The Internet of Things: P&C Carriers & The Power of Digital

Armed with information from the Internet of Things’ growing network of connected objects and devices, P&C carriers can create a new and better experience across the insurance value chain – from underwriting, pricing and risk management, to loss prevention, claims and customer retention.
Executive Summary

The increasing penetration of the Internet and the unrelenting digitization of our physical world has forever changed how we live, work and play. Rapid advancements in digital platforms and solutions are enabling a growing number of people, devices, places and objects to connect in ways never thought possible. This phenomenon has given rise to the Internet of Things (IoT) - the global network of small, powerful sensors and interconnected “things” that enables physical objects - from desktop and notebook computers, to wearable devices, smartphones, vehicles and equipment - to link and share data through the Internet. By 2020, more than five billion people and 50 billion things will be connected.¹

Not surprisingly, the Internet of Things has sparked the interest of many businesses and institutions - large, small, established and new. In 2014, approximately 65% of global companies surveyed had already deployed or were in the process of implementing IoT solutions.² Today, various industries are making IoT investments to improve safety and security, enhance the efficiency of operations, and keep risk at bay.

Initial IoT implementations tend to be product or device-centric (sensors used to improve operations with autonomous machines, or standalone sensors for consumer products, such as health and fitness devices). But as adoption grows and technologies mature, companies will focus more on the customer - allowing people and organizations to customize devices however they choose, and derive maximum benefits from this closely connected ecosystem.

The IoT’s impact extends well beyond traditional entities, and has piqued the interest of the P&C insurance industry at a time when carriers are struggling to grow and differentiate themselves by offering new products, moving into new markets, and acquiring and retaining more customers. Armed with information available from countless connected devices and sensors, P&C carriers can create a new digital experience across the value chain, reduce and mitigate losses, and
improve risk selection and pricing – all while delivering richer, more personalized experiences to commercial and personal lines customers. At the same time, IoT environments can bring new liabilities and exposures – compelling carriers to consider changes to their products, services and operating model.

Imagine a world where machines and materials can automatically resist and repair damage – making them inherently more sustainable, but requiring carriers to reexamine their replacement and actual cost value policies, and immediately take stock of such disruptions, since many of their customers are already embracing the IoT. While personal lines carriers are ahead in driving IoT innovation and making investments in auto telematics and smart homes, commercial lines carriers are just starting to explore the IoT in detail.

This white paper discusses the growing acceptance of the Internet of Things and the implications for the commercial lines insurance industry – concentrating on commercial auto, commercial property, workers’ compensation, general liability and inland marine lines of business. We believe that the IoT for commercial lines carriers will focus more on loss prevention and charging premiums commensurate with risks, and less on offering discounts. To succeed in this environment, carriers must overcome significant challenges around security, privacy and data standardization, and develop a value proposition that aligns with corporate objectives. Carriers will also need to build solid business and technology partnerships that can form the foundation for a resilient, secure, and standards-based ecosystem.

The commercial lines business is on the verge of an extraordinary transformation that will be buttressed by the IoT’s growing network of connected objects – altering the way organizations communicate, collaborate and conduct everyday business. To prepare for and stay in step with these advancements, we advise carriers to adopt a three-step framework (discover, ideate, prototype, pilot and scale) that enables them to extend and strengthen their capabilities in key areas.
Defining the Internet of Things

The term Internet of Things (IoT) was coined back in the 1990s. It refers to the vast network of physical objects – home and portable computers, mobile and wearable devices, vehicles, buildings and appliances – equipped with sensors that capture information (operating conditions, speed, pressure, leakage) and transmit this data to a central data store, or blockchain, to be processed and analyzed. This capability allows companies to derive meaningful intelligence from the information they collect and dispense; simplify processes; assure business security and continuity; and significantly improve operational performance (see Figure 1).

IOT Adoption

Investment in the Internet of Things is expected to grow from ~$650 billion in 2014 to ~$2 trillion in 2020, with a compound annual growth rate (CAGR) of ~17%. As connections expand, the IoT’s technology potential, capabilities and analyzable data will increase exponentially. This momentum is primarily due to three factors:

- **Enhanced wireless technology capabilities**: These advancements support the transmission of data at greater speeds, in real time, anywhere in the world.
- **The decreasing cost of sensors, Bluetooth, Wi-fi and near field communications (NFC)**: With prices coming down, more devices are connecting using Internet Protocol (IP) - improving penetration and making it easier to realize an early return on investment.
- **Emerging standards and protocols**: Partnerships between device manufacturers, network and platform providers, as well as industry associations, are resulting in new standards and protocols for data generation, transmission, and storage.

