

BSS4003A
Special Seminars in Business: Innovation and Productivity

Tentative schedule:

Wednesday, 9am-12pm

Riady Building, #2-1

I.P.L. Png

Riady Building, Level 6, Room 38

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This module introduces students to recent research in innovation and productivity, emphasizing econometric methods of data analysis. The module emphasizes a multi-disciplinary approach and critical appreciation of research papers. Students will analyze data, write reports, and engage in discussion. The module will especially help students who plan to write honours theses on innovation and productivity.

The only prerequisite is basic knowledge of statistics and algebra. If you would like some background, read Melissa Schilling, *Strategic Management of Technological Innovation*, 3rd/4th edition.

The following syllabus is subject to revision and will be updated online. Please refer to the Google drive for the current version.

Syllabus

Date	Subject	Assignment
Jan 14	Innovation	<p>Read any of the following books or articles: Eugene Fitzgerald, Andreas Wankel, and Carl Schramm, <i>Inside real innovation: How the right approach can move ideas from R&D to market: and get the economy moving</i>, Singapore: World Scientific, 2011 (Chapters 1-4) [HC79 Tec.Ft 2011 e-book]. Frans Johansson, <i>The Medici Effect: What Elephants and Epidemics Can Teach Us About Innovation</i>, Boston, MA: Harvard Business School Press, 2006 (Chapters 1-5). [HC79 Tec.J 2006 CL, HSSML] Alberto Savoia and Patrick Copeland, "Entrepreneurial Innovation at Google", <i>IEEE Computer</i>, April 2011, 56-61. William J. Abernathy and Kim B. Clark, "Innovation: Mapping the winds of creative destruction", <i>Research Policy</i>, Vol. 14 No. 1, 1985, 3-22.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. Summarize the authors' recommended strategies to increase innovation. 2. Compare the recommended strategies to possible alternatives. 3. How would you design an experiment to test the authors' recommendations?

Date	Subject	Assignment
Jan 21	Productivity	<p>Chad Syverson, "What Determines Productivity?" <i>Journal of Economic Literature</i>, Vol. 49 No. 2, 2011, 326-365.</p> <p>Nicholas Bloom, Benn Eifert, et al., "Does management matter? Evidence from India", <i>Quarterly Journal of Economics</i>, Vol. 128 No. 1, February 2013, 51.</p> <p>* James Levinsohn and Amil Petrin, "Estimating production functions using inputs to control for unobservables", <i>Review of Economic Studies</i>, Vol. 70 No. 2, 2003, 317-341.</p> <p>* Amil Petrin, Brian P. Poi, and James Levinsohn, "Production function estimation in Stata using inputs to control for unobservables", <i>Stata Journal</i>, Vol. 4, 2004, 113-123.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. Discuss the differences between innovation and raising productivity. 2. Identify and explain other important factors that might affect productivity which Syverson (2011) did not review. 3. Why is it important to know whether management can affect productivity? 4. Bloom et al. show that management makes a difference. Do they show that management is cost-effective? <p>Exercise:</p> <ol style="list-style-type: none"> 1. Estimate the growth of TFP and labour productivity in the Singapore economy over the last 20 years. 2. For any company that produces a single fairly homogeneous product -- airline, gas producer -- estimate TFP growth over the last 10 years.

* Supplementary reading

Date	Subject	Assignment
Jan 28	Psychology	<p data-bbox="539 320 1310 600">Beth A. Hennessey and Teresa M. Amabile, "Creativity", <i>Annual Review of Psychology</i>, Vol. 61, 2010, 569-598. Teresa M. Amabile, "Componential Theory of Creativity", Working Paper 12-096, Harvard Business School, 2012. Marilyn Oppezzo and Daniel L. Schwartz, "Give Your Ideas Some Legs: The Positive Effect of Walking on Creative Thinking", <i>Journal of Experimental Psychology: Learning, Memory, and Cognition</i>, 2014.</p> <p data-bbox="539 640 675 674">Questions</p> <ol data-bbox="587 678 1362 1249" style="list-style-type: none"> <li data-bbox="587 678 1362 813">1. How do Amabile's components apply to totally new, blue-sky inventions (eg, electricity, nuclear physics, Internet) as contrasted with problem-driven innovations (eg, electric vis-a-vis petrol-engine car)? <li data-bbox="587 817 1362 884">2. Discuss the limitations of the Consensual Assessment Technique. <li data-bbox="587 889 1362 956">3. If individual creativity is purely neurological, what are the implications for management and policy? <li data-bbox="587 960 1362 1028">4. Why does walking stimulate divergent thinking, but not convergent thinking? <li data-bbox="587 1032 1362 1249">5. When economists conduct randomized controlled trials, they typically check that the control and treatment groups are similar in terms of observable characteristics and the treatment does not spill over to control groups. In the walking experiments, what would you check?

