

**Nome da Disciplina:** Complexidade, Inovação e Desenvolvimento Regional

**Código:** ECN958

**Turma:** C

**Classificação:** Optativa

**Carga Horária:** 60 horas/aula

**Créditos:** 4

**Curso:** Pós-Graduação Economia

**Pré-requisito:** -

**Período Letivo:** 1º Semestre de 2023

**Horários:** Quinta-Feira: 9:00-12:50.

**Professores:** João P. Romero ([jpromero@cedeplar.ufmg.br](mailto:jpromero@cedeplar.ufmg.br) - Gabinete 3098)

Ulisses dos Santos ([ulisses@cedeplar.ufmg.br](mailto:ulisses@cedeplar.ufmg.br) - Gabinete 3019/3124)

## EMENTA

O curso visa o estudo de teorias e trabalhos empíricos sobre a relação entre inovação tecnológica, complexidade econômica e desenvolvimento regional, tendo como objetivo o aprendizado de coleta, tratamento e análise de dados, e elaboração de artigo científico. Serão discutidas teorias sobre indústria e desenvolvimento regional, geografia da inovação, sistemas regionais e locais de inovação, e cadeias globais de produção e inovação. Serão também estudados artigos empíricos relacionados à abordagem da complexidade econômica em nível nacional e regional. Indicadores e métodos para o estudo da inovação, da complexidade econômica e do desenvolvimento regional também serão discutidos ao longo da disciplina.

## OBJETIVOS

- Estudo de trabalhos teóricos e empíricos acerca das relações entre complexidade econômica, inovação tecnológica e desenvolvimento regional
- Aprendizado de coleta, tratamento e análise de dados
- Prática de elaboração de artigo científico

## ESTRATÉGIAS E PROCEDIMENTOS DE AVALIAÇÃO

- Apresentações: 30 pontos.
- Trabalho Intermediário: 30 pontos.
- Trabalho Final: 40 pontos.

## CONTEÚDO PROGRAMÁTICO

\*\* = Leitura Obrigatória

\* = Leitura Importante

### MÓDULO 1

#### Aula 1-2: Apresentação + Estruturação de artigo científico (09/03)

\*\* Levine, R.; Renelt, D. (1992) A sensitivity analysis of cross-section growth regression, *American Economic Review*, 82(4), pp. 942-63.

\* Balland, P. A.; Broekel, T.; Giuliani, E.; Hausmann, R.; O'Clery, N.; Rigby, D. (2022) The new paradigm of economic complexity, *Research Policy*, 1-11.

Barro, R. J. (1991) Economic Growth in a Cross Section of Countries, *Quarterly Journal of Economics*, 106, pp. 407-43.

#### Aula 3-4: A abordagem da Complexidade + Complexidade e desenvolvimento (16/03)

\*\* Stojkoski, V.; Koch, P.; Hidalgo, C. (2023) Multidimensional Economic Complexity: How the Geography of Trade, Technology, and Research Explain Inclusive Green Growth, *Mimeo*.

\*\* Hidalgo, C.; Klinger, B.; Barabasi, A.L.; Hausmann, R. (2007) The product space conditions the development of nations, *Science*, 317, pp. 482-7.

\* Hidalgo, C.; Hausmann, R. (2009) The building blocks of economic complexity, *PNAS*, 106(26), p.10570-10575.

\* Hausmann, R.; Hwang, J.; Rodrik, D. (2007) What you export matters, *Journal of Economic Growth*, 12, 1-25.

\* Hausmann, R.; Hidalgo, C.A.; Bustos, S.; Coscia, M.; Chung, S.; Jimenez, J.; Simões, A.; Yildirim, M.A. (2014) *The atlas of economics complexity – mapping paths to prosperity*, Puritan Press.