**What the Internet of Things Looks Like**

**Industrial/Commercial Applications**
- Smart energy (intelligent power; metering; smart wind turbines; robotics; vending machines)
- Connected vehicles/fleet self-driving/assisted driving vehicles; ice detectors
- Smart buildings (smart elevators; sensory lighting/heating; predictive maintenance; smart badges)

**Consumer/Personal Applications**
- Smart wearables (watches, fitness bands; health monitoring devices)
- Smart appliances (televisions, refrigerators, washing machines, dryers)
- Smart homes (smart appliances, thermostats, lighting, security, water pipe sensors)

**Representative applications for capturing information**
- Barcodes
- Global Positioning Systems (GPS)
- Near Field Communications (NFC)
- Wi-Fi
- Real-Time Location Systems (RTLS)
- Radio Frequency Identification (RFID)

**Representative technologies for capturing information**
- Artificial intelligence
- Big data analytics
- Cloud computing
- Data sciences
- Intelligent process automation
- Mobile computing
- Predictive analytics
- Robotics

**Generate additional sources of revenue**
**Make smart business choices**
**Enhance safety & security**
**Realize higher efficiencies & cost savings**
Approximately 90% of the world’s data was generated over the past two years. How companies utilize the massive influx of data unleashed by the IoT will be a huge factor in determining their future success. Not surprisingly, organizations’ interest has led to an increase in IoT-related investments. Recent media reports reveal that technology leaders such as Cisco, Dell, Amazon, Google, Microsoft and AT&T are pouring a lot of money into enterprise IoT solutions. Many of these companies are building platforms for supporting IoT-based infrastructures or machine learning – allowing enterprises to gather insights from the vast amounts of unstructured data generated by the IoT.

Businesses in nearly every industry (see Figure 2) are examining how the Internet of Things can help them achieve profitable growth and operate at peak efficiency. This puts the onus on P&C commercial lines carriers to keep pace.

IoT proof of concepts continue to emerge – from identifying ways to increase safety, enhance business processes and streamline operations, to demonstrat-
ing approaches for reducing risk exposure and improving business outcomes. These investments are expected to grow exponentially – a good reason for insurance carriers to piggyback on existing proof of concepts to develop preemptive systems for reducing risk, minimizing loss exposures and improving customer experiences.

**Implications for P&C Carriers**

The projected growth and adoption of the Internet of Things throughout industry segments has significant implications for P&C insurance companies. We believe that the large amount of data produced by IoT sensors and its immediate availability for making “in the moment” business decisions has the potential to change the way insurance carriers sell and service insurance products. Since large organizations have already begun to invest in the Internet of Things, commercial lines carriers must step up with strategies for leveraging IoT data and developing insights from these investments. For smaller companies that have yet to invest in the IoT, carriers need to educate them on the IoT business proposition and benefits.

**With capabilities afforded by the Internet of Things, carriers can better assess risk exposures and prevent losses by remotely monitoring data and taking corrective actions.**

In P&C commercial lines, the impact is being felt in virtually every business process – distribution, underwriting, pricing, loss prevention and claims. In the intermediary-driven commercial lines world, insights afforded by IoT technologies and solutions will enable carriers to strengthen relationships with customers and enrich their value proposition. These benefits apply to businesses of all sizes in various industry segments, although the impact will vary based on the level of IoT adoption and the ability to share and leverage data.

Historically, most carriers do not perform safety and risk inspections for small businesses. However, with the IoT, carriers can better assess risk exposure and prevent losses by remotely monitoring data and taking immediate corrective actions. For example, in the case of a restaurant, sensors on water mains and smoke detectors can inform carriers about the condition of water pipes and smoke detectors (for example, a history of freezing pipes, leaks, and the number of times smoke alarms are triggered).

