



Technology & Innovation Strategy (MGMT 927)

SPRING 2019 - QUARTER 4

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This quarter-length doctoral seminar deals with major streams of management research in technology strategy and innovation. We will focus on both classical topics such as incumbents' management of technological change and industry evolution, and new emergent topics such as ecosystems and platforms. The emphasis will be on understanding the link between technologies and firms in terms of both strategy choices and performance outcomes.

The syllabus lists main readings and optional readings for each class session. The optional readings offer a broader treatment and may serve as useful reference for the final assignment and for those interested in exploring research on a particular topic. You are expected to come fully prepared to discuss and critique the main readings. The readings for each class session have an internal logical flow and are best read in the sequence laid out in the syllabus. In addition, each student will serve as a discussion leader for one of the papers in sessions 2-5. The final assignment includes the development of a research proposal. More details of class requirements will be given in the first class session. We will meet on Mondays in SHDH 2034 from 1pm to 4pm.

SESSION 1: MODELS OF TECHNOLOGY AND INDUSTRY EVOLUTION

Sahal, D. (1981). Alternative conceptions of technology. *Research policy*, 10(1), 2-24.

Dosi, G. (1982). Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change. *Research policy*, 11(3), 147-162.

Abernathy, W. J., & Clark, K. B. (1985). Innovation: Mapping the winds of creative destruction. *Research policy*, 14(1), 3-22.

Anderson, P., & Tushman, M. L. (1990). Technological discontinuities and dominant designs: A cyclical model of technological change. *Administrative Science Quarterly*, 604-633.

Agarwal, R., & Tripsas, M. (2008). Technology and industry evolution. *The Handbook of Technology and Innovation Management*, 1, 1-55.

Optional:

Foster, R. (1986), "The S-curve: A New Forecasting Tool," Chapter 4 in *Innovation, The Attacker's Advantage*.

Utterback, J. M., & Abernathy, W. J. (1975). A dynamic model of process and product innovation. *Omega*, 3(6), 639-656.

Suarez, F. F., & Utterback, J. M. (1995). Dominant designs and the survival of firms. *Strategic Management Journal*, 16(6), 415-430.

Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *The American economic review*, 562-583.

Klepper, S. (1997). Industry life cycles. *Industrial and corporate change*, 6(1), 145-182.

Murmann, J. P., & Frenken, K. (2006). Toward a systematic framework for research on dominant designs, technological innovations, and industrial change. *Research Policy*, 35(7), 925-952.

Kapoor, R., & Furr, N. R. (2015). Complementarities and competition: Unpacking the drivers of entrants' technology choices in the solar photovoltaic industry. *Strategic Management Journal*, 36(3), 416-436.

Moeen, M., & Agarwal, R. (2016). Incubation of an industry: heterogeneous knowledge bases and modes of value capture. *Strategic Management Journal*.

SESSION 2: INCUMBENTS' MANAGEMENT OF TECHNOLOGICAL CHANGE I

Cooper, A. C. and D. Schendel (1976). Strategic responses to technological threats. *Business horizons* 19(1), 61-69.

Henderson, R. (1993). Underinvestment and Incompetence as Responses to Radical Innovation: Evidence from the Photolithographic Alignment Equipment Industry. *Rand Journal of Economics* 24(2), 248-270.

Christensen, C. M. and J. L. Bower (1996). Customer Power, Strategic Investment, and the Failure of Leading Firms. *Strategic Management Journal* 17, 197-218

Tripsas, M., & Gavetti, G. (2000). Capabilities, cognition, and inertia: Evidence from digital imaging. *Strategic Management Journal*, 21(10-11), 1147-1161.

Gilbert, C. G. (2005). Unbundling the structure of inertia: Resource versus routine rigidity. *Academy of Management Journal*, 48(5), 741-763.

Optional:

Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative science quarterly*, 439-465.

Henderson, R. M., & Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 9-30.

Rosenbloom, R. S. (2000). Leadership, capabilities, and technological change: The transformation of NCR in the electronic era. *Strategic Management Journal*, 21(10-11), 1083-1103.

Kaplan, S. (2008). Cognition, capabilities, and incentives: Assessing firm response to the fiber-optic revolution. *Academy of Management Journal*, 51(4), 672-695.

Danneels, E. (2011). Trying to become a different type of company: dynamic capability at Smith Corona. *Strategic Management Journal*, 32(1), 1-31.

SESSION 3: INCUMBENTS' MANAGEMENT OF TECHNOLOGICAL CHANGE II

Tripsas, M. (1997). Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry. *Strategic Management Journal*, 18(s 1), 119-142.

Rothaermel, F. T. (2001). Incumbent's advantage through exploiting complementary assets via interfirm cooperation. *Strategic Management Journal*, 22(6-7), 687-699.

Wu, B., Wan, Z., & Levinthal, D. A. (2014). Complementary assets as pipes and prisms: Innovation incentives and trajectory choices. *Strategic Management Journal*, 35(9), 1257-1

Kapoor, R., & Klueter, T. (2015). Decoding the Adaptability–Rigidity Puzzle: Evidence from Pharmaceutical Incumbents' Pursuit of Gene Therapy and Monoclonal Antibodies. *Academy of Management Journal*, 58(4), 1180-1207.

