For innovation, give scientists intellectual challenge, independence

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(PhysOrg.com) -- Duke researchers measured innovative performance using the number of U.S. patent applications produced by employees.

Scientists and engineers who produce innovative work aren't in it just for the money, according to researchers from Duke University and the Georgia Institute of Technology.

Innovators' drive to create new ideas and inventions stems primarily from a desire for intellectual challenge and independence, say study co-authors Wesley M. Cohen, the Frederick C. Joerg professor of business administration at Duke's Fuqua School of Business, and Henry Sauermann, an assistant professor of strategic management at Georgia Tech.

"For innovators, the most important incentives may not be financial," Sauermann said.

The results come from an analysis of survey data, collected by the National Science Foundation, from more than 1,700 Ph.D. scientists and engineers who work in research and development at private firms.

The researchers measured innovative performance using the number of U.S. patent applications produced by employees. They linked this performance measure to employees' motives, including how much employees care about such factors as intellectual challenge, independence, salary, job security, opportunity for advancement,

responsibility and contributing to society. Scientists and engineers who highly ranked intellectual challenge, independence and income had the most patent applications.

Sauermann and Cohen found a strong relationship between hours worked and innovative output, with the peak of productivity reached at about 60 hours per week. However, longer hours did not explain why people interested in challenge or independence were more productive.

"Although people might think the impact of motives on innovation is measured simply by the quantity of effort that is expended, that is not the case," Cohen said. "The effect has more to do with the character -- rather than the quantity -- of effort."

One possible explanation for this correlation: "A desire for intellectual challenge may lead scientists and engineers to choose more promising projects," said Sauermann, who conducted the research at Duke as part of his doctoral thesis. "Or it may make them more curious about things, more creative."

In contrast, people who said job security was important had fewer patent applications than their peers. The need for job security may lead people to pursue safer projects, or it could cause risk aversion that may squelch creativity, the researchers suggest.

More information: A report on the study appears in the December 2010 issue of the journal *Management Science*: mansci.journal.informs.org/cgi … e&resourcetype=HWCIT

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