Small businesses need to actively work to prevent loss and settle claims quickly, due to limited working capital and resources. Roughly 20% of small business owners were impacted by theft and burglary in the past five years, with claims averaging $8,000 per claim. The IoT can help overcome these issues with proactive measures such as automatically closing store doors or deploying traffic spikes in cases of theft or intrusions.
Businesses of all sizes are rapidly adopting IoT platforms and solutions - compelling commercial lines carriers to make changes to their core business processes and technology platforms, and determine how information from Internet-equipped sensors can best be used.

Some midsize and large businesses have already implemented IoT solutions. In these instances, carriers can use the data collected from these sources to develop innovative services and programs for specific industry segments, and improve underwriting, pricing, loss mitigation and claims resolution. These initiatives can lead to new partnerships and distribution models where carriers work directly with device manufacturers and service providers.

Businesses of all sizes are rapidly adopting IoT platforms and solutions - compelling commercial lines carriers to make changes to their core business processes and technology platforms, and determine how information from Internet-equipped sensors can best be used. For example, KUKA Systems Group's factory for Jeep Wrangler auto bodies connects devices and robots to a central data management system - enabling it to quickly adapt to changing production requirements, improve accuracy and eliminate waste. At the same time, the adoption and use of IoT environments can open new liabilities and risk exposures for customers. Carriers should consider making changes to their core product, coverage structure and services, and work on enhancing the skills of their underwriters, risk engineers, claims adjusters and actuaries. In this way, companies can be better prepared to handle the risks that come with IoT environments, including situations where liability transfers to equipment manufacturers (e.g., vehicle manufacturers assume liability for autonomous vehicles incidents). Carriers will also need to advise customers about the evolving IoT landscape, which requires a new way of thinking, as well as new operating models.

Carriers can also use this opportunity to educate their agents on having more informed conversations with their clients - adding more value and potentially increasing wallet share. Figure 3 on page 11 shows a framework for understanding how the Internet of Things will impact risk exposures, insurance products and distribution; the services and skills that insurance professionals will need going forward, and the key questions carriers should address.

Data from smart devices provides important, real-time insights for analyzing commercial risks, improving underwriting and pricing, and predicting losses - either preventing them or reducing their impact. (See pages 8-10.) Select scenarios are detailed later in this white paper.
# How The Internet of Things Impacts Major Commercial Insurance Lines

