Columbia Business School

Catching Growth Waves to 2050 and Beyond (B8658)

Draft syllabus

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Instructors

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Introduction

Thirty years ago, the Internet was a curiosity, China was in the early years of its economic ascent and India had just begun economic liberalization. In the intervening years, emerging markets would come to dominate economic growth; and seven new companies would take their place among the ten largest in the world today, commanding a combined market capitalization of about $9 trillion. When the pandemic struck last year, vast numbers of people in the world depended on the technologies these companies developed to communicate, work, and entertain themselves.

The changes we will see in the next thirty years will surpass those of the last thirty years. Some of today's emerging markets will have emerged by 2050, rising to become middle-income or upper middle-income economies. Scientific and technological advancements that are only now emerging will have matured, changing where and how we live and what we consume. Yet these positive changes are contingent on our ability to contain the effects of climate change and simultaneously provide enough energy, food and other goods to sustain economic growth. They also depend on our ability to limit the destabilizing force of economic inequality, and the fissures created by ideological differences between the old and new world powers.

The objective of this course is to examine the changes we can expect between now and mid-century, assess their implications and identify opportunities for businesses. We will examine three types of opportunities: (1) those arising because a larger, richer, more urban (but still unequal) world demands more goods and services; (2) those created by addressing the three intertwined challenges of subduing climate change, transforming energy supply, and changing food production; and (3) those arising from transformative technologies over the next thirty years. Some of these technologies --- including biotechnology, artificial intelligence, and robotics --- are poised to bring about changes that sound as fantastical as hyperconnected pocket supercomputer did thirty years ago. Emerging technologies in biology are expected to allow, for better and for worse, much

greater control over the genetic basis of life, allow treating many presently incurable diseases, and change the practice of medicine. Robots are likely to become a routine part of life, performing such varied tasks as assisting surgeons and interacting with people in social settings. Developments in vertical takeoff and landing technology are poised to allow electric “flying cars,” and hyperloop technology to provide dramatically faster travel within and between dense city clusters in which most humans will live by mid-century. And artificial intelligence, which is still in infancy, will likely transform almost every business and industry. These and other technologies will change the way we live and work, create new industries, and propel global growth waves that include consumers and companies not only in the developed world but also in emerging markets that are on the path to convergence with the developed economies.

Course objectives

The objective of this class is to understand the most important changes likely to occur in the next 30 years, and to develop capabilities that allow you to think strategically about how to anticipate and capture the opportunities likely to emerge from these changes. Our aim is to combine the development of a conceptual framework with real life examples and assignments that help you develop a strategy for a specific opportunity. The conceptual framework lays the ground to:

- Understand the drivers and patterns of past and future economic growth, including
    - New technologies that create and disrupt entire industries
    - Emerging markets that are increasingly converging and competing with developed economies
    - An increasingly more urban and affluent world in which the ability of many people to meet their needs and aspirations is matched by vast and rising inequalities
- Understand the interdependencies and key global challenges in the coming decades with a “new world map” in which China, and potentially India, compete for economic and technological leadership with the US. These challenges include
    - Climate change
    - Supplying food and energy to a growing urban world
    - Global trade and reliance with competing global powers and systems of government

- Analyze how new technologies may help address these issues and create new waves of opportunities
    - Examples of emerging technologies with the potential to help address global issues and disrupt entire industries, including electric propulsion, robotics, quantum computing, machine learning and artificial intelligence
    - Cases of players that are at the forefront of leveraging these technologies
    - Strategic foresight as to the global waves of opportunities resulting from technological innovation in the “new world map” and potential strategies to capture them
- Apply the knowledge and frameworks from the class to develop a project analyzing an opportunity in an industry of your choice and developing a strategy to capture it
    - Learn from and be exposed to a variety of emerging opportunities across industries and geographies.
    - Understand how different players value the opportunities, and how they weigh the risks and challenges involved in capturing them.

An additional benefit of this class is that it will allow you to gain some basic consulting skills, including framing and defining the scope of the strategic opportunity to be analyzed; developing hypothesis and defining the analysis to address them; gathering the right data and information; synthesizing information to drive key conclusions; and presenting well- structured recommendations and conclusions.

Class Structure

The class follows a structured sequence around three factors driving future growth waves: a growing world that is increasingly unequal and urban; facing global challenges; and new technologies and opportunities (see the session details below). Class time will be split among (i) lectures to develop a frame of reference on each of these types of waves and the business opportunities they generate; (ii) case discussions and assignments; and (iii) project work and presentations. There will be lectures in each of the first ten sessions. The last two sessions will be dedicated to having the groups present their different projects, answering questions, synthesizing what was learned and receiving feedback from the rest of the class.