- Weber, I.; Semieniuk, G.; westland, T. Liang, J. (2021) What you exported matters: Persistence in Productive Capabilities across Two Era of Globalization, *Rebuilding Macroeconomics WP Series*, 41, p.1-44.
- Felipe, J.; Kumar, U.; Abdon, A.; Bacate, M. (2012) Product complexity and economic development, *Structural Change and Economic Dynamics*, 23, p.36-68.
- Britto, G.; Romero, J. P.; Freitas, E.; Coelho, C. (2019) The great divide: economic complexity and development paths in Brazil and the Republic of Korea. *Cepal Review*, 127, pp. 191-213.
- Hidalgo, C. (2021) Economic complexity theory and applications, *Nature Reviews: Physics*, pp. 1-22.
- Tacchella, A.; Cristelli, M.; Caldarelli, G.; Gabrielli, A.; Pietronero, L. (2012) A new metrics for countries' fitness and products' complexity, *Scientific Reports*, 2, p. 1-7.
- Hidalgo, C.; et al. (2018) The principle of relatedness, *International conference on complex systems*, p. 451-457.
- \*\* Hartmann, D.; Guevara, M.; Jara-Figueroa, C.; Aristarán, M.; Hidalgo, C. (2017) Linking Economic Complexity, Institutions, and Income inequality, *World Development*, p. 1-19.
- \*\* Romero, J. P.; Gramkow, C. Economic Complexity and Greenhouse Gas Emissions. *World Development*, 139, p.1-25.
- \* Mealy, P.; Teytelboym, A. (2020) Economic complexity and the green economy, *Research Policy*, pp. 1-24.
- \* Moraes, B. M.; Swart, J.; Jordaan, J. A. (2021) Economic complexity and inequality: does regional productive structure affect income inequality in Brazilian States? *Sustainability*, 13(1006), p.1-23.
- Gala, P.; Rocha, I.; Magacho, G. (2018) The structuralist revenge: economic complexity as an important dimension to evaluate growth and development, *Brazilian Review of Political Economy*, 38(2), p.219-36.
- Sciarrà, C.; Chiarotti, G.; Ridolfi, L.; Laio, F. (2021) A network approach to rank countries chasing sustainable development, *Nature: Scientific Reports*, 11(15441), pp. 1-12.

#### **Aula 5-6: Inovação e desenvolvimento (23/03)**

- Dosi, G. (1982) Technological paradigms and technological trajectories - a suggested interpretation of the determinants and directions of technical change. *Research Policy*, v.11, p.147-162.
- \*\*Freeman, C. (1995) The National System of Innovation in historical perspective. *Cambridge Journal of Economics*, v. 19, n. 1.
- \*Freeman, C. (2002) Continental, National and Sub-National Innovation Systems—complementarity and economic growth. *Research Policy*, v. 31, n. 2, p. 191-211, fevereiro.
- Freeman, C.; Louçã, F. (2001) *As time goes by: from the industrial revolutions and to the information revolution*. Oxford: Oxford University.
- Nelson, R. (ed.) (1993) *National innovation systems: a comparative analysis*. New York, Oxford: Oxford University.
- \*\* Perez, C. Technological revolutions and techno-economic paradigms. *Cambridge Journal of Economics*, v. 34, n. 1, p. 185–202, 2010.

#### **Aula 7-8: Conceito de espaço, território e região + Teorias de indústrias e desenvolvimento regional (30/03)**

- \*\*Asheim, B. T. (1996) Industrial districts as "learning regions": a condition for prosperity. *European Planning Studies*, v. 4, n. 4, p. 7-11, 1996.
- Granovetter, M (1985). Economic Action and Social Structure: the problem of embeddedness. *American Journal of Sociology*, v. 91, n. 3, p. 481-510.
- Perroux, F. *Economia do Século XX*. Lisboa: Herder, 1967. p. 755.
- \*Cooke, Philip. 1998. "Introduction: Origins of the Concept." In *Regional Innovation Systems*, edited by H Braczyk, Philip Cooke, and M Hidenreich, 2–25. London: UCL Press.
- \*\*Cooke, Philip. 2001. "Regional Innovation Systems, Clusters, and the Knowledge Economy." *Industrial and Corporate Change* 10 (4): 44–45.

#### **Aula 9-10: Bases de dados + introdução ao R [Prática] (06/04)**

- \*\* De Vries, A.; Meys, J. (2015) *R for Dummies*, John Wiley & Sons: New Jersey.
- Wickham, H.; Grommund, G. (2017) *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*, O'Reilly: Boston.
- Cunningham, S. (2021) *Causal Inference: The Mixtape*, Yale Univ. Press: London.

#### **Aula 11-12: Indicadores de Complexidade [Prática] (13/04)**

- \*\* Balland, P.A. (2017) Economic Geography in R: Introduction to the EconGeo Package, *Papers in Evolutionary Economic Geography*, 17 (09): 1-75
- Guevara, M. R.; Hartmann, D.; Mendoza, M. (2016) diverse: an R Package to Analyze Diversity in Complex Systems, *The R Journal*, 8:2, p. 60-78.