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<th>Line of Business</th>
<th>Key IoT Scenario</th>
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| **Commercial Property** | Reduce loss costs and improve pricing accuracy via real-time monitoring of property conditions - HVAC, water mains. (see Scenario #1 on page 11). | • Smart sensors located within buildings, HVAC and boilers remotely monitor temperature, humidity, water leaks, pressure, fractures and potential for freezing.  
• Information can be used to alert appropriate personnel with early warnings of abnormal equipment operation, and initiate remote diagnosis and maintenance as needed.  
• Carriers can leverage information from multiple sources (HVAC units, boilers, smoke detectors, water sprinklers) to gain a better understanding of exposures for underwriting and pricing and provide recommendations for loss control. |
|                  | Minimize sinkhole claims by constantly evaluating ground stability.                | • Sensors continuously track ground conditions in and around insured properties, allowing carriers to evaluate ground stability and notify insureds about the possibility of sinkhole collapses - minimizing damage to property and property contents, and even preventing loss of life.  
• Data from multiple sources (e.g., weather, soil characteristics) can help build robust predictive models for detecting potential sinkhole collapses.  
• Carriers can utilize insights from monitoring ground conditions to perform effective risk assessments and underwrite/price policies more accurately. |
|                  | Improve loss prevention and pricing accuracy of oil and gas fields through remote sensing. | • Ground sensors monitor oil capacity and oil characteristics such as oil level, viscosity and temperature to provide information on oil condition and quantity, and initiate preventive response if thresholds are not met.  
• Carriers can leverage these insights to determine risk exposures at any point, and accurately adjust price during premium audits. |
| **Commercial Auto** | Improve underwriting accuracy and driver safety through behavioral data. | • On-board diagnostics (OBD II) devices and wearables track things like acceleration; speed; braking; distance between vehicles; where and when drivers drive; phone/text usage, and number of stops – all in granular detail.  
• Information gathered from driver data and vehicle models can be used to create driver profiles and behavioral classifications.  
• Data from third-party sources (e.g., weather, GPS systems, social data) helps in building a robust commercial auto underwriting and pricing model.  
• Using insights from the data they collect, carriers can improve underwriting accuracy and develop driver training and safety programs. |
|                  | Enhance pricing and determine liability for smart/driverless vehicles (see Scenario #2, page 12). | • Smart products are changing how insurance can be sold, with the potential to split premiums between manufacturers and consumers.  
• Sensors track miles driven by a vehicle in both manual and driverless mode, as well as acceleration and braking.  
• Sensors continuously record malfunctions/lack of responsiveness of various automated components while a vehicle is in motion – improving the ability to effectively determine liability.  
• Pricing and underwriting will change, based on risk exposure (e.g., if a car is driving 60% in driverless mode, the rating would consider risk factors for 60% in driverless mode and 40% in manual mode). Analysis of driving patterns in both manual and driverless mode can be used to determine actual cause of loss, examine subrogation options with sensor manufacturers, and develop driver training programs. |
|                  | Improve risk management through continuous monitoring of vehicle conditions (predictive maintenance). | • Sensors track vehicle conditions (life of brake pads, engine oil) in real time, in granular detail.  
• Historical analysis of claims data helps carriers develop hypotheses around potential problems upfront (e.g., historical analysis suggests that vehicles with ~100,000 miles have a greater chance of brake-pad failures, ultimately resulting in “fender benders”).  
• Carriers can apply these hypotheses when planning maintenance activities, and forge partnerships with auto mechanics to provide discounts to insureds – resulting in a predictive ecosystem for reducing auto claims. |
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| **Workers' Compensation** | Reduce claims frequency and severity by monitoring workers' health and surrounding conditions using equipment such as sensor-equipped hard hats. | • Hard hat sensors monitor biometric signals to detect and communicate slip and fall. Sensors integrated in a typical construction helmet can monitor construction workers' blood gas saturation levels in a continuous and non-invasive mode and prevent fainting.  
• Data transmitted by hard hats can help determine a worker’s proximity to workplace hazards, and in conjunction with wearables can determine body movements and locate workers in real time. This can predict and prevent injuries, and reduce the frequency and severity of workers' compensation claims. |
| | Facilitate faster return to work and reduce overall claims payout via wearables data (see Scenario #3, page 13). | • Data from wearables (fitness and health monitors) and mobile devices are analyzed by return to work (RTW) coordinators (representing the insurance carrier) to keep a close tab on the overall progress of a worker’s recovery.  
• Physicians leverage mobile applications and collaboration tools to communicate with workers and monitor their progress.  
• Physicians can understand the health condition and progress of injured workers on a continual basis and identify other treatment options, if needed, without delay – helping to reduce claims payouts. |
| | Improve driver safety and minimize claims using data from vehicle telematics and wearables. | • Wearables track the condition and state of the driver, such as heartbeat, sleep patterns, and number of steps walked during the day to understand driver fatigue.  
• Data from vehicle telematics devices provides information on driver behavior (acceleration, braking, distance between vehicles) and analyzes driver responsiveness.  
• Carriers can monitor this information, alert employers, and help develop robust driver safety/loss prevention programs using interactive methods such as gamification – reducing the frequency and severity of workers’ compensation claims. |
| **General Liability** | Enhance pricing and effectively determine product recall exposures through continuous monitoring. | • Sensors track the condition of vehicles, machinery and other equipment to pinpoint problems and check conditions (air or fluid leaks, energy consumed, noise produced).  
• Manufacturers can use this data to update software remotely, or install new features (Tesla completed an “over-the-air” fix for approximately 30,000 vehicles, based on a recall from the NHTSA).38  
• Carriers can use these scenarios to improve pricing based on companies' product-recall processes and capabilities. |
| | Reduce fraudulent slip and fall claims through continuous monitoring. | • Sensors embedded in plant/office floors transmit friction characteristics and the amount of moisture on the floor on a continual basis – sending alerts when these conditions drop below an acceptable threshold and signaling for immediate preventive measures.  
• Carriers can monitor information to detect fraud (unexpected spills and similar fraud techniques employed by claimants) at the time of claims investigation. |
| | Minimize the severity and frequency of food recall claims through real-time tracking and monitoring. | • Edible RFID sensors monitor temperature, the presence of moisture, light exposure and jostling to evaluate the quality of food at each critical handoff.  
• Carriers receive information in real time and understand preventive measures taken by insureds to accurately assess and appraise food recall claims. |
### How The Internet of Things Impacts Major Commercial Insurance Lines