Date	Subject	Assignment
Feb 4	Architecture	<p>Thomas Allen and Gunter Henn, <i>The Organization and Architecture of Innovation</i>, Routledge, 2006, Chapter 4. Umut Toker and Denis O. Gray, "Innovation spaces: Workspace planning and innovation in U.S. university research centers", <i>Research Policy</i>, Vol. 37, 2008, 309-329. Edwin Heathcote, "Lovely Laboratories", <i>Financial Times</i>, October 18, 2013.</p> <p>Questions</p> <ol style="list-style-type: none"> 1. "Most scientific breakthroughs have occurred in boring buildings. Can a new generation of architects change that?" (<i>Financial Times</i>). Please discuss. 2. Allen and Henn describe a factory (Skoda) and university faculty (TUM) arranged around a central spine. How scalable is this architecture? 3. Evaluate the empirical design of the Toker and Gray (2008) study. What do we learn from the study about the effect of office design on scientific productivity? 4. Referring to Toker and Gray (2008) Table 5, how would you estimate and report the effect of accessibility on interaction? 5. Toker and Gray (2008: 328) remark that "trying to build a local, regional or national innovation system on building blocks comprised of poorly designed public research facilities appears to be "penny-wise and pound foolish"". Please discuss.

Date	Subject	Assignment
Feb 11	Human resource management <ul style="list-style-type: none"> ● Selection ● Training ● Job rotation ● Suggestions ● Quality circles ● Decentralization ● Implementation 	<p>Keld Laursen and Nicolai J. Foss, "New human resource management practices, complementarities and the impact on innovation performance", <i>Cambridge Journal of Economics</i>, Vol. 27 No. 2, 2003, 243-263.</p> <p>Sandra Black and Lisa Lynch, "What's Driving the New Economy? The Benefits of Workplace Innovation", <i>Economic Journal</i>, Vol. 114 No. 493, 2004, 97-116.</p> <p>Nicholas Bloom and John Van Reenen, "Human resource management and productivity", <i>Handbook of Labor Economics</i>, Vol. 4, 2011, 1697-1767.</p> <p>Michael Gibbs, Susanne Neckermann, and Christoph Siemroth, "A Field Experiment in Motivating Employee Ideas", SSRN Working Paper 2420965, 2014.</p> <p>Virginia Stuart, "Prime Time", <i>UNH Magazine</i>, Fall 2013.</p> <p>* Matthew J. Lindquist and Mirjam Van Praag, "Why Do Entrepreneurial Parents Have Entrepreneurial Children?" Discussion Paper No. 6740, IZA, July 2012.</p> <p>Questions</p> <ol style="list-style-type: none"> 1. Laursen and Foss (2003: 258) conclude that the "application of HRM practices does matter for the likelihood of innovation". Do you agree? 2. Contrast the findings of Laursen and Foss with Black and Lynch. 3. How would you test for complementarities among new HRM practices in their effect on productivity? 4. In the Gibbs et al. experiment, suppose that control groups knew about the rewards given to treatment groups. How might that affect the behavior of control and treatment groups? 5. Discuss the importance of selection in producing innovation.

Date	Subject	Assignment
Feb 18	Diversity <ul style="list-style-type: none"> ● Gender, age, ethnicity ● Experience ● Education 	<p>Sander Hoogendoorn, Hessel Oosterbeek, and Mirjam van Praag, "The Impact of Gender Diversity on the Performance of Business Teams: Evidence from a Field Experiment", <i>Management Science</i>, Vol. 59 No. 7, 2013, 1514-1528.</p> <p>Ray Reagans, Ezra Zuckerman, and Bill McEvily, "How to make the team: Social networks vs. demography as criteria for designing effective teams", <i>Administrative Science Quarterly</i>, Vol. 49, No. 1, 2004, 101-133.</p> <p>Marc Gruber, Dietmar Harhoff, Karin Hoisl, "Knowledge Recombination Across Technological Boundaries: Scientists vs. Engineers", <i>Management Science</i>, Vol. 59, No. 4, 2013, 837-851.</p> <p>* Alberto Alesina, Johann Harnoss, and Hillel Rapoport, "Birthplace diversity and economic prosperity", Working Paper 18699, National Bureau of Economic Research, 2013.</p> <p>Questions</p> <ol style="list-style-type: none"> 1. Does diversity increase productivity, and if so, how? 2. Does diversity increase innovation, and if so, how? 3. Compare job rotation and diversity as ways to increase innovation. 4. Reagans et al. (2004) discuss their identification strategy on page 109. Discuss why their analysis does <i>not</i> identify the causal effects of diversity or network structure. 5. Hoogendoorn et al. (2013) use the same teams of students to study gender and ethnic diversity. What if gender is correlated with ethnicity? 6. Gruber et al. (2013) study recombination by individual inventors. For a business that employs half engineers and half scientists, what is the expected degree of recombination?