## MÓDULO 2

### Aula 13-14: A geografia da Inovação + Sistemas regionais de inovação (20/04)

- \*\*Shearmur, R.; Carrincazeaux, C.; Doloreux, D. (2016) Handbook on the Geographies of Innovation. Cheltenham, UK and Northampton, USA: Edward Elgar. 512pp. Capítulos 1, 2, 3 e 4
- \*Asheim, B.; Isaksen, A.; Trippl, M. (2019) Advanced Introduction to Regional Innovation Systems. Cheltenham, UK and Northampton, USA: Edward Elgar. 146pp.
- Audretsch, D.; Feldman, M. (1996) R & D spillovers and the geography of innovation and production. *The American Economic Review*, v. 86, n. 3, p. 630–641.
- \*Gonçalves, E.; Almeida, E. (2009) Innovation and Spatial Knowledge Spillovers: Evidence from Brazilian Patent Data. *Regional Studies*, v. 43, n. 4, p. 513–528.
- Santos, U. P. (2017b) Distribución espacial de los entes del sistema nacional de innovación brasileño: análisis de la década de 2000. *Revista de la Cepal*, v. 121.
- \*Santos, U. P.; Mendes, P. S. (2021) Regional spillovers of knowledge in Brazil: evidence from science and technology municipal indicators. *Innovation and Development*, p. 1–20, 15 set.
- Balland, P.-A.; Rigby, D. (2017) The Geography of Complex Knowledge. *Economic Geography*, v. 93, n. 1, p. 1–23.

### Aula 15-16: Diversificação relacionada e não-relacionada (27/04)

- \*\* Frenken, K.; Van Oort, F.; Verburg, T. (2007) Related variety, unrelated variety and regional economic growth, *Regional Studies*, 41(5), p.685-97.
- \*\* Nefke, F.; Henning, M.; Boschman, R. (2011) How do regions diversify over time? Industry relatedness and the development of new growth paths in regions, *Economic Geography*, 87(3), p. 237-66.
- \* Jara-Figueroa, C.; Jun, B.; Glaeser, E.; Hidalgo, C. (2018) The role of industry-specific, occupation-specific, and location-specific knowledge in the growth and survival of new firms, *PNAS*, 115, p.12646-53.
- Diodato, D.; Nefke, F.; O'Cleary, N. (2018) Why do industries coagglomerate? How Marshallian externalities differ by industry and have evolved over time, *Journal of Urban Economics*, 106, p. 1-26.
- Glaeser, E.; Kallal, H.; Scheinkman, J.; Shleifer, A. (1992) Growth in cities, *Journal of Political Economy*, 100(6), p. 1126-52.
- Boschma, R. (2017) Relatedness as driver of regional diversification: A research agenda, *Regional Studies* 51 (3), 351-364.
- Galetti, J. R. B.; Tessarin, M. S.; Morceiro, P. C. (2021) Skill relatedness, structural change and heterogeneous regions: evidence from a developing country, *Papers in Regional Science*, 1-22.
- \* Aarstad, J.; Kvitastein, O. A.; Jakobsen, S.-E. (2016) Related and unrelated variety as regional drivers of enterprise productivity and innovation: a multilevel study, *Research Policy*, 45, p. 844-856.

### Aulas 17-18: Apresentações de trabalhos (04/05)

### Aulas 19-20: Complexidade, desenvolvimento regional e spillovers regionais (11/05)

- \*\* Boschma, R.; Frenken, K. (2011) The emerging empirics of evolutionary economic geography, *Journal of Economic Geography*, 11, p.295-307.
- \*\* Boschma, R. (2005) Proximity and innovation: a critical assessment, *Regional Studies*, 39(1), p.61-74.
- \* Nefke, F.; Hartog, F.; Boschma, R. (2018) Agents of structural change: the role of firms and entrepreneurs in regional diversification, *Economic Geography*, p.1-26.
- Balland, P. A.; Jara-Figueroa, C.; Petralia, S.; Steijn, M.; Rigby, D.; Hidalgo, C. (2020) Complex economic activities concentrate in large cities, *Nature Human Behaviour*, 4, p.248-54.
- Boschma, R.; Frenken, K. (2006) Why is economic geography not an evolutionary science? Towards an evolutionary economic geography, *Journal of Economic Geography* 6 (3), 273-302.
- Boschma, R.; Lambooy, J. (1999) Evolutionary economics and economic geography, *Journal of Evolutionary Economics*, 9, pp.411-29.
- \*\* Gao, J.; Jun, B.; Pentland, A.; Zhou, T.; Hidalgo, C. (2021) Spillovers across industries and regions in China's regional economic diversification. *Regional Studies*, pp. 1-17.
- \*\* Boschma, R.; Iammarino, S. (2009) Related variety, trade linkages, and regional growth in Italy, *Economic Geography*, 85(3), p.289-311.
- \* Bahar, D.; Hausmann, R.; Hidalgo, C. (2014) Neighbors and the evolution of the comparative advantage of nations: Evidence of international knowledge diffusion? *Journal of International Economics*, 92, p.111-23.
- Migueluez, E.; Moreno, R. (2018) Relatedness, external linkages and regional innovation in Europe, *Regional Studies*, 52(5), p. 688-701.

