

**RUTGERS UNIVERSITY
RUTGERS BUSINESS SCHOOL Ph.D. PROGRAM**

**GRADUATE COURSE IN CORPORATE INNOVATION AND
INTERNATIONAL BUSINESS
RBS Course Code 26:553:604:01
DGA Course Code 26:478:596:01**

COURSE CONVENOR: PROFESSOR J.A. CANTWELL

**(1 Washington Park, Room 1093, office hour Tuesday, 4-5pm
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Spring Semester 2020

Class Program and Reading List

Course outline description, and requirements of students

An outline description of the course in Corporate Innovation and International Business:

This course shows how the multinational firm depends critically on its technological and related skills to achieve its central strategic objectives. Introductory classes consider the determinants and characteristics of corporate technological change, and the linkages between science and technology, and the consequences of their geographical localization for international business. Then we assess the contention that corporate strategy should include a strategy for managing innovation, the purpose of which is deliberately to accumulate and exploit firm-specific knowledge. The course examines the implications of technological change as a learning process, for inter-company technology-based alliances, for international technology transfer, and for capturing the returns to innovation in the multinational firm. The innovative records of large and small firms are compared. The use of corporate patent statistics is appraised as a means of measuring patterns of innovation at the firm level. The course concludes with a discussion of systems of innovation, and of technology policies.

Requirements of students on the course:

1. To attend all weekly classes, and any other additional lectures as may be advised from time to time. The weekly classes are to be held on Tuesdays from 1pm to 3.50pm, and the full schedule is set out below.
2. To complete a term paper by the end of the Spring semester, to be submitted in week 15 (by Monday, May 4th). Term papers should not normally exceed 2,500 words of text (the bibliography is not part of this word count). The title for the term paper must be chosen from the titles given below, each associated with a particular class topic (from topics 2-11; it is not possible to write on topic 1, which is a background introduction). The term paper must demonstrate an understanding of the issues raised in the relevant lecture, and make reference to the readings set for that topic. The term paper must answer the question set, with reference to the key themes of the course articulated in the lectures and readings. It is not to be treated as an independent research paper. All students should read the chapters and articles indicated in the lists below, whether or not they are writing their term paper on that topic. The course has been designed as an integrated treatment of the subject with underlying connections between topics. The term paper should therefore also demonstrate an appreciation of how the answer to a specific question on a given topic fits into the broader context of the course. The course must not be regarded as a set of 11 separate topics that can be treated in isolation from one another. Thus, while students are welcome if they wish to undertake additional reading on the topic of their term paper, this must be related to or used to critique the central themes of the course in the term paper. Any such extra readings should not be used in the term paper merely to provide

some other alternative essentially unrelated approaches to the topic, and in particular additional readings on a specific topic must not be regarded as a potential substitute for undertaking (and where they are relevant, referring to) the readings for other topics that are also part of the course. To reiterate: a term paper should answer the question set so as to (i) incorporate understandings derived from all the readings for the relevant topic and from the lecture on that topic, (ii) incorporate reference to other selected readings required in the course, and to general themes that recurred at various stages during the classes, and (iii) should only incorporate other references not included in the readings for the course to the extent that these help build upon and consolidate (but not detract from) the key themes and content of the course.

3. For Ph.D. students, and selected M.S. students, to give a presentation on their chosen topic to the class towards the end of the semester, prior to the submission of the paper itself at the end of the semester. Presentations can last for a maximum of 15 minutes when given by just one student, and for a maximum of 20 minutes when a joint presentation is given by two or more students (the allotted time then being divided equally between them). Presentations are to be prepared in PowerPoint, and to ensure that the necessary time limits are observed they must be contained in a maximum of 12 slides per student for a lone presenter or 8 slides per student in the case of joint presentations (excluding a title slide, if there is one), and all the text of each slide must be in at least a minimum font size of 24. Any presentation that does not conform to these guidelines may be stopped before it is completed. A hard copy of the slides to be used is to be given to the course convenor prior to the oral presentation. Topics will be allocated in week 1 (January 21st), and presentations will be scheduled for specific slots during the classes in weeks 13 or 14 (April 14th or April 21st). Where students give presentations, assessment will be 25% for the presentation, and 75% for the paper.
4. Those students that will give presentations are expected to consult the class materials for their topic ahead of the session to be held on that topic, and to prepare some questions on the lecture in order to begin a class discussion once that week's lecture has been completed.

