, but must consider it through all phases of the Emergency Management Lifecycle. Perhaps the most vital characteristic of tomorrow's Emergency Management is the integration of the resilience component into the very fabric of Emergency Management discipline. Resilience is vital to a municipality returning to a new normal following an incident. Recent disasters have shown that very often, returning to normal does not mean returning to the pre-incident normal. This new normal is often

[1] Brasuell,J. (2015). *The Early History of the 'Smart Cities' Movement – in 1974 Los Angeles.* https://www.planetizen.com/node/78847.
[2] Funk, K; Deninger, N. (2018). *Five Innovative Examples of Smart Cities in the U.S.* https://bipartisanpolicy.org/blog/five-innovative-examples-of-smart-cities-in-the-u-s/.
[3] Gemalto, a Thales company (2019). Secure, sustainable smart cities and the IoT. https://www.gemalto.com/iot/inspired/smart-cities.
[4] Fleming, J. & Ledogar, R. (2008). *Resilience, and Evolving Concept: A Review of Literature Relevant to Aboriginal Research.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2956753/.
[5] Scherer, J. (Houston Chronical) (2019). *Turner Appoints Aho as Houston's Chief Resilience Officer.* https://www.chron.com/news/politics/houston/article/Turner-appoints-Aho-as-Houston-s-chief-resilience-13643157.php

leaner and more robust, and municipalities that integrate adaptiveness into their government and main street private sector entities are usually the first to find that new post-incident normal.

Smart Cities are advanced in their technology and infrastructure largely through private sector innovation and effort. The depth to which a municipality has utilized and integrated private-sector innovation into their day-to-day operations determines its "smartness". Those governments that collaborate heavily with innovative goods and technology will prepare resilience frameworks that consider the environment, economics, quality of life, and sustainability. Their planning efforts will focus on the ability to maintain a source of power throughout future response and recovery efforts in order to sustain data visibility and utilization; and rather than train the public solely on survival techniques, they will advance their education to include resilience practices and behaviors, changing the way the public views its "normal", thereby increasing the potential for the public's adaption to a new post-incident normal.

Embracing Business Process and Robotics Automation

Automated approval processes (including electronic document execution), form generation, workflows, and other Business Process Automation (BPA) aspects have only recently made their way to government entities. Additionally, Robotic Process Automation (RPA) is not fully matured and while its usage has increased greatly in the private sector, RPA is not widely used by the public sector. These could be the most significant obstacles for today's Emergency Management to assimilate itself into tomorrow's Smart City environment.

A Smart City gathers data and information from all corners of its municipality. The archival of data from past incidents, corresponding response, and resilience design efforts are catalogued and contextualized to the current state of the municipality through RPA with machine learning[6] to accommodate changing data environments. Preparation efforts are designed and implemented according to the overarching resilience paradigm, allowing for the creation of Response, Mitigation, and Recovery Plans that are more efficient, more successful, and are easily modified to accommodate the changing municipality and its public.

Though today's municipality data input is sourced from many different channels, it remains largely *reactive*. Tomorrow's Emergency Management could *proactively* receive more real-time data from the

[6] Papney, R. & Bharadwaj, R. (Ed.) (2019). *Cognitive Robotic Process Automation – Current Applications and Future Possibilities*. Emerj. https://emerj.com/partner-content/cognitive-robotic-process-automation-current-applications-and-future-possibilities/

public, buildings[7], and newly-places sensors that include logic decision trees, allowing for accurate analysis[8], decreasing response guesswork, and increasing Response Plan implementation efficacy.

Redefining the Office of Emergency Management

Pushing information overload to the next level may define those municipalities that take on the Smart City challenge before they're ready! Having already become empowered to hold their governments to task for planning, response, and recovery failures, the public may soon be a primary source of real-time incident-related data and information. All the other sensors and gadgets may only confirm what the public is reporting, while offering much-needed logic-tree determinations and predictive analysis. Any failures by the government to adequately foresee and proactively address incidents will not only be experienced by its public, but witnessed by the ever-growing list of non-U.S. cities that have appropriately learned to harness the benefits of a Smart City.

And in order for a municipality to realize the benefits of a Smart City, the Emergency Management Department needs to become *more* than a single government office with a mandate for collaboration and communication. Instead of a department staff comprised of primarily tactical operations personnel and planners, tomorrow's Emergency Management Department will be a Data Center and Communication Hub, with its staff implementing the analysis of the municipality's Smart City data, BPA and RPA development specific to emergency management objectives, and digital communications across mainstream and unconventional channels during disaster warning, response, and recovery.

Due to the Smart City's enhanced ability to forecast and plan due to available data, incident responses should be more focused and concise, with more automation implemented in response logistics and operations. The Data Center and Communication Hub will alert each appropriate government department to required response needs, while communicating efforts to the public as the response unfolds. This allocation of emergency management responsibilities across multiple municipality departments has already gained traction in New York City[9] following Super Storm Sandy.

[7] Phillips, J. (2019). *Cognitive: The Next Generation of Smarter Buildings.* https://www.ibm.com/blogs/insights-on-business/government/cognitive-next-generation-smarter-buildings/

[8] CiGen, (2018). *10 RPA Application Areas that You Can Implement In Your Company*. https://www.cigen.com.au/cigenblog/10-rpa-application-areas-you-can-implement-your-company.

[9] United States District Court Southern District of New York, (2014). *BROOKLYN CENTER FOR INDEPENDENCE OF THE DISABLED, a nonprofit organization, CENTERFOR INDEPENDENCE OF THE DISABLED NEW YORK, a nonprofit organization, GREGORY D. BELL, and TANIA MORALES, v. BILL DE BLASIO, in his official capacity as Mayor of the City of New York, and the CITY OF NEW YORK.* https://dralegal.org/case/brooklyn-center-for-independence-of-the-disabled-bcid-et-al-v-mayor-bloomberg-et-al/#files.

Summary

The changes indicated in this article are just a few of the many that today's Emergency Management Department should be assessing before the Smart City data wave breaks. But while the time until the next municipality's Smart City transformation is short, many ideas and innovations currently seeded by today's Emergency Management may have just enough time to mature into tomorrow's Smart City Emergency Management!

Resilience Design seeks to continually educate residents on the aspects of disaster management in hopes of building a more resilient community. Sometimes this education means teaching new facts while at other times it may include dispelling myths and incorrect assumptions. Be sure to look for future writings from us and visit us on LinkedIn or ResilienceDesign.org!