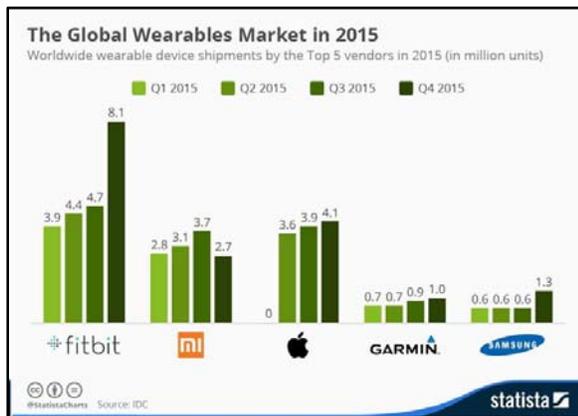


# Wearable Technologies

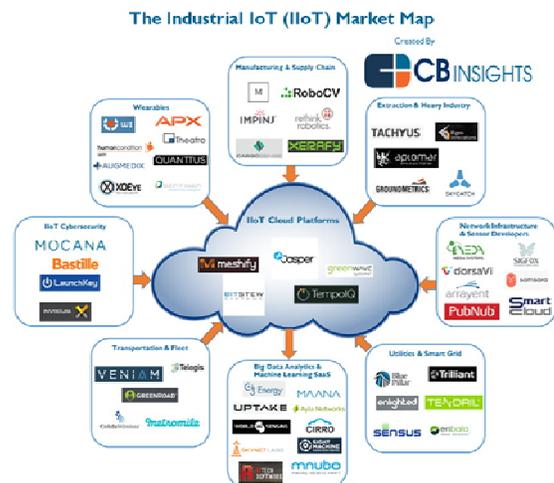
By Michael J Martin  
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In the consumer world, the Internet of Things (IoT) is exploding in popularity, mostly with wearable technology from leading vendors like FitBit, Apple, and Garmin to name just three.



Source: IDC

Applications vary, but the most popular is sport and health devices to measure heart rate, steps, stairs climbed and monitor sleep duration and patterns. These consumer devices are linked to your smartphone and often to web portals so users can interact and log their performance and progress.



Source: CB Insights

In the commercial world, such as in Mining, Oil, and Gas industries, these wearable devices are gaining attention for productivity, situational awareness, and safety reasons. A variety of innovations is seen for these industries. Here are a few of the more interesting and innovative devices showing up on the market.



Source: Author Photograph

A camera mounted on the worker's helmet provides video logging of the work activities and live streaming to the surface as well as to analytical processing and man-machine interfaces for intuitive control of machinery.



Source: Author Photograph

The wrist computer is a more convenient and portable user interface for machine control and communications. Interactions with pointing devices can provide novel and faster control over machines.



Source: Reuters

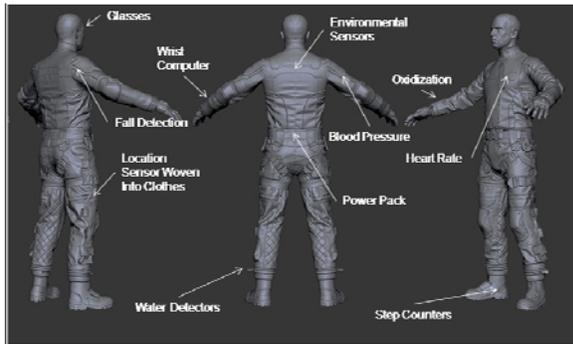
The visibility vest or jacket is standard equipped at every site for safety purposes to help workers to be seen. However, by adding IoT devices and communications into the vest, machines can be aware of worker proximity and automatically brake to prevent an accident. With embedded technology sensing the worker and transmitting a myriad of worker's vital signs in real-time, the vest can send out warnings when environmental conditions become dangerous, even if the workers are not aware of the situation themselves.



Source: SSI

Source: SSI

A variety of IoT devices from sensors, smart sensors, and actuators can be applied to the workers clothing for interactions and data capture.



Source: Mining Today Magazine

When properly equipped, workers become sensors of the local environment and the sensor readings can be fed back to the surface for correlation and modelling to form a real-time bigger picture view of the environment and the worker. Air quality and quantity, gas detection, temperature, humidity, water levels, and more, can all be gathered from the worker's wearable technology and shared with the mine management for analysis and decision-making.



Source: Coal Age, Mining Media International, 2014

Wearable vision systems integrated into the safety glasses provide telemetry, measure distances, display checklists, and snap pictures all while connected to a cloud to share the point of view of the field workers with the knowledge workers.

Whatever sensors and controllers are used, the worker can become enabled as a source of data capture and streaming.

What if... Potential Performance Gains in Key Sectors

Industry	Segment	Type of Savings	Estimated Value Over 15 Years (Billion nominal US dollars)
Aviation	Commercial	1% Fuel Savings	\$30B
Power	Gas-fired Generation	1% Fuel Savings	\$66B
Healthcare	System-wide	1% Reduction in System Inefficiency	\$63B
Rail	Freight	1% Reduction in System Inefficiency	\$27B
Oil & Gas	Exploration & Development	1% Reduction in Capital Expenditures	\$90B

Note: Illustrative examples based on potential one percent savings applied across specific global industry sectors. Source: GE estimates.

Image Source: GE

Source: General Electric

As the GE graphic above shows, that even if 1% of saving are earned over a period of 15 years, the dollar value saved is in the billions and the return on investment is substantial. In these hard economic times, every dollar saved can flow to the bottom line. However, wearable technology can provide less tangible returns too, especially when applied for worker safety purposes, which is paramount at every work site.

*Michael Martin has more than 35 years of experience in broadband networks, optical fibre, wireless and digital communications technologies. He is a Senior Executive Consultant with IBM Canada Ltd in the Network Services team. He was previously a founding partner and President of MICAN Communications and earlier was President of Comlink Systems Limited and Ensate Broadcast Services, Inc., both divisions of Cygnal Technologies Corporation. He holds three Masters level degrees, in business (MBA), communication (MA), and education (MEd). As well, he has diplomas and certifications in business, computer programming, internetworking, project management, media, photography, and communication technology.*