Learning goals and objectives

This course is designed to help graduate students to acquire advanced knowledge in the area of specialization of International Business. Students who complete this course will demonstrate mastery of some fundamental concepts used in research in the International Business field.

Students develop this knowledge through the following course activities and assignments:

(i) *Lectures*, that deliver basic concepts, arguments and methods used in research in the field, and explain how they are related, to provide an integrated perspective on the subject area. Some common themes are shown to apply in more than one context, and so the lecture materials ensure that the course is more than just the sum of its parts.

(ii) A *term paper*, in which each student is required to individually complete a paper which answers a specific question on a topic covered in the course. In doing so, the student is expected to demonstrate their understanding of some selected key research themes that have been highlighted during the course.

(iii) Doctoral students on the International Business major in the Ph.D. Program in Management need to successfully pass a *qualifying exam*, following the completion of their coursework.

Academic integrity

I do *not* tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy, see:

https://slwordpress.rutgers.edu/academicintegrity/wp-content/uploads/sites/41/2014/11/AI_Policy_2013.pdf

I will strongly enforce this Policy and pursue all violations. On all assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through SafeAssign on Blackboard, a plagiarism detection service that compares the work against a large database of past work. Do not let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

Support services

If you need accommodation for a disability, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. <https://ods.rutgers.edu> If you are a military veteran or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of mental health services, please use:

Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>

If you are in need of physical health services, please use:

Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>

If you are in need of legal services, please use: <http://rusls.rutgers.edu/>

If you are in need of additional academic assistance, please use:

Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>

Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>

Class topics

1. Establishing corporate technological competence as an evolutionary process.
2. The determinants of corporate technological change.
3. The role of science in technology, and the localization of science-technology linkages.
4. The changing motives for internationalization of technological activity, with the emergence of multinational company networks.
5. Alternative approaches to corporate technology strategy.
6. Inter-firm technological cooperation and international technology transfer.
7. Comparing innovation in small and large firms.
8. The connection between the internationalization and diversification of corporate technology.
9. Capturing the returns to innovation in the multinational firm.
10. The measurement of technological change: the use of corporate patent statistics.
11. National systems of innovation, institutions and technology policy.

Detailed topic schedule, outlines and reading lists

Week 1, January 21st

1. Establishing corporate technological competence as an evolutionary process.

(An introduction pertinent to each of the remaining topics; students should treat this as essential background material, but there is no term paper corresponding to this topic.)

Cantwell, J.A. (1991), "The theory of technological competence and its application to international production", in D.G. McFetridge (ed.), *Foreign Investment, Technology and Growth*, Calgary: University of Calgary Press.

Nelson, R.R. (1992), "What is 'commercial' and what is 'public' about technology, and what should be?" in N. Rosenberg, R. Landau and D.C. Mowery (eds.), *Technology and the Wealth of Nations*, Stanford: Stanford University Press.

Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Review*, vol 18, no. 7, pp. 509-533.

Nelson, R.R. (1991), "Why do firms differ, and how does it matter?", *Strategic Management Journal*, Vol. 12, pp. 61-74.

Mowery, D.C. and Rosenberg, N. (1989), "A new framework for R&D: analysis and policy implications", Chapter 1 in *Technology and the Pursuit of Economic Growth*, New York: Oxford University Press.

Week 2, January 28th

2. The determinants of corporate technological change.

Paper Title: Describe and comment on Schmookler's analysis in support of "demand-pull" explanations of technical change.

Schmookler, J. (1962), "Economic sources of inventive activity", *Journal of Economic History*, vol. 22, pp. 1-10; reproduced in N. Rosenberg (ed., 1971), *The Economics of Technological Change*, Harmondsworth: Penguin, chapter 5.

