

# TMC'S ADVISOR

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## Digital Twins Improve Innovation *By Ellen Koskinen-Dodgson*

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If you prefer, you are always welcome to send Ellen an e-mail with your comments—[ellen@tmconsulting.ca](mailto:ellen@tmconsulting.ca).

We appreciate your help and input.



## Climate Change and Cell Phone Alerts *By Guy Robertson*

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## IoT Research Best Practices *By Lee-Ann Dittrich*

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# Digital Twins Improve Innovation

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## How They Work

Dynamic digital representations, or Digital Twins, can allow a company to understand, predict and optimize the performance of bridges, cars, buildings or, in future, even their business operations.

Digital Twins are fed IoT sensor data as well as maintenance records, weather reports, hazardous materials spill incident reports and any other potentially related data. This is the natural evolution of Big Data analysis today.

## Bridge Example

Before Digital Twins, a bridge would be designed using expert knowledge, simple models, complex calculations and sizable safety margins.

Whenever there was a partial or complete bridge failure, Engineers would review the investigation results and update their knowledge base for inclusion in their next design.

With the emergence of IoT sensors, masses of data can be collected, analyzed and used to update the Digital Twin. The Digital Twin would know the time of day traffic patterns



for pedestrians and cars, even to the point of knowing that bikes were improperly using the pedestrian areas. Sensor data would identify any minor sinking or twisting of the bridge deck or support towers as well as many other parameters.

## Public Policy

Digital Twins could be developed to reduce exposure to pollution. These could be used to determine the economic and other impacts of mandatory reductions in pollution exposure.

For an electric bike, sensors would collect information about traffic congestion, pollution, rider heart rate

etc. In areas of higher pollution, the electric motor would provide an assist to reduce the rider's breathing rate and hence, pollution intake.

In another example, a hybrid car could be 'forced' into electric mode when close to pedestrians or cyclists.

## Business Potential

Since anything can be modelled, Digital Twins could be developed to understand the implications of changes in business processes or strategy. Examples could include:

- Automating clerical level jobs in an organization
- Abandoning downtown centres and establishing distributed office 'hubs'
- Collecting direct and indirect data from consumer products during use or even from the consumers themselves

Have you considered Digital Twinning? If not, it's in your future.

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### Social Media Data

These days most people want to share their life by publishing facts and photographs. We have the urge to share—on services like Facebook. We 'tag' photos with names to show our circle of friends and we link to their profiles to form a giant pool of data.

Commercially, we do similar things with services like LinkedIn—again sharing our background and experiences. We also share business ideas and recommendations in a sort-of soft advertising format.

These vast libraries of ever growing data are a valuable source of information—which can be accessed and analyzed .

### The Dark Side

The negative to all this free sharing is when someone puts this data to uses for which the owner would never have given permission if they been asked.

Welcome to the world of Cambridge Analytica, who are in the news at present for harvesting personal data from Facebook to allegedly influence the US election. Their web site says:

*'Cambridge Analytica uses data to change audience behavior. Visit our Commercial or Political divisions to see how we can help you.'*



### About The Data

Facebook and other social media sites are seen as basically 'free' by users. Yet Facebook is very profitable with income from advertising and from marketing social data. In order to meet privacy laws, there is no link to the users who provide it. This is like taking a jigsaw puzzle that has a meaningful picture and breaking it up into pieces—none of which individually mean anything. Analytics companies specialize in creating jigsaw pictures from pieces they acquire and then selling the created 'pictures'.

### About The Uses

As users, we tend to look only at the 'pieces' not the pictures that can be created from them. We see no harm in publishing pictures of ourselves,

tagged with times and locations. We do not think that the inverse of this data clearly shows when we are not at home—which is useful to burglars.

We share fragments about our life and what we are doing, where and when. Put together, those fragments tell a story. If your LinkedIn profile shows that you work in avionics and your Facebook profile shows you spending time in particular cities then likely you are working on contracts with companies in those cities—something you may not have intended to share. Marines using fitness apps never intended to show the world where US bases are located.

### The Real World

We cannot stop analytical data mining—though lawmakers will try.

In the end we have only ourselves to blame. We need to take responsibility for our actions and stop expecting others to legislate it for us. Teach your employees not to share private data in public ways show them how simple facts like GPS and time tags can reveal way more than intended.