Grading

Class attendance & participation	30
Individual case assignments*	20
Midterm project proposal**	10
Final project***	40
Total	100%

*Discussion questions for the cases are posted on Canvas.

**Midterm project proposals are due by midnight on Friday October 14.

***Final projects are due by midnight on Sunday November 27. All students must attend all presentations on both days.

Session Details

Session, Date and Topic	Readings (R) and Cases (C)
A growing but unequal world	
1. Jan.24 - Growth Waves: Drivers and outlook to 2050 - Technology (RK) - Converging Markets (AM)	- Global Trends 2040 - The Prospects for Developing Countries Are Not What They Once Were
2. Jan. 31 - Economic development: Conditions and patterns (AM) - Human capital and social stability - Consumption and consolidation patterns	- The Inevitable Rivalry: America, China, and the Tragedy of Great Power Politics - The Flatbread Factor
3. Feb.7 - Demographic change and urbanization to 2050 (RK) Case: Medellin's Transformation (AM)	- Long Slide Looms for World Population, With Sweeping Ramifications - China Gambles on Modernizing Through Urbanization - Case: Medellin's Transformation: Towards a More Equitable, Innovative and Participatory Urban Society

Global challenges	
4. Feb. 14 - Climate change: Problems, solutions, and opportunities to 2050 (RK) Case: Impossible Foods (RK)	- IPCC 2022 – slides from press conference - Fact sheets (Review human settlements and biodiversity, North America and other regions of interest to you) - Case: Impossible Foods: Fighting Climate Change with Plant-Based Meat
5. Feb. 21 - Energy: the changing world map (AM) Perspective and choices to 2050 (AM)	- The New Energy Order: How Governments Will Transform Energy Markets - The Controversial Future of Nuclear Power in the U.S.
6. Feb. 28 - Food: Feeding 9 billion by 2050 (AM) Case: OCP Africa	- A World Grain Shortage puts tens of millions at risk (Read and watch video) - Case: OCP Africa
Reminder: Project proposals are due by midnight on Friday March 3	
Emerging technologies	
7. March 21 - Life sciences revolution Guest speaker: Prof. Sam Sternberg, Department of Biochemistry and Biophysics	- Watch the film *Human Nature*. Available with subscription on Netflix and PBS Passport. (Can be rented on Amazon Prime video and iTunes). Which potential markets for gene editing are likely to develop most in the next 10 years?
8. March 28 - Artificial intelligence and robotics – 1 (RK)	- Modern automation (A): Artificial intelligence - Modern automation (B): Robotics - AI is Mastering Language. Should We Trust What it Says?
9. April 4 - Artificial intelligence and robotics - 2 (RK) Case: Waymo (RK) Guest speaker: Prof. Hod Lipson, Columbia Engineering	- Self-driving cars begin to emerge from a cloud of hype - Case: Waymo
10. April 11 - It's all connected: Transportation waves (AM) Course review (RK)	- Electric Vehicle Outlook 2022
Reminder: Final projects are due by midnight on Sunday November 27	
11. and 12. April 18 and 25 - Final project presentations All students are required to attend both classes.	

Readings and case assignments

You should read the assigned articles before a class session and prepare to discuss them in class. Several readings complement cases and provide frameworks for their analyses.

You should discuss the cases in your groups and submit 3-4 PowerPoint slides addressing the case questions. Submit these slides on Canvas by midday on Monday before the class in which a case is scheduled to be discussed. We will ask some of the groups with the best slides to present in class.

Project assignments

Form a group of 5 students during the first two weeks of class. Your group should work together on all class assignments and the final project.

Project proposal and final project

The aim of the project is to identify and analyze potential business opportunities in an industry that you expect to change and grow substantially due to new technologies and emerging needs in global markets over the coming decades.

Select an existing or nascent industry that interests you and that you expect to change substantially due to the multiple factors discussed in the course: an increasingly affluent but unequal, urban and aging population; growing global interdependence; global warming; increasing food and energy demand; growing tensions and competition for global power; and new technologies (such as artificial intelligence, robotics, and biotechnology) that can help solve problems, create new opportunities and potentially disrupt entire industries.

1. Examine how you expect the industry to develop or evolve over each of the next 10, 20 and 30 years. Which new technologies will impact it significantly? How will the products and services it offers be different from those available today? Which consumer segments will it impact and how will it change their lives? How will it change industry structure and the business models of companies?
2. Which are the established and potential new key players in this market? What are the capabilities they are likely to need to compete in the industry over each of the next 10, 20 and 30 years? Which of the well-established companies and startups in the industry are likely to fail and survive?

3. Suppose you ran one of the companies you expect to survive. Develop a strategy that the company should use over the next ten years. Discuss how this strategy is likely to evolve over the following decades.

