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### Commercialization of science: A longitudinal study of knowledge distance, firm capabilities, and the structure of licensing contracts

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## INTERACTIVE PAPER

### COMMERCIALIZATION OF SCIENCE: A LONGITUDINAL STUDY OF KNOWLEDGE DISTANCE, FIRM CAPABILITIES, AND THE STRUCTURE OF LICENSING CONTRACTS

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#### Principal Topic

Though the popularity of research on technology transfer offices (TTOs) has vastly increased, there is little empirical evidence of how the potential value for a technology is estimated and negotiated in a license. Limited qualitative work and empirical work (e.g., Owen-Smith, 2005) tap into the underlying decisions before a technology can be licensed. Consequently, we know very little on how a particular technology is valued and its impact on contract design. In this study, we analyze the content, design, and performance of 847 licensing contracts between university technology transfer offices and firms.

#### Method

*Knowledge distance.* Basic sciences in universities vary in the relevance, proximity, and creation of technology to industries (Klevorick et al., 1995). Discoveries in scientific domains that are more proximate to industry are more likely to be patented and licensed. Hence we posit that lower knowledge distance between science and industry will increase the likelihood of upfront payments and fixed annual payments.

*Firm capabilities.* Firms build absorptive capacity and capabilities in technology domains through investment in research and development (Cohen and Levinthal, 1990). Hence, firms with technology capabilities in a domain are more likely to negotiate fixed contracts than royalty based contracts. Hence, the technology capabilities of a firm will increase the likelihood of upfront payments and fixed annual payments.

*Relationship history.* The relationship history between the licensing firms and the TTO acts as conduit to transfer information on capabilities of the firm to the TTO and for firms to gain understanding on the discoveries made by academic inventors. Hence we posit that prior licensing history between the TTO and licensee firms positively moderates the relationships (a) knowledge distance, and (b) firm capabilities and the contract structure.

#### Results and Implications

Our study offers normative guidance for licensing managers in designing technology contracts. In addition, our theoretical and empirical contribution is significant. By using longitudinal data to estimate the economic effects of licensing contracts and their terms, we are able to throw light on theoretical models of licensing conducted in diverse areas such as game theory, agency theory and organizational sociology.

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