*(continued from page 9)*

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| **Marine**       | Use sensors to enhance pricing accuracy and estimate claims payout for art and high-value scheduled properties (see Scenario #4 on page 14). | • RFID sensors embedded in valuable artwork and high-value scheduled properties detect the frequency of movement and the quality of transporting conditions (temperature, humidity of the fleet), which helps carriers price policies accurately.  
• Information from sensors can be used to assess total inventory value at a given location and time in the event of a loss, allowing carriers to accurately estimate claims payout.  
• Additionally, the adoption of disruptive technologies such as IoT on a blockchain enables a single source of data for any artwork and high-value property to be shared - allowing carriers to determine the authenticity of artwork and minimize fraud. |
|                  | Improve underwriting of contractors’ equipment through real-time sensors. | • Sensors on contractors’ equipment monitor usage, including regions and terrains where equipment is used, to understand real-time exposures that impact high-cost machinery (difficult terrains such as mountainous regions; drilling heavy rocks).  
• Carriers can leverage this information to effectively underwrite and appropriately price contractors’ equipment risk. |
|                  | Improve pricing of marine exposures and reduce cargo theft claims through real-time tracking. | • Sensors in ships monitor information (fuel burn rate, battery usage, location, weather, ocean current) to optimize navigation, diagnose vessel operations, analyze fuel consumption and achieve operational savings.  
• Sensors track the location of individual freight and the conditions of the environment in which the package is stored (e.g., temperature, humidity). For example, the temperature conditions of highly combustible cargo could be tracked to ensure the safety of the entire cargo.  
• Sensors also track cargo status (when container doors are opened or closed) and provide geo-fencing capabilities - allowing carriers to improve loss-control measures.  
• Carriers can use this information to build robust models for effectively pricing marine exposures and reducing claims such as cargo theft. |
As IoT adoption starts to transform the way commercial lines carriers gather, process and analyze information, carriers should consider ways to apply these strategies and convert their potential into actual, game-changing business results.

Scenario #1: Reduce Loss Costs & Improve Pricing Accuracy via Real-Time Monitoring of Property Conditions

For a long time, systems that controlled building infrastructures, such as heating, ventilation, air conditioning (HVAC), boilers and lighting, lacked the intuitive monitoring and analytic capabilities needed to customize or integrate with other systems through standard methods.

Using the Internet of Things framework in commercial buildings can transform this environment. For example, intelligent sensors on HVAC units and boilers can monitor conditions such as temperature, pressure, the presence of leaks, • Could it create new risk exposures (malfunction, cyber, hacking/security, expensive repairs/replacement)?
• Could it create new liability exposures (E&O, D&O)?

Considerations as the IoT Goes Mainstream

Industry Segments

Manufacturing  Construction

Contractors  Healthcare

Transportation  Education

Energy  Aviation, Marine & Mining

EXPOSURES

• What are the specific industries and business segments that will be impacted first? What is the time frame?
• Does this require new coverages or endorsements?
• Should new underwriting guidelines, pricing and rate structures be developed?
• Are new coverages and forms available from bureaus like ISO, or does this require proprietary coverages and forms?

PRODUCTS

• Will this create new distribution models that require carriers to work directly with manufacturers to provide insurance?
• How do we unbundle insurance services like underwriting, claims, and reinsurance, and partner with players within this ecosystem? What is the operating model?

DISTRIBUTION

• Who should we partner with? What would this ecosystem look like?
• Will this create a new service opportunity for carriers to focus on preventive maintenance and customer retention?
• How could we start small? What sensors and data should we experiment with?