Mowery, D. and Rosenberg, N. (1979), "The influence of market demand upon innovation: a critical review of some recent empirical studies", *Research Policy*, vol 8, pp 103-53; reproduced in N. Rosenberg (1982), *Inside the Black Box:*

Technology and Economics, New York: Cambridge University Press, chapter 10.

Cantwell, J.A. and Fai, F.M. (1999), "Firms as the source of innovation and growth: the evolution of technological competence", *Journal of Evolutionary Economics*, vol. 9, no. 3, pp. 331-366.

Rosenberg, N. (1994), "Critical issues in science policy research", chapter 8 in *Exploring the Black Box*, New York: Cambridge University Press.

Walsh, V. (1984), "Invention and innovation in the chemical industry: demand pull or discovery push?", *Research Policy*, vol 13, pp. 211-234.

Week 3, February 4th

3. The role of science in technology, and the localization of science-technology linkages.

Paper Title: Assess the links between science and technology, and the implications of their geographical localization.

de Solla Price, D. (1965), "Is technology historically independent of science? A study in statistical historiography", *Technology and Culture*, vol. 6, pp. 553-568.

Rosenberg, N. (1994), "Scientific instrumentation and university research", chapter 13 in *Exploring the Black Box*, New York: Cambridge University Press.

Nelson, R.R. and Rosenberg, N. (1998), "Science, technological advance and economic growth", in A.D. Chandler, P. Hagström and Ö. Sölvell (eds.), *The Dynamic Firm: The Role of Technology, Strategy, Organization and Regions*, New York: Oxford University Press.

Jaffe, A., Trajtenberg, M. and Henderson, R. (1993), "Geographical localization of knowledge spillovers, as evidenced by patent citations", *Quarterly Journal of Economics*, vol. 58, no. 3, August, pp. 577-598.

Almeida, P. (1996), "Knowledge sourcing by foreign multinationals: patent citation analysis in the US semiconductor industry", *Strategic Management Journal*, vol. 17, pp. 155-165.

Week 4, February 11th

4. The changing motives for internationalization of technological activity, with the emergence of multinational company networks.

Paper Title: Outline the conditions for the internationalization of corporate technological development. Discuss whether the motives for such internationalization have changed recently, and if so how.

Cantwell, J.A. and Kosmopoulou, E. (2002), "What determines the internationalisation of corporate technology?", in V. Havila, M. Forsgren and H. Håkansson (eds.), *Critical Perspectives on Internationalisation*, New York: Pergamon.

Cantwell, J.A. and Santangelo, G.D. (2002), "The new geography of corporate research in information and communications technology (ICT)", *Journal of Evolutionary Economics*, vol. 12, nos. 1-2, pp. 163-197.

Pearce, R.D. (1999), "Decentralised R&D and strategic competitiveness: globalised approaches to generation and use of technology in multinational enterprises (MNEs)", *Research Policy*, vol. 28, nos. 2-3, pp. 157-178.

Cantwell, J.A. (1995), "The globalisation of technology: what remains of the product cycle model?", *Cambridge Journal of Economics*, vol. 19, no. 1, pp. 155-174.

Hedlund, G. (1986), "The hypermodern MNC: a heterarchy?", *Human Resource Management* vol. 25, pp. 9-25.

Week 5, February 18th

5. Alternative approaches to corporate technology strategy.

Paper Title: Compare and contrast the rationalist and the incremental approaches to corporate technology strategy.

Tidd, J., Bessant J. and Pavitt, K.L.R. (1997), "Developing the framework for an innovation strategy" and "Paths: exploiting technological trajectories", chapters 3 and 5 in *Managing Innovation: Integrating Technological, Market and Organizational Change*, New York: John Wiley.

Patel, P. and Pavitt, K.L.R. (1998), "The wide (and increasing) spread of technological competencies in the world's largest firms: a challenge to conventional wisdom", in A.D. Chandler, P. Hagström and Ö. Sölvell (eds.), *The Dynamic Firm: The Role of Technology, Strategy, Organization and Regions*, New York: Oxford University Press.