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**Aulas 21-22: O papel da ciência pra inovação + fluxos internacionais de conhecimento (18/05)**

- \*\*Shearmur, R.; Carrincazeaux, C.; Doloreux, D. (2016) Handbook on the Geographies of Innovation. Cheltenham, UK and Northampton, USA: Edward Elgar. 512pp. Capítulo 12.
- \*Asheim, B.; Isaksen, A.; Trippl, M. (2019) Advanced Introduction to Regional Innovation Systems. Cheltenham, UK and Northampton, USA: Edward Elgar. 146pp.
- Santos, E. G. et al. (2021) Spatial and non-spatial proximity in university–industry collaboration: Mutual reinforcement and decreasing effects. *Regional Science Policy and Practice*, v. 13, n. 4, p. 1249–1261, 1 ago.
- TRIPPL, M.; SINOZIC, T.; LAWTON SMITH, H. The Role of Universities in Regional Development: Conceptual Models and Policy Institutions in the UK, Sweden and Austria. *European Planning Studies*, v. 23, n. 9, p. 1722–1740, 2 set. 2015.
- \*CHAMINADE, C. A.; PLECHERO, M. B. Do Regions Make a Difference? Regional Innovation Systems and Global Innovation Networks in the ICT Industry. *European Planning Studies*, v. 23, n. 2, p. 215–237, 2015.

**Aula 23-24: Complexidade e políticas de desenvolvimento regional (25/05)**

- \*\* Pinheiro, F.; Alshamsi, A.; Hartmann, D.; Boschma, R.; Hidalgo, C. (2018) Shooting low or high: do countries benefit from entering unrelated activities? *Papers in Evolutionary Economic Geography*, p.1-44.
- \*\* Hartmann, D.; Bezerra, M.; Pinheiro, F. (2019) Identifying smart strategies for economic diversification and inclusive growth in developing economies: The case of Paraguay. Mimeo, p. 1-41.
- \* Hartmann, D.; Zagato, L.; Gala, P.; Pinheiro, F. (2020) Why Did Some Countries Catch-Up, While Others Got Stuck in the Middle? Stages of Productive Sophistication and Smart Industrial Policies, *SSRN Electronic Journal*.
- Hausmann, R.; Santos, M.; Obach, J. (2017) Apraising the Economic Potential of Panama: Policy Recommendations for Sustainable and Inclusive Growth, *CID WP*, no. 334.
- Romero, J. P.; Freitas, E. (2018) Setores promissores para o desenvolvimento do Brasil: complexidade e espaço do produto como instrumentos de política. In: Mônica Viegas, Eduardo Albuquerque. (Org.). *Alternativas para uma crise de múltiplas dimensões*. 1ed. Belo Horizonte: Cedeplar-UFMG, p. 358-374.
- \*\* Balland, P. A.; Boschma, R. (2021) Complementary interregional linkages and Smart Specialization: an empirical study on European regions, *Regional Studies*, 55(6), p. 1059-70.
- \*\* Balland, P.-A.; Boschma, R.; Crespo, J.; Rigby, D. L. (2019) Smart specialization policy in the European Union: relatedness, knowledge complexity and regional diversification. *Regional Studies*, 53(9), pp. 1252-1268.
- \* Romero, J. P.; Freitas, E.; Silveira, F.; Britto, G.; Cimini, F.; Jayme Jr., F. G. (2021) Economic complexity and regional development: evidence from Brazilian municipalities, *Proceedings of the EAEPE Conference*, p.1-25.
- Pinheiro, F.; Balland, P. A.; Boschma, R.; Hartmann, D. (2022) The Dark Side of the Geography of Innovation. Relatedness, complexity and regional inequality in Europe, *Papers in Evolutionary Economic Geography*, 22.02, p. 1-47.
- Boschma, R. (2021) Designing Smart Specialization Policy: relatedness, unrelatedness, or what? *Papers in Evolutionary Economic Geography*, 21.28, p.1-33.

**Aula 25-26: Gráficos [Prática] (01/06)**

**Aulas 27-28: Políticas para inovação e desenvolvimento regional (15/06)**

- \*\*Shearmur, R.; Carrincazeaux, C.; Doloreux, D. (2016) Handbook on the Geographies of Innovation. Cheltenham, UK and Northampton, USA: Edward Elgar. 512pp. Capítulos 17 e 18
- Vang, J.; Chaminade, C. (2009) Local innovation systems, upgrading and innovation policy: Lessons from the Bangalore cluster, India. In Belussi, F.; Sammarra, A. (Eds) *Business networks in clusters and Industrial Districts: the Governance of the Global Value Chain*.
- \*Chaminade, C. & Lundvall, B-Å., (2019) Science, Technology and Innovation Policy- old patterns and new challenges. *Oxford Research Encyclopaedia of Business and Management*. Oxford University Press.

**Aulas 29-30: Apresentações de trabalhos (22/06)**

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