SERVICES

• What training should be considered for underwriters, risk engineers, and claims adjusters as they evaluate risk exposures and conduct site visits?
• What types of agent and customer trainings/education need to happen? Who is responsible for imparting them?
• Is there a need to create a specialized unit focusing on this area?
fractures, and the potential for freezing. When pulled together in real time, this information can signal early warnings of faulty equipment, and perform remote diagnosis and maintenance as required. Imagine a scenario where all the boilers and HVAC units in a building are monitored 24x7 against a set of thresholds. By combining this information with related data (information on occupants from wearables, mobile devices), carriers will be able to monitor risks more effectively and notify insureds immediately when thresholds are breached. They can automatically initiate the FNOL (first notice of loss) process based on sensor readings, and use this information for claims investigation, which can save costs and improve operational efficiency. Carriers can apply these insights, along with historical data, to build robust predictive models for accurate pricing and appropriate discounts. These capabilities can build the foundation for pay-as-you-use commercial property insurance.

A few carriers have already started investing in the IoT space. Hartford Steam Boiler (HSB), a leader in equipment breakdown insurance and other specialty insurance, invested in Waygum, a technology startup focused on developing a mobile app platform for the industrial IoT space.  

Carriers can automatically initiate the FNOL process based on sensor readings, and use this information for claims investigation, which can save costs and improve operational efficiency.

Scenario #2: Enhance Pricing & Determine Liability for Smart/Driverless Vehicles

Currently in the U.S., approximately 4,000 people are killed and 100,000 injured every year in accidents involving large commercial vehicles. Most of these incidents are caused by human error – resulting in a large number of claims for commercial lines carriers. Auto manufacturers have introduced several new features – emergency braking, adaptive cruise control, lane change assist and electronic stability control, for example – that require less monitoring by drivers. While these features can potentially reduce the number of accidents and save lives, they do not completely eliminate human errors. To address this problem, automakers and technology providers are developing smart vehicles that can drive in both modes – driverless and manual.

As driverless vehicles transform from high-concept to practical applications, they will easily shift from manual to driverless mode (see Figure 4). With this in mind, insurance companies will have to modify not only how they market future policies, but also how they underwrite, price, and administer claims. Also, the concept of miles driven will have to be closely examined. Assuming the probability of accidents will be less in driverless mode, intelligent sensors embedded in these vehicles can continuously track miles driven in both modes (manual and driverless) in real time, while calculating factors such as acceleration, braking, and distance between vehicles and objects. As a result, pricing will be based on risk exposure (e.g., if the car is driving 60% in driverless mode, the rating would consider risk factors for 60% in driverless mode and 40% in manual mode). These insights will help commercial lines carriers competitively price future policies for driverless vehicles – effectively opening the way for “pay as you behave” models.
As more vehicles are equipped with sensor components, determining the actual cause of loss and subsequent liability becomes critical. For example, an accident due to the malfunction of a sensor reading the distance between objects could be the fault of either the sensor manufacturer or the car manufacturer. Using data from the respective vehicles and objects, such as adjacent cars or signals, insurance companies can reconstruct the accident scene, and determine liability. In addition, understanding driver patterns, such as why drivers switch to manual mode when the vehicle could have been driven in driverless mode, will enable carriers to develop new driver-training modules, and employ dynamic loss prevention and claims processing.

**Scenario #3: Facilitate Faster Return to Work & Reduce Overall Claims Payout**

The overall industry combined ratio in the workers' compensation line of business has usually remained at more than 100% over the past few years. This implies that claims costs are higher in workers’ compensation, which means that carriers need strategies to improve profitability as medical costs rise.

Insurance carriers have encouraged their customers to improve the safety of work environments to reduce work-related injuries. Likewise, organizations are working to maintain safe, hazard-free working conditions for their employees. Yet in spite of these efforts, claims costs have continued to rise due to the spike in medical costs and the inherent risks associated with certain jobs.

One way to reduce claims costs is to implement a return to work (RTW) program. These initiatives have proven effective in helping injured workers return to work in a timely manner. RTW programs are based on the philosophy that many injured workers can safely perform productive work during their recovery. Having a RTW
A program in place is a win-win for both employee and employer – resulting in a reduction in claims payout and opportunity costs, and greater employee satisfaction and retention. For additional insight on our view of RTW, please read “A Smart and Connected Ecosystem for Faster Return to Work for Disability and Workers’ Comp Insurers.”