Date	Subject	Assignment
Mar 4	Organization <ul style="list-style-type: none"> ● Size ● Organic/mechanistic ● Weak/strong ties ● Vertical integration 	<p>Paul Strebels, "Organizing for Innovation Over an Industry Cycle", <i>Strategic Management Journal</i>, Vol. 8, 1987, 117-124.</p> <p>Morten T. Hansen, "The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits", <i>Administrative Science Quarterly</i>, Vol. 44, No. 1, March 1999, 82-111.</p> <p>Daron Acemoglu, et al., "Vertical integration and technology: theory and evidence", <i>Journal of the European Economic Association</i>, Vol. 8, No. 5, 2010, 989-1033.</p> <p>New York State Department of Health, <i>Adult Cardiac Surgery in New York State 2009-2011</i>, March 2014.</p> <p>Questions</p> <ol style="list-style-type: none"> 1. Discuss the distribution of weak and strong ties in Strebels's taxonomy of organizational structures -- team competition, simulated entrepreneurship, independent task forces, spin-offs. 2. Singapore Airlines provides low-cost travel through partly-owned Tiger Air and wholly-owned Scoot. Discuss from an organizational (not marketing) viewpoint. 3. To what extent and why does vertical integration increase innovation? 4. Refer to the New York state report on adult cardiac surgery, Appendices 1-3. To estimate the effects of hospitals and surgeons, what variables would you add to the regressions?

Date	Subject	Assignment
Mar 11	Benchmarking Learning	<p>Jerker Denrell and Chengwei Liu, "Top performers are not the most impressive when extreme performance indicates unreliability", <i>Proceedings of the National Academy of Sciences</i>, Vol. 109, No. 24, 2012, 9331-9336.</p> <p>Amitabh Chandra, "Economics Meets the Geography of Medicine", Harvard University, September 2012.</p> <p>C. Lanier Benkard, "Learning and Forgetting: The Dynamics of Aircraft Production", <i>American Economic Review</i>, Vol. 90 No. 4, 2000, 1034-54.</p> <p>Rebecca Achee Thornton and Peter Thompson, "Learning from Experience and Learning from Others: An Exploration of Learning and Spillovers in Wartime Shipbuilding", <i>American Economic Review</i>, Vol. 91 No. 5, 2001, 1350-68.</p> <p>Questions</p> <ol style="list-style-type: none"> 1. Should organizations invest more in learning from best practices? <p>Exercise:</p> <ol style="list-style-type: none"> 1. New York: Chart risk-adjusted mortality rate against experience.

Date	Subject	Assignment
Mar 18	Adoption of innovations <ul style="list-style-type: none"> ● Recognizing opportunity ● Absorptive capacity ● Competition 	<p>Bass, Frank M., "Comments on "A New Product Growth for Model Consumer Durables: "the Bass Model"", <i>Management Science</i>, Vol. 50, No. 12, 2004, 1833-1840.</p> <p>Wesley M. Cohen and D. A. Levinthal, "Absorptive capacity: A new perspective on learning and innovation", <i>Administrative Science Quarterly</i>, Vol. 35 No. 1, March 1990, 569-596.</p> <p>Steven F. Bolling, et al. "Predictors of Mitral Valve Repair: Clinical and Surgeon Factors", <i>Annals of Thoracic Surgery</i>, Vol 90 No. 6, 2010, 1904-1912.</p> <p>David Atkin, et al., "Organizational Barriers to Technology Adoption: Evidence from Soccer-Ball Producers in Pakistan", Yale University, May 2014.</p> <p>Philip Anderson and Michael L. Tushman, "Technological Discontinuities and Dominant Designs: A Cyclical Model of Technological Change", <i>Administrative Science Quarterly</i> , Vol. 35 No. 4, December 1990, 604-34.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. What does the Bass model teach us about getting consumers to adopt a new product? 2. In the Bass model, current adoption depends on past adoptions. Discuss the challenges in estimating this model. 3. "When the competition process is artificially forestalled, dominant designs may not emerge. Such cases arise under regimes of high appropriability" (Anderson and Tushman, 1990: 614). Please discuss.