Benner, M. J. (2010). Securities analysts and incumbent response to radical technological change: Evidence from digital photography and internet telephony. *Organization Science*, 21(1), 42-62.

Optional:

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and corporate change*, 11(3), 529-555.

Hill, C. W., & Rothaermel, F. T. (2003). The performance of incumbent firms in the face of radical technological innovation. *Academy of Management Review*, 28(2), 257-274.

Taylor, A., & Helfat, C. E. (2009). Organizational linkages for surviving technological change: Complementary assets, middle management, and ambidexterity. *Organization Science*, 20(4), 718-739.

Eklund, J. & Kapoor, R. (2016). *Uncovering an Incumbency Paradox: Firms with the Greatest Need to Change Face the Greatest Stock Market Pressure to Conform*. Working Paper.

SESSION 4: FIRM BOUNDARIES AND TECHNOLOGICAL INNOVATION

Teece, D. J. (1996). Firm organization, industrial structure, and technological innovation. *Journal of Economic Behavior & Organization*, 31(2), 193-224.

Christensen, C. M., Verlinden, M., & Westerman, G. (2002). Disruption, disintegration and the dissipation of differentiability. *Industrial and Corporate Change*, 11(5), 955-993.

Wolter, C., & Veloso, F. M. (2008). The effects of innovation on vertical structure: Perspectives on transaction costs and competences. *Academy of Management Review*, 33(3), 586-605.

Kapoor, R., & Adner, R. (2012). What firms make vs. what they know: how firms' production and knowledge boundaries affect competitive advantage in the face of technological change. *Organization Science*, 23(5), 1227-1248.

Felin, T., & Zenger, T. R. (2014). Closed or open innovation? Problem solving and the governance choice. *Research Policy*, 43(5), 914-925.

Optional:

Afuah, A. (2001). Dynamic boundaries of the firm: are firms better off being vertically integrated in the face of a technological change? *Academy of Management journal*, 44(6), 1211-1228.

Argyres, N., & Bigelow, L. (2010). Innovation, modularity, and vertical deintegration: Evidence from the early US auto industry. *Organization Science*, 21(4), 842-853.

Kapoor, R. (2013). Persistence of integration in the face of specialization: How firms navigated the winds of disintegration and shaped the architecture of the semiconductor industry. *Organization Science*, 24(4), 1195-1213.

Helfat, C. E., & Campo-Rembado, M. A. (2016). Integrative capabilities, vertical integration, and innovation over successive technology lifecycles. *Organization Science*, 27(2), 249-264.

Cassiman, B., & Valentini, G. (2015). Open innovation: Are inbound and outbound knowledge flows really complementary?. *Strategic Management Journal*.

SESSION 5: TECHNOLOGICAL SYSTEMS AND INTERDEPENDENCIES

Rosenberg, N. (1979). Technological interdependence in the American economy. *Technology and Culture*, 20(1), 25-50.

Henderson, R. (1995). Of life cycles real and imaginary: The unexpectedly long old age of optical lithography. *Research Policy*, 24(4), 631-643.

Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3), 306-333.

Ansari, S., & Garud, R. (2009). Inter-generational transitions in socio-technical systems: The case of mobile communications. *Research Policy*, 38(2), 382-392.

Hargadon, A. B., & Douglas, Y. (2001). When innovations meet institutions: Edison and the design of the electric light. *Administrative science quarterly*, 46(3), 476-501.

Optional:

Ethiraj, S. K. (2007). Allocation of inventive effort in complex product systems. *Strategic Management Journal*, 28(6), 563-584.

Adner, R., & Kapoor, R. (2016). Innovation ecosystems and the pace of substitution: Re-examining technology S-curves. *Strategic Management Journal*, 37(4), 625-648.

SESSION 6: TECHNOLOGY PLATFORMS AND ECOSYSTEMS

Gawer, A. (2014). Bridging differing perspectives on technological platforms: Toward an integrative framework. *Research Policy*, 43(7), 1239-1249.

Zhu, F., & Iansiti, M. (2012). Entry into platform-based markets. *Strategic Management Journal*, 33(1), 88-106.

Kapoor, R. & Agarwal, S. (2016). *Sustaining Superior Performance in Business Ecosystems: Evidence from Application Software Developers in the iOS and Android Smartphone Ecosystems*. Working paper

Optional:

Gawer, A., & Henderson, R. (2007). Platform owner entry and innovation in complementary markets: Evidence from Intel. *Journal of Economics & Management Strategy*, 16(1), 1-34.

Boudreau, K. (2010). Open platform strategies and innovation: Granting access vs. devolving control. *Management Science*, 56(10), 1849-1872

Eisenmann, T., Parker, G., & Van Alstyne, M. (2011). Platform envelopment. *Strategic Management Journal*, 32(12), 1270-1285.

Ansari, S. S., Garud, R., & Kumaraswamy, A. (2015). The disruptor's dilemma: TiVo and the US television ecosystem. *Strategic Management Journal*.