

When innovations meet institutions:
The role of design in technological revolutions

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Abstract: Introducing change into established social systems is a risky endeavor. To initially gain acceptance, entrepreneurs must locate their ideas within the set of existing understandings and actions that constitute the institutional environment yet simultaneously set their innovation apart from what already exists. To ultimately change the existing system, they must also retain the means to evolve beyond—even reshape—those existing institutions. This paper considers the role of design, as the emergent arrangement of concrete details that embodies a new idea, in mediating between innovations and established institutional fields. Analysis of perhaps the prototypical innovation, Edison's system of electric lighting, offers insights into how the grounded details of an innovation's design shapes its acceptance and ultimate impact. The notion of robust design is introduced to explain how Edison's design strategy enabled his organization to successfully gain acceptance for an innovation that would ultimately (and rapidly) displace the existing institutions of the gas industry. By examining the principles through which design allows entrepreneurs to simultaneously exploit the established institutions while retaining the flexibility to ultimately displace them, this analysis highlights the value of robust design strategies in innovation efforts.

Andrew Hargadon is Associate Professor of Technology Management and Director of Technology Management Programs at the Graduate School of Management at University of California, Davis. Professor Hargadon's research focuses on the effective management of innovation, and he has written extensively on the role of learning and knowledge management in innovation, on

technology brokering, and on the strategic value of design in introducing new technologies. He has published in *Administrative Science Quarterly*, *Organization Science*, *California Management Review*, *Research in Organizational Behavior*, and *Harvard Business Review*, and serves on the editorial board of *Administrative Science Quarterly*, *Organization Science*, *Organization Studies*, and the *Academy of Management Review*. He received his Ph.D. from the Management Science and Engineering Department in Stanford University's School of Engineering, where he was named Boeing Fellow and Sloan Foundation Future Professor of Manufacturing. He received his B.S. and M.S. in Stanford University's Product Design Program in the Mechanical Engineering Department. Prior to his academic appointment, he worked in IDEO and Apple Computer and taught in the Product Design program at Stanford University.