

***A Study on the Creative Sources of Commercialization***

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Continued interest in understanding how ideas are produced and the means by which they are diffused is driven by the belief that technological inventions spur wealth creation and stimulate economic growth (Mansfield, 1972; Rosenberg, 1974). Although innovation scholars have a reasonable understanding of the various individual factors that enhance creativity and research productivity, such as prior productivity (Simonton, 1999), connectivity (Burt, 2004; Collins, 1998; Girotra, Terwiesch, & Ulrich, 2010; Jeppesen & Lakhani, 2010; McEvily & Zaheer, 1999; Obstfeld, 2005; Singh & Fleming, 2010), and personal attributes (Dougherty, 1992; Jones, 2009; Leonard-Barton & Swap, 1999; Simonton, 1989; Stern, 2004), there is little work on drivers that lead to high rates of generation of commercially successful ideas. However, there is anecdotal evidence that some researchers are able to generate commercially successful ideas repeatedly, while others are able to generate ideas but many of which do not turn into commercial successes. Moreover, little is known about the cognitive and social factors that spur commercializable creativity and innovation within the context of firms.

The goal of this project is to explore the process by which firm researchers or teams of researchers conceive of commercially successful ideas and uncover patterns that are predictably linked to commercial outcomes. Once these behavioral trends are identified we can then understand how they can be incentivized intrinsically – through job recognition, training and employee involvement, etc. – and extrinsically – through traditional monetary rewards, shared rewards, as well as shared capitalism. The capability to create commercializable ideas is especially crucial at R&D intensive firms as costly R&D, uncertainty around paradigm defining technologies coupled with increased competition exert continued pressures of building a steady portfolio of innovative products. Thus, a better understanding of this process and the ability to better elicit such creativity that regularly leads to product commercialization would have significant implications for firm performance and competitiveness. However, most prior works that link creativity and innovation either stop short at investigating determinants of idea generation that lead to commercial hits or do not differentiate between generating innovative ideas and the commercial outcome of ideas. Moreover, there is a lack of consensus on how to best incentivize for such behavior (Eisenberger & Cameron, 1996). Thus, the findings of this project will inform this gap.

Since agents of innovation are individuals, I will take a bottom up approach focusing on individual and team behavior in order to gain a deeper understanding of how individual scientists and their teams enact creativity for commercialization purposes in their day-to-day activities. The project will make use of two research methodologies: inductive qualitative interviews and randomized controlled experiment to empirically test findings from the interviews. First, I would like to explore why some researchers or teams generate more novel ideas and create more commercial hits than others. Besides intrinsic differences, what do commercially prolific scientists and their teams do differently than their enabler peers? I hope to hone in on their behavioral patterns, such as how they pose and frame problems, how they interact with the environment and their teams, and how they go about solving the problem, etc. Ideally, I would interview the whole R&D organization of a small or medium enterprise or an entire R&D division at a larger firm. I will not only focus on prolific star

scientists and teams but also their enablers in order to paint a complete picture of the phenomenon. I am currently working on getting field access to a handful of high technology and biotechnology firms. Second, once I inductively uncover testable hypotheses of patterns that are predictably linked to commercial outcomes I will design a controlled experiment to test for them and infer causality. Participants will be asked to brainstorm for innovative ideas while randomly treating for factors found in the qualitative phase. These ideas will be evaluated for creativity and commercial viability by the participants themselves, their teammates, as well as judged by a panel of experts in the field.

This proposal links together two literatures. First, it contributes to the innovation literature by investigating the link between creativity and commercialization, and identifying behavioral patterns conducive to successful commercialization. Second, it also speaks to the industrial relations literature by exploring how such behaviors can be elicited. This project also departs from prior works in several ways: first, it differentiates between creative ideas and creative commercializable ideas; second, it digs deeper into the cognitive and social factors by which firm researchers or teams of researchers conceive of commercially successful ideas; and third, it uses a hybrid methodology that first offers a deeper understanding of the phenomenon with inductive qualitative interview data thereby offering a glimpse into the respondent's train of thought and sense making, and, then, testing the findings with a randomized controlled experiment.

Managers and executives will find this interesting because once we have a grasp of behavioral patterns that lead to consistent commercialization, they can be abstracted to inform many aspects of the management of R&D and its challenges, such as hiring decisions, talent training and retention, incentive design and organizational design, and, in turn, enhance product development and firm performance. Investigating this question is also interesting for policymakers. This work will inform the design of effective commercial-based innovation funding programs originating from by public or private grant giving agencies.

The output from this proposed research is a social science/management paper that focuses on uncovering and testing for behavioral patterns of researchers and teams of researchers who consistently generate novel ideas that are translated into commercial hits, shedding light on the link between creativity and commercialization. Aspired publication outlets include *Administrative Science Quarterly*, *Management Science*, and *Organization Science*.

The gracious funds from the NBER Innovation Policy Working Group research grant will be used in the initial fieldwork phase of the project for travel to interviews and transcription services (approximately \$7,000), in the experimental phase to run the experiments (approximately \$5,000), while remaining funds would be used as support as a post-doctoral fellow. In the long-term, it will also help kick start a line of research that tests these findings in organizational settings. These include exploiting a sudden change in shared capital policy, shared reward policy or employment practice that encourage a specific pro creativity and commercialization behavior implemented by a specific firm, or informing the design of a field experiment that incentivizes these behaviors inside an R&D intensive firm.