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One doesn't need to be especially creative or innovative to come up with great new ideas, just smart enough to listen to creative people and collect ideas from experts.

In this spirit, the OWIC Executive Innovation Brief summarizes thinking from global innovation experts that we feel have application for forest industry companies.

In addition, each Brief includes insights from a group of advisors, listed below.

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OWIC EXECUTIVE INNOVATION BRIEF

# The Internet of Things: Opportunity for the Forest Sector?

**Spotlight on the Internet of Things.** PricewaterhouseCoopers (PWC).

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The Internet of Things (IoT) is the connectivity of physical objects with the Internet. PWC describes the IoT as “transforming everyday physical objects that surround us into an ecosystem of information that will enrich our lives.” There are possibly five billion connected objects today and this is expected to grow to around 25 billion by 2020. This development opens up many opportunities for forest sector companies.

You are already familiar with the basics of the IoT and are utilizing connected devices in your everyday life (think FitBit). Manufacturers are immersed in the IoT with sensors and scanners that are creating enormous amounts of data. Big Data is part of your world currently and will be more so in the future. Enhanced process efficiency is the obvious application of the IoT for manufacturing operations and there are many additive benefits to be discovered in internal operations. Here are examples of IoT uses internal to forest sector companies.

**Forestry:** Opportunities are especially obvious for intensive plantation operations. Google “smart vineyards” and you will find a host of companies offering a range of networked solutions for monitoring growing conditions and even predicting disease hotspots. Think of a similar system augmented with a fleet of networked drones and you can begin to picture the “smart forest.”

**Sawmilling:** The use of scanners and optimizers in sawmills has grown dramatically in the last decade resulting in vast amounts of data on log and lumber geometries, grade yields, real-time kiln conditions, etc. And much of this information is available remotely via wireless networks. Many companies now are exploring how to ‘mine’ these data to optimize their processes. For example, mills might try to link grade yields to specific forest regions to determine where they might find the ‘best logs’ to meet specific market needs.

**Distribution:** Sensors will play an increasingly important role in inventory monitoring and control. Enhanced partnerships between buyers and sellers will mean integration of systems along supply chains. Data from these systems will be used for increased forecast accuracy, reduced inventory levels, increased insight into customer needs, and reduced prices for customers. Sensors on forklifts and people could nearly eliminate the potential for unintended “interactions.”

Perhaps more intriguing than internal operations is the

innovations that lie in using the IoT externally, with customers, supply chain partners, and final consumers. How might the IoT be used to enhance your market orientation? How might forest products interact with other products via the IoT? Here are some examples of potential in various parts of the industry.

**Engineered Wood:** In-situ monitoring of structural members for integrity and moisture content is an obvious application and is already being done on an experimental basis. Are there service opportunities associated with knowing more about the status over time of structural products within a building? How might time series data inform development of new structural products?

**Doors and Windows:** Various components of houses are already highly connected to the Internet. Think of smart meters, smart thermostats, and systems where temperature, locks, etc. can be controlled remotely. Anderson offers a line of windows with VeriLock® sensors. Smart Glass from Glass Apps can go from clear to opaque. Biometric recognition for entry doors is bound to become common in the relatively near future. What are the yet-to-be dreamed up concepts for incorporation of windows and doors into the IoT?

**Underlayment:** If particleboard or other types of underlayment could function as a giant moisture sensor, in-home moisture problems could be eradicated. By sensing high moisture concentrations and warning the home owner of “dangerous” levels, leaks could be fixed before extensive damage or mold results.

**Packaging:** Smart packaging could interact with smart industrial refrigeration units at the wholesale and retail levels, during transportation, and smart refrigerators in consumer homes. Collaboration and sharing of data with the food manufacturer could lead to improvements and optimization of package size and design as well as identifying consumer preferences.

**Furniture and Cabinets:** Furniture already has touch screens that allow the user to make calls, listen to the radio, and browse the Internet<sup>1</sup>. A line of furniture designed to monitor user weight and blood pressure, with the option of delivering that data to health care providers is available<sup>2</sup>. One can imagine a whole suite of diagnostics being collected about the furniture user. Do they need to sit differently to improve their posture, for example? Data on how furniture is used will be accessed by designers and incorporated into future product development efforts.

The IoT is a prime avenue for cross-sector, cross-company collaboration and innovation. Most forest sector firms won't have in-house, IoT expertise, so collaborating in this realm is a logical pathway to more innovation opportunities.