Data from sources such as wearable and mobile health monitors can be analyzed by physicians to understand the effectiveness of a patient’s treatment plan and make appropriate modifications. The same information can be utilized by the insurance carrier’s RTW coordinator to keep a close tab on the overall progress of a worker’s recovery and ensure that their return to work is authorized and timely. Physicians can also leverage mobile collaboration tools to communicate with injured workers and the RTW coordinator. Workers can use their mobile device to stay connected to their physician, the RTW coordinator, and their workplace. This capability can motivate workers to get well and focus on returning to work. It also helps them get up to speed sooner when they go back to work (see Figure 5). Faster return to work leads to a reduction in medical costs, as well as a reduction in wage replacement costs.

Scenario #4: Enhance Pricing Accuracy & Estimate Claims Payout for Arts & High-Value Scheduled Properties

Superstorm Sandy severely impacted the fine arts world, including the insurance side of it – changing how the collectibles industry views and manages various aspects of safeguarding and insuring assets. These include:

- Warehouse storage of fine art.
- Preparedness for disasters, as well as changing environmental conditions.
- Understanding valuations and loss limits.
After Hurricane Sandy, numerous art galleries in lower Manhattan suffered water damage, and struggled not only to repair their facilities, but also restore and reclaim their artwork. Many of these boutique galleries are “below grade,” meaning they are below street level (underground). Given that appraisal is such a critical aspect of the art industry, the condition of an item plays a huge role in determining its value. When unexpected exposures, such as water, come into play the value of a piece of art can change dramatically.

Currently, there is no accurate mechanism for systematically estimating the value of art. Insurance carriers must evaluate these works by performing a detailed, manual analysis and studying market value. The process is time-consuming and subject to inconsistencies if fluctuations in value are not properly captured and maintained by insurance carriers.

With sensors like RFIDs embedded in artwork, carriers and art dealers can uncover various exposures (humidity, temperature) at any given time; perform audits; assess the total value of inventory at a certain location; and detect any movement of high-value artwork. Using technologies such as blockchain, they can share a single, transparent source of the truth – allowing them to determine the authenticity of high-value scheduled properties and minimize fraud. For additional insight on blockchain, please read “Blockchain: Instead of Why, Ask Why Not?”

This information will also help carriers adjust insurance premiums based on any changes in the value of high-value scheduled properties. For example, if an artist's popularity increases, there is a corresponding increase in the value of their art. In cases where art is damaged by unexpected events, carriers can immediately and accurately estimate the loss in value, and reduce claims leakage using data generated by sensors.

**IoT Adoption Challenges**

As with any technology disruption, commercial lines carriers are bound to encounter challenges when adopting and operationalizing the Internet of Things. Early movers are likely to pursue specific opportunities to serve their customers better, reduce costs and provide more value. Long-term commercial success of the IoT will depend on how well carriers overcome its unique set of challenges:

- **Execute successful partnerships.** As equipment/product manufacturers are exposed to greater risks and liabilities, carriers’ business models will need to evolve to keep pace (e.g., Volvo is planning to accept all liability when its vehicles are in driverless mode). Carriers need to adapt to new distribution models and partner with appropriate players (i.e., manufacturers, service providers, integration framework providers) in the ecosystem. Also, the data from IoT sensors could be captured and maintained in a third-party system, which is outside the control of the carrier and its customers. Commercial lines carriers need to partner with these entities to leverage the resulting data and derive meaningful insights.

- **Create a compelling value proposition.** Although providing discounts for IOT use may be sufficient for early adopters, mainstream acceptance will require well-grounded, customer-oriented communication, education and loss mitigation. Given that a few businesses have already employed the Internet of Things to improve business operations and efficiency, carriers will need to convey a unique value proposition to illustrate the benefits they can bring to each industry and business segment, including but not limited to loss mitigation, pricing accuracy, and risk management.
• **Quell fears over privacy and security.** With advancements in technology, many if not most business elements are digitally tracked and observed. These insights have the potential to reveal critical personnel information when patched together. Given that remote sensors and monitoring are the core applications for IoT, heightened sensitivity over access control and data ownership is likely to result. Carriers will need to educate customers on ways to secure data and prevent security incidents.

• **Increase capacity to manage escalating data volumes and types.** The vast variety of devices and implementations within the IoT world will result in heterogeneous sets of data that vary in formats, quality and frequency. As carriers scramble to adapt to this new reality, they will be challenged to meet demands from the business, effectively manage the volumes and types of IoT data, and turn raw data into insights and foresights.