Nonaka, I. and Takeuchi, H. (1998), "A theory of the firm's knowledge-creation dynamics" in A.D. Chandler, P. Hagström and Ö. Sölvell (eds.), *The Dynamic Firm: The Role of Technology, Strategy, Organization and Regions*, New York:

Oxford University Press.

Granstand, O., Patel, P. and Pavitt, K.L.R. (1997), "Multi-technology corporations: why they have 'distributed' rather than 'distinctive core' competencies", *California Management Review*, vol. 39, no. 4, pp. 8-25.

Starbuck, W. (1993), "Strategizing in the real world", *International Journal of Technology Management*, vol. 8, nos. 1-2, pp. 77-85.

Week 6, February 25th

6. Inter-firm technological cooperation and international technology transfer.

Paper Title: Examine the implications of technological change as a corporate learning process for technology-based alliances between firms, and for international technology transfer.

Rosenberg, N. (1982), "Technological interdependence in the American economy", chapter 3 in *Inside the Black Box: Technology and Economics*, New York: Cambridge University Press.

Cantwell, J.A. and Barrera, M.P. (1998), "The localisation of corporate technological trajectories in the interwar cartels: Cooperative learning versus an exchange of knowledge", *Economics of Innovation and New Technology*, vol. 6, no. 2, pp. 257-292.

Mowery, D.C., Oxley, J.E. and Silverman, B.S. (1998), "Technological overlap and interfirm cooperation: implications for the resource-based view of the firm", *Research Policy*, Vol. 27, no. 5, pp. 507-523.

Loasby, B.J. (1998), "The organisation of capabilities", *Journal of Economic Behavior and Organization*, vol. 35, no. 2, pp. 139-160.

Sachwald, F. (1998), "Cooperative agreements and the theory of the firm: focusing on barriers to change", *Journal of Economic Behavior and Organization*, vol. 35, no. 2, pp. 203-228.

Week 7, March 3rd

7. Comparing innovation in small and large firms.

Paper Title: Discuss the circumstances under which small firms are most likely to be relatively strong innovators.

Pavitt, K.L.R., Robson, M. and Townsend, J. (1987), "The size distribution of innovating firms in the UK: 1945-83", *Journal of Industrial Economics*, vol. 35, no. 3, pp. 297-316.

Acs, Z.J. and Audretsch, D.B. (1991), "R&D, firm size and innovative activity", chapter 3 in Acs, Z.J. and Audretsch, D.B. (eds.), *Innovation and Technological Change: An International Comparison*, London: Harvester Wheatsheaf.

Acs, Z.J. and Audretsch, D.B. (1988), "Innovation in large and small firms: an empirical analysis", *American Economic Review*, vol.78, no. 4, September, pp. 678-690.

Cohen, W. (1995), "Empirical studies of innovative activity", in P. Stoneman (ed.), *Handbook of the Economics of Innovation and Technological Change*, Oxford: Basil Blackwell.

Levin, R.C., Cohen, W. and Mowery, D. (1985), "R & D appropriability, opportunity and market structure: new evidence on the Schumpeterian hypothesis", *American Economic Review*, vol. 75, no. 2, pp. 20-24.

Week 8, March 10th

8. The connection between the internationalization and diversification of corporate technology.

Paper Title: In what ways has the relationship between the internationalization and diversification of corporate technology changed recently?

Cantwell, J.A. and Piscitello, L. (2000), "Accumulating technological competence: its changing impact upon corporate diversification and internationalisation", *Industrial and Corporate Change*, vol. 9, no. 1, pp. 21-51.

Cantwell, J.A. and Piscitello, L. (1999), "The emergence of corporate international networks for the accumulation of dispersed technological competences", *Management International Review*, vol. 39, Special Issue no. 1, pp. 123-147.

Zander, I. (1997), "Technological diversification in the multinational corporation: historical evolution and future prospects", *Research Policy*, vol. 26, no. 2, pp. 209-228.