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# Climate Change and Cell Phone Alerts

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In the hot summer of 2017, more than 840 wildfires burned approximately 4200 square kilometres of BC's forests and neighbouring land. Hundreds of buildings—including 71 residences—were destroyed. What worries BC residents is a lack of adequate warning that a wildfire is approaching their area. In 2018, however, a new warning system could protect people and give them more lead-time to evacuate their communities.



## Climate Change

With climate change, wildfire season has grown longer and hotter. The threat to human settlements continues to increase.

"Big fires start small," says Andrew, a geotechnical engineer who has worked throughout BC. Last summer he and his team were forced to evacuate a Central Interior work site owing to smoke from a nearby wildfire. "At first we didn't think that it was necessary to leave, but the little fire grew quickly, and the local firefighters told us to go."

Andrew and his co-workers had just enough time to pack up their equipment before driving 30 miles to safety. They were fortunate. Soon the wildfire swept through their abandoned work site, leaving nothing but charred debris.

"It was the speed of the wildfire that scared me," says Andrew. "With the warmer temperatures, the ground and vegetation were extremely dry. They made great fuel for the blaze, and the wind pushed it our way more quickly than expected."



## New Alerting Capability

The Canadian Radio-Television and Telecommunications Commission (CRTC) asked wireless providers to develop a new function for the National Public Alerting System that will trigger an attention-grabbing alarm in smartphones when civil authorities issue an emergency alert.

Such alerts will reach smartphone users not only when wildfires break out, but also in the event of Amber Alerts, severe weather, and terrorist attacks. Considered by some emergency planners as long overdue, this technology could change the ways in which people respond to approaching threats.

"When your cell phone starts to squeal, you should pay attention and take action to protect yourself," says Linda, a BC paramedic. "A lot of emergency planners and responders will welcome a system that reaches the people in communities that are about to get hit by a wildfire or other disaster."

Smartphone emergency alerts can be directed at specific areas. Alerts will include information in English and French, and in some instances pictures will appear on phone screens. While the system is not foolproof, it constitutes a significant improvement over earlier technologies. And the occasional false alarm will be a small price to pay for increased public safety.

## Update Disaster Plan

How will smartphone emergency alarms affect the disaster plan? Your plans will require updating and revision. Another hot summer will arrive soon.

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## IoT Research Best Practices *By Lee-Ann Dittrich*

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### Today

Approximately half of surveyed organizations have defined metrics and currently use IoT for:

1. Monitoring and correlating events
2. Root cause analysis

Only forty percent use events to trigger alerts or automated actions.

Currently, the top IoT event analysis capabilities are used by half of respondents and deal with:

1. IT network or system outages
2. Cyber attacks

### Top Goals

The top goals going forward are:

1. Detecting fraud (60%)
2. Identifying opportunities for improvement (56%)
3. Complying with regulations (53%)

### Recommendations

The following recommendations are identified as best practices for IoT planning and implementation:

1. **Educate** managers and end users about IoT opportunities. Once educated, these are the people that will identify the most important business problems that need to be addressed.
2. Establish an **IoT Strategy** that



aligns with the corporate business strategy.

3. Improve your ability to **define which events to monitor**. Only 11% of participants say that they were excellent at identifying significant events or event trends to detect, monitor and analyze.
4. **Include wearables** in your planning. More than half of participants said that wearables such as smart watches, fitness monitors and wearable environmental sensors are important.
5. Consider using **the cloud** for IoT deployments even though only 23% of participants identified SaaS as their preferred approach.

Participants with cloud deployments identified higher levels of satisfaction with their applications and tools than those that did not use the cloud. They also reported lower costs.

6. Where possible, **use commercial tools and applications** rather than building custom applications. Over half of participants with purchased products were satisfied with their products where less than a third with custom applications were satisfied.

7. **Focus on usability and reliability** in selecting IoT systems. 29% reported dissatisfaction that end-users were not able to perform their own analyses on data. One third identified difficulty in deploying an easy-to-use interface and with analyzing data from multiple sources.

### Your Status?

Do you have an IoT Strategy? If not, ask for our [IoT Strategy Planning Guide](#).

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