

# The Motivation For Innovation

by Luke Simpson, Associate Editor, IMPO

In an economic climate that demands efficiency and responsible spending, long term research and development (R&D) projects with no return-on-investment in sight can be a hard pitch. There is, however, evidence indicating that investing during a down economy pays off.

### SHOW ME THE MONEY

According to a survey conducted by the [Industrial Research Institute](#) [1] (ISI), R&D spending in the U.S. leveled off at the start of 2009—but it is not decreasing. In 2008, the survey revealed a “sea change index” of 27, indicating the highest level of R&D spending and hiring in 8 years. The index dropped to 1 in the most recent survey.

It appears that some industries are planning to cut more than others. Industry-specific data from ISI shows that food and petroleum companies are planning R&D spending increases for 2009, while chemical companies plan to decrease spending by 1.8 percent.

A [report](#) [2] in the Wall Street Journal found that R&D spending is only slightly down among 28 of the largest R&D spenders in the U.S. (excluding auto makers and the drug industry). While revenue for these companies has dropped 7.7 percent, total R&D spending is down only 0.7 percent across the board.

The report cites the iconic iPod—developed and released during the last downturn—and the GE 90 aircraft engines—a revolutionary engine launched during the early 90s—as recession-born innovations that eventually paid big dividends. Other notable companies and inventions to be developed or launched during a downturn include:

- 1981–1982: Personal computers first came to market; MTV launched
- 1974: Microsoft founded
- 1957–1959: Traders Joe’s founded; semi-conductors first came to market
- Great Depression: Hewlett Packard and Texas Instruments founded

Business Week recently released figures that could give any cost-cutting CEO a case of innovation motivation. The [report](#) [3] shows the cumulative increase in share price for 177 companies that increased R&D spending during the 2001–2002 downturn. Share prices for these companies increased by an average of 51 percent after 1 year; 88 percent after 3 years; and 136 percent after 5 years—roughly double the increases seen in the S&P 500 index for the same periods.

### NETWORK OF FUNDING

So where is all the money at the moment? Wireless sensor network (WSN) research

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is generating interest and massive funding from public and private sectors. A WSN is a network of devices that can monitor physical or environmental conditions and transmit the information wirelessly. Each node in the network has application-specific transducers that sense and transmit data using a radio transceiver or other communication device. Powering the nodes can be achieved using a battery, but solar and wind powered models are currently under investigation.

Research group On World recently released figures projecting R&D spending on WSNs to reach \$1.3 billion in 2012, up from \$522 million in 2007. In the U.S. the National Science Foundation granted \$416 million in active WSN awards, \$200 million of which went to WSN research groups at UCLA, UC Berkeley and the University of Michigan.

On World's report found that environmental and healthcare applications made up 68 percent of the targeted end-to-end applications for WSNs, while industrial applications made up only 17 percent. Mareca Hatler, an analyst with On World, sees four main areas of industrial WSN development.

"The major overall industrial WSN applications include process, machine health, environmental, and structural monitoring, and the specific applications that are included in the R&D funding projects are extremely varied and often focus on the WSN technology performance, security, or applications in specific environments such as underwater."

One of the main players in the industrial WSN market is Dust Networks Inc., founded in 2002 by UC Berkeley Professor Kris Pister, Ph.D. Dust's goal is to sell its [Smardust sensor technology](#) [4] to automation equipment manufacturers who then build the technology into their own products. In a recent [Q&A with Automation World](#) [5], Pister revealed that improvements in reliability, the emergence of wireless standards such as WirelessHART, ISA SP100.11a and "industrial" ZigBee, and reduced installation costs have made industrial WSN technologies more appealing for businesses. One company that is using WSN technology—Emerson Process Management—claims that the installation of wireless monitoring equipment is one-tenth the cost of wired technology.

So how will WSN technology intersect with current industrial control systems? Jonathan Collins, an analyst with ABI Research group, sees a number of paths that businesses can take. "WSNs will be deployed first as part of existing industrial automation systems. WSNs are also being considered as a tool for monitoring and condition-monitoring technology, serving as part of an incumbent industrial automation system, or being deployed as an "overlay" or "parallel" network separate from the control system."

"However, significant opportunities also exist for WSN technology to be deployed as a parallel or overlay network in plant environments, especially for condition-monitoring applications in which the WSN connects back to enterprise IT infrastructure. For example, enterprise resource planning systems include applications that address asset management and regulatory compliance," Collins adds.

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It's hard to imagine that a technology such as WSNs—with massive funding, low installation costs and almost unlimited applications—would not emerge from this recession as an in-demand technology. But any claim to revolutionary technology should be taken with a grain of salt. Just look at the ex-President of the Lewyt vacuum cleaner company, who in 1955 stated that “nuclear-powered vacuum cleaners will probably be a reality in 10 years.”

At the same time, people will always be speculative about the potential of new technologies. In 1959, IBM told the eventual founders of Xerox that “the world market for copying machines is 5000 at most,” and hence production could not be justified. In 2009, Xerox ranked number 147 on the Fortune 500 list with an annual revenue of \$17.6 billion.

What's your take? Email [luke.simpson@advantagemedia.com](mailto:luke.simpson@advantagemedia.com) [6]

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[1] <http://www.iriinc.com>

[2] <http://online.wsj.com/article/SB123819035034460761.html>

[3] [http://www.businessweek.com/blogs/personal\\_finance/archives/2009/01/research\\_spendi.html](http://www.businessweek.com/blogs/personal_finance/archives/2009/01/research_spendi.html)

[4] <http://en.wikipedia.org/wiki/Smartdust>

[5] <http://www.automationworld.com/feature-4770>

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