We will provide feedback on the projects to all the group and give the go ahead for the final project. Each group will be assigned one of the instructors as a guide. Once the proposal is approved you should schedule ***at least one*** meeting with your assigned instructor to receive further feedback and guidance on the project.

See examples of projects from previous term (Canvas link)

Project deliverables: Each group will

- Submit a project proposal addressing point 1 above by Friday October 14. The proposal should be in the form of 4-5 PowerPoint slides.
- Meet with the instructors to present and discuss their project proposals during the first two weeks of the Fall B term (before November 4). All students in a group must be present for the meetings with the instructors.
- Present their final project to the class during the last two sessions (a 20-minute presentation – around PowerPoint 15 slides). The final project presentations are due by noon on the Sunday after class 10.

Class culture and rules

- Attendance: Is required for all classes, including both sessions of the final project presentations.
- Punctuality: Make sure to arrive a few minutes early so that class can begin on time. Inform the professors and the TA if you have a valid reason for arriving late or leaving early for a class session.
- Fixed seating: Select a seat in the first class and sit in it for the rest of the semester. We use the seating chart to mark attendance. Notify the TA at the start or end of class if for some reason you are in a different seat for a class.
- No devices: Never use any devices during class other than the iPads provided by the school. Working on other assignments, web browsing, texting, reading and posting on Twitter, Facebook, Instagram and other social media, or using laptops/cellphones in other ways, is strictly disallowed during class.
- Class break: Do not enter and leave class except during the break. If you must leave for an emergency, return as soon as possible, and inform the professor and TA.
- Class participation: We expect you to contribute to the learning of your classmates, both

through class discussion and in collaboration on the final project. Good participation is defined as (i) active participation in case discussions, based on case preparation; and (2) adding insights to discussions from course readings and your own knowledge and experience.

- Project work: We expect each member of a group to fully contribute to the final project. We will obtain feedback from each member of your group on your contribution to the final project and use it as input to your project grade.

Recommended books

Although not required, we recommend that you read at least some of the following books that are of most interest to you.

1. Mauro F. Guillen (2020), 2030: How Today's Biggest Trends Will Collide and Reshape the Future of Everything
2. Bill Gates (2021), How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need
3. Daniel Yergin (2020), The New Map: Energy, Climate, and the Clash of Nations
4. Jane Jacobs (1992) The Death and Life of Great American Cities
5. David Sincalir (2019) Lifespan: Why We Age—and Why We Don't Have To
6. Eric Topol (2019) Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again
7. Jamie Metzel (2020) Hacking Darwin
8. Siddhartha Mukherjee (2017) The Gene: An Intimate History
9. Walter Isaacson (2021) The Code Breaker: Jennifer Doudna, Gene Editing, and the Future of the Human Race
10. Kai-Fu Lee and Chen Qiufan (2021), AI 2041: Ten Visions for Our Future (fiction)
11. Ishiguro, Kazuo (2021), Klara and the Sun: A novel (fiction)

Recommended films

Human Nature is required viewing for class 7. It is available with subscription on Netflix and PBS Passport and can also be rented on Amazon Prime video.

You might also want to watch some of the following films.

1. Jennifer Doudna (2018) CRISPR Biology and Biotechnology: The Future of Genome Editing
2. Gattaca
3. Jurassic Park

4. Blade Runner
5. A.I. Artificial Intelligence
6. Moneyball
7. Minority Report

About the instructors

Rajeev Kohli is the Ira Rennert Professor of Business at Columbia Business School. He

has research and teaching interests in marketing and policy issues in emerging markets, product development, pricing, and models of consumer choice. He has taught MBA and Executive MBA courses at Columbia Business School on Catching Growth Waves: To 2050 and Beyond, *Catching the Growth Waves in Emerging Markets*, *New Product Development*, *Information Technology in Marketing*, and *Marketing Planning.* He also teaches an MS course on *Social and Economic Networks* and a PhD course on *Mathematical Models in Marketing*.

Alonso Martinez is a Senior Lecturer in Practice at Columbia Business School. He

combines teaching and research with extensive global experience doing strategy consulting, with particular expertise in emerging markets. He gives the Catching Growth Waves to 2050 and Beyond course in both the MBA and EMBA programs and the Winning Strategic Capabilities course to the MBAs. He also teaches and mentors entrepreneurs in the Enterprise Competitiveness in Latin America (ECLA) Program and teaches regularly at the Africa Business School in Morocco. Professor Martinez is a former Senior Vice President at Booz, Allen & Hamilton, having joined in Brazil in 1982 and subsequently opened and/or managed the firm's offices in every major Latin American country. He moved to the United States in the year 2000 with global responsibility for major client relationships. Mr. Martinez has worked with many of the world's largest multinationals and leading local groups in the consumer products, media, steel, and construction materials industries. His focus has been global growth strategies, including international expansion, mergers and acquisitions and go to market strategies.