Zander, I. (2002), "The formation of international innovation networks in the multinational corporation: an evolutionary perspective", *Industrial and Corporate Change*, vol. 11, no. 2, pp. 327-353.

Cantwell, J.A. and Janne, O.E.M. (1999), "Technological globalisation and innovative centres: the role of corporate technological leadership and locational hierarchy", *Research Policy*, vol. 28, nos. 2-3, pp. 119-144.

Week 9, March 17th

Spring recess week, no class.

Week 10, March 24th

9. Capturing the returns to innovation in the multinational firm.

Paper Title: Explain how the capabilities-based or competence-based approach to the multinational firm complements the contract-based approach, and how the capabilities-based approach suggests a different way of understanding the means by which multinational firms capture the returns to their innovation.

Cantwell, J.A. (2017), "Innovation and international business", *Industry and Innovation*, vol. 24, no. 1, pp. 41-60.

Teece, D.J. (2014), "A dynamic capabilities-based entrepreneurial theory of the multinational enterprise", *Journal of International Business Studies*, vol. 45, no. 1, pp. 8-37.

Mowery, D.C. and Rosenberg, N. (1989), "A new framework for R&D: analysis and policy implications", chapter 1 in *Technology and the Pursuit of Economic Growth*, New York: Oxford University Press.

Cohen, W.M. and Levinthal, D.A. (1989), "Innovation and learning: the two faces of R&D", *Economic Journal*, vol. 99, no. 3, September, pp. 569-596.

Hodgson, G.M. (1998), "Competence and contract in the theory of the firm", *Journal of Economic Behavior and Organization*, vol. 35, no. 2, pp. 179-202.

Week 11, March 31st

10. The measurement of technological change: the use of corporate patent statistics.

Paper Title: Discuss the use of corporate patent statistics in the light of any potential difficulties you can identify with patent statistics as a measure of innovative activity.

Pavitt, K.L.R. (1988), "Uses and abuses of patent statistics", in van Raan, A. (Ed.), *Handbook of Quantitative Studies of Science Policy*, Amsterdam: North Holland.

Basberg, B.L. (1987), "Patents and the measurement of technological change", *Research Policy*, vol. 16, no. 2, April.

Archibugi, D. (1992), "Patenting as an indicator of technological innovation: a review", *Science and Public Policy*, vol. 19, no. 6, December.

Griliches, Z. (1990), "Patent statistics as economic indicators: a survey", *Journal of Economic Literature*, vol. 28, no. 4, December, pp. 1661-1707.

Acs, Z.J. and Audretsch, D.B. (1989), "Patents as a measure of innovative activity", *Kyklos*, vol. 42, no. 2, pp. 171-180.

Week 12, April 7th

11. National systems of innovation, institutions and technology policy.

Paper Title: Comment on the justification for government subsidies for basic research, and on the role of technology policy in Europe, Japan and the USA.

Patel, P. and Pavitt, K.L.R. (1994), "National innovation systems: why they are important, and how they may be measured and compared", *Economics of Innovation and New Technology*, vol. 3, no. 1, pp. 77-95.

Cantwell, J.A. (1999), "Innovation in the global economy", in D. Archibugi, J. Howells and J. Michie (eds.), *Innovation Policy in a Global Economy*, New York: Cambridge University Press, pp. 225-241.

Pavitt, K.L.R. (1991), "What makes basic research economically useful?", *Research Policy*, vol 20, no 2, pp 109-20.

Rosenberg, N. (1990), "Why do firms do basic research (with their own money)?", *Research Policy*, vol. 19, pp. 165-174.

Nelson, R.R. (1992), "National innovation systems: a retrospective on a study", *Industrial and Corporate Change*, vol. 1, no. 2, pp. 347-74.

Week 13, April 14th

Discussion of first set of student presentations.

Week 14, April 21st

Discussion of second set of student presentations.

Week 15, April 28th

No class; completion of term papers; submission of term papers due by Monday, May 4th, via the Blackboard course site (under the tab "Assignment", you'll find an assignment named "Term paper", click "View/Complete", upload your paper there, and submit).