Date	Subject	Assignment
Mar 25	<p>Open innovation</p> <ul style="list-style-type: none"> ● User innovation ● Alliances ● Joint ventures ● Open source <p>Bottom-up innovation</p> <ul style="list-style-type: none"> ● Appropriate technology ● Frugal innovation 	<p>Henry Chesbrough, "New Puzzles and New Findings", Chap. 2 in Henry Chesbrough, Wim Vanhaverbeke, and Joel West, eds., <i>Open Innovation: Researching a New Paradigm</i>, Oxford: Oxford University Press, 2006.</p> <p>Jens Frøslev Christensen, Michael Holm Olesen, Jonas Sorth Kjær, "The industrial dynamics of Open Innovation -- Evidence from the transformation of consumer electronics", <i>Research Policy</i>, Vol. 34 No. 10, December 2005, 1533-1549.</p> <p>Eric von Hippel, <i>Democratizing Innovation</i>, Chaps 1-2, Cambridge: MIT Press, 2005.</p> <p>Vijay Govindarajan and Ravi Ramamurti, "Reverse innovation, emerging markets, and global strategy", <i>Global Strategy Journal</i>, Vol. 1 No. 3-4, 2011, 191-205.</p> <p>[Pasha : Aravind Eye Hospital]</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. Why should any organization <i>not</i> engage in open innovation? 2. How should competition affect an organization's open innovation strategy? 3. Discuss the role of user innovation in B2B vis-a-vis B2C contexts. 4. How does open-source innovation work? Compare with proprietary innovation. Discuss in the contexts of Linux and Wikipedia. 5. Contrast: (i) Jaipur foot and bottle light (http://www.bbc.co.uk/news/magazine-23536914) with (ii) SMS and pre-paid mobile service.

Date	Subject	Assignment
Apr 1	Location <ul style="list-style-type: none"> ● Clustering ● Knowledge spillovers ● Professional mobility 	<p>Juan Alcacer and Wilbur Chung, "Location strategies and knowledge spillovers", <i>Management Science</i>, Vol. 53 No. 5, May 2007, 760-776.</p> <p>Stefano Breschi and Francesco Lissoni, "Mobility of skilled workers and co-invention networks: an anatomy of localized knowledge flows", <i>Journal of Economic Geography</i>, Vol. 9 No. 4, 2009, 439-468.</p> <p>Gerald Carlino and William R. Kerr, "Agglomeration and Innovation", in <i>Handbook of Regional and Urban Economics</i>, forthcoming.</p> <ol style="list-style-type: none"> 1. Discuss the extent of spill ins and spill outs. Examples: Silicon Valley, but Microsoft? 2. Discuss how researchers measure innovation and the limitations of these measures.

Date	Subject	Assignment
Apr 8	Appropriation <ul style="list-style-type: none"> ● Patents ● Copyright ● Trademark ● Trade secrecy ● Covenants not to compete 	<p>Teece, David J., "Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy", <i>Research Policy</i>, Vol. 15, No. 6, 1986, 285-305.</p> <p>Albert G.Z. Hu and I.P.L. Png, "Patent rights and economic growth: Evidence from cross-country panels of manufacturing industries", <i>Oxford Economic Papers</i>, Vol. 65 No. 3, July 2013, 675-698.</p> <p>Heidi L. Williams, "Intellectual Property Rights and Innovation: Evidence from the Human Genome", <i>Journal of Political Economy</i>, Vol. 121 No. 1, 2013, 1-27.</p> <p>I.P.L. Png, "Law and Innovation: Evidence from State Trade Secrets Laws", September 2014.</p> <p>Matt Marx, Deborah Strumsky, and Lee Fleming, "Mobility, Skills, and the Michigan non-compete experiment", <i>Management Science</i>, Vol. 55, No. 6, June 2009, 875-889.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. How do spillins and spillouts depend on the laws of intellectual property law, trade secrets, contract, and employment? 2. <p>Exercise: Estimate patents as function of revenue and R&D.</p>

Date	Subject	Assignment
Apr 15	<p>Competition</p> <ul style="list-style-type: none"> • Domestic • International <p>Government policy</p> <ul style="list-style-type: none"> • Lead user • Subsidies, tax incentives • Higher education 	<p>Joseph A. Schumpeter, <i>Capitalism, Socialism, and Democracy</i>, Harper & Row, 1942, Chap. VII-VIII (pp. 81-92).</p> <p>Aamir Hashmi, "Competition and Innovation: The Inverted-U Relationship Revisited", <i>Review of Economics and Statistics</i>, Vol. 95 No. 5, December 2013, 1653-1668.</p> <p>Aw, Bee Yan, Mark J. Roberts, and Daniel Yi Xu, "R&D Investments, Exporting, and the Evolution of Firm Productivity", <i>American Economic Review</i>, Vol. 98 No. 2, 2008, 451-56.</p> <p>Daniel Wilson, "Beggars thy neighbor? The in-state, out-of-state, and aggregate effects of R&D tax credits", <i>Review of Economics and Statistics</i>, Vol. 91, No. 2, 2009, 431-436.</p> <p>Questions:</p> <ol style="list-style-type: none"> 1. Schumpeter analogized from patents to argue that market power encourages the process of "creative destruction". Does this mean that government policy should not restrict monopolies and cartels? 2. <p>Exercise: Evaluate Singapore's Productivity and Innovation Credit</p>