• **Overcome a lack of standards.** According to a survey by Light Reading, roughly 38% of businesses polled cited a lack of standards as the biggest stumbling block to IoT adoption. This challenge can be overcome if device manufacturers, service providers and system integrators work together to establish standards for gathering and making sense of IoT data from any number of sources and sensors.

**Moving Forward: An Action Plan for Commercial Lines Carriers**

The Internet of Things is evolving at a rapid pace, and will eventually become part of our everyday lives. Commercial lines carriers will be able to use the enormous amount of data available to them to understand their customers’ behavior at a detailed level – allowing them to deliver highly personalized products and services in a way that is impossible today. Most carriers are still experimenting with the IoT, and have yet to reach a stage where they can act on the information they gather. To take the next step, carriers should ask and resolve several important questions:

• How can we effectively pilot and understand the IoT’s value proposition?
• Which industry segment should we target for pilots?
• Are our customers currently using IoT sensors in their business operations? What kind of data are they collecting? Would they be willing to share the relevant data with us?
• What kind of partnerships should we develop with IoT device manufacturers and service providers?
• What new training programs/skills should we develop for our staff (e.g., underwriters, risk engineers, claims adjusters)?
• If our pilots are successful, how fast can we scale and become operational?

To address the above questions, we recommend a three-phase approach that can reduce time-to-market while minimizing the risk of large failed investments (see Figure 6). Our IoT innovation framework helps carriers think big, start small, learn fast and scale quickly. While the framework can be applied across a variety of commercial accounts (small, midsized and national), the implementation details, including commercial partnerships, value proposition and priorities vary with each business segment and customer type, depending on an organization’s specific needs and goals.
Digital will transform how businesses operate, connect, service and sell. Harnessing the IoT’s potential will require innovative thinking, as well as revamping the business strategy, operating model and processes, and making investments in new capabilities and talent. As carriers take on these challenges, they need to remember that along with early adoption, achieving strategic differentiation is crucial to reaping the long-term benefits of the Internet of Things.

A Framework for Accelerating IoT Adoption

**Discover**
Identify high-impact areas and develop hypotheses.

- Understand the IoT ecosystem and potential applications in commercial insurance.
- Identify target lines of business and industry segments (e.g., manufacturing, construction, transportation).
- Develop hypotheses utilizing sensors to understand/solve business problems (e.g., facilitating return to work by analyzing data from wearable devices for workers’ compensation).
- Prioritize the hypotheses.
- Develop business case for the impacted line of business based on prioritized hypotheses.
- Perform market scan to identify IoT sensors that can be used for the particular situation/hypotheses, as well as potential partnerships.

**Ideate & Prototype**
Partner with an IoT platform/device provider and prototype hypotheses.

- Evaluate IoT players to partner with for the prototype phase.
- Obtain necessary regulatory approvals, if required.
- Create simulations of each scenario; test concepts with end users in a variety of scenarios tailored to the type of commercial lines accounts that are primary targets.
- Develop plans to promote the adoption of sensor technology across lines of business and industry segments.
- Based on prototype results, establish partnerships with respective IoT players and outline the cost structure.
- Develop the business case, considering the revised scale of business; define key performance measures to monitor success.
- Determine target customer segments and value propositions.
- Determine process and technology investments that need to be made for aggregating/analyzing data, and merging it with existing processes/systems.
- Determine how sensor technology can be expanded to other lines of business.
- Develop a detailed strategy for operationalizing and scaling, including changes to the operating model; business process changes; skill enhancements; platform/technology changes, and change management.

**Pilot & Scale**
Seek real-world feedback and ensure readiness to scale.

- Perform real-world feedback on the pilot phase and ensure readiness to scale.

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Figure 6
Footnotes


About the Authors

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Acknowledgments

We would especially like to thank the following members of Cognizant’s IoT Practice for their valuable contributions during our research and brainstorming: Rajesh Rajagopalan (Director and Head of Delivery), Vishal Kelkar (Consulting Manager), Deepthi Menon (Senior Consultant), Dhivya S.T (Business Analyst), and Mathangi Nageswar (Associate Director).
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