

# THE EVOLUTION OF AN INTERDISCIPLINARY COURSE: INTELLECTUAL PROPERTY AND BUSINESS STRATEGY

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This article is a reflective case study that traces the epistemological and pedagogical evolution of a course called Intellectual Property and Business Strategy that integrates law, technology, business strategy, and ethics within an engineering-oriented curriculum. This course was taught over a ten-year period at four academic institutions. The article traces a historical evolution of this interdisciplinary course and its epistemological broadening over time. The article also discusses the knowledge foundations that underpin the course. Three broad knowledge domains are examined, including the broader legal environment, stakeholder analysis, and strategic management. The article also discusses five learning goals that have emerged from the course and the methods for achieving these goals.

**Key words:** Pedagogy; Innovation; Technology; Commercialization; Patents

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“Again, you can’t connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future. You have to trust in something—your gut, destiny, life, karma, whatever. This approach has never let me down, and it has made all the difference in my life.”

Steve Jobs  
Co-founder of Apple, Inc.

## INTRODUCTION

As an educator, a large part of my job is to motivate and assist students as they embark on a lifelong journey to *connect the dots*. To further this goal, I design courses with a systems approach and introduce a broad array of material to stimulate holistic learning. This article will discuss my attempts to educate technologists about law and strategy through a course offering that has evolved considerably and is now

called Intellectual Property and Business Strategy. This article is a reflective case study that traces the epistemological and pedagogical evolution of this course as it was taught over a ten-year period at four academic institutions, each with a fairly different student profile.

One of the unifying aims of the course has been to prepare students to appreciate and connect the dots that will arise in their professional lives. At the core of my interest in teaching interdisciplinary

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courses that target engineers, designers, and scientists (henceforth referred to as “innovators”) is a belief that law, technology, society, and business are all closely interwoven and that the world is improved when individuals from diverse backgrounds collaborate to create and capture economic value.

Some of the greatest advances in technology and innovation have emerged from individuals who have been able to connect the dots across disparate fields. Thomas Edison, the Wright brothers, Tim Berners Lee, Bill Gates, and many others come to mind as individuals who spanned knowledge domains to create new and pioneering areas of scientific inquiry. Along the way, many innovators experienced great personal growth and satisfaction through the development of their entrepreneurial and business leadership skills. Innovators often succeed as entrepreneurs, and research shows that many start-up companies are initially led by their scientific founders (1). One of the goals of a course like Intellectual Property and Business Strategy is to spark the imagination of innovators who are curious about their role in the larger value-creation ecosystem and stimulate their interest in pursuing business opportunities. The creation of courses such as this one also encourages university instructors to span disciplines and experiment within their curricular and institutional environments.

Innovators should, at a minimum, appreciate their vital role in the value-creation ecosystem. Often, they

are the source of value creation through their technological advancements and inventions. The value chain framework that is often used in strategic management education and planning exercises depicts technology development as a fundamental value-creating activity that is often linked to other business activities to generate competitive advantage (2). Additional value in this well-accepted framework is created and captured through subsequent primary and support activities, such as manufacturing, distribution, marketing, legal administration, and corporate governance (Figure 1).

Innovators, therefore, play a fundamental and early role in value creation at the individual, team, and firm levels of analysis. A general trend is the commercialization of knowledge assets among firms competing within the knowledge economy (3). This has resulted in macro-level adjustments. For example, the investment rate in intangible assets in the U.S. is currently 14.3 % of gross domestic product compared to a 9.5 % investment rate in tangible property (4). These are the assets on firms’ balance sheets that, in part, comprise patents, designs, trade secrets, brands, copyrights, and know-how.

The fortunes of nations are increasingly dependent on innovation and the systems that incentivize innovators who reside within their borders (5,6). South Korea’s industrial transformation is a recent and striking example. China is undergoing a similar transition period as its economy and intellectual

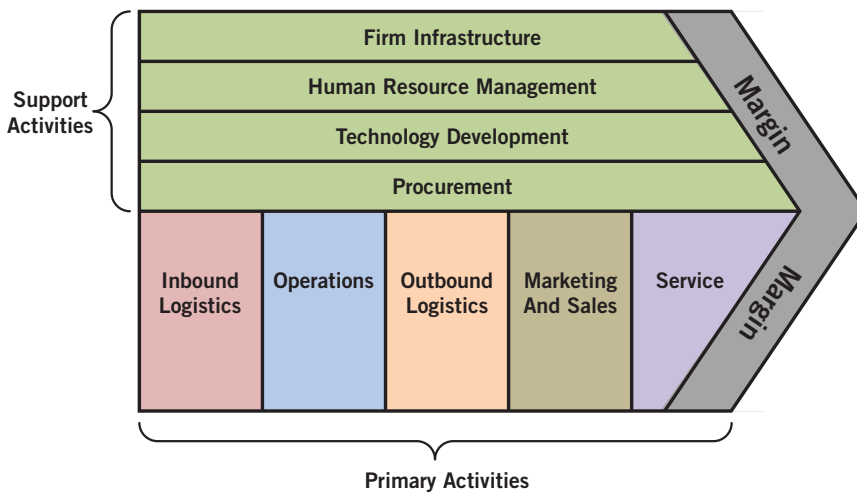


Figure 1. The value chain of the firm (2).

property (IP) system mature, and, in the process, it has become the number one patent-filing nation in the world (5). China's patenting activity is linked to that nation's aspiration to compete at the highest strategic levels in the global knowledge economy (6). Studies confirm that nations undergo a transition period of capacity building and intellectual capital development that is correlated with increased levels of patenting. Patents are therefore an imperfect but acceptable proxy to measure national innovative capacity (7). One study assessed China's national innovative capacity and demonstrates that patenting in China has increased significantly since 2001, led by universities and members of private sector industry (7). China is following global and macro-level trends that will assuredly have a significant impact on U.S. firms and innovators going forward.

The idea of teaching business and IP to innovators is not novel. Professors Robert Rines of the Massachusetts Institute of Technology and Charles Garris of the George Washington University persuasively argued in favor of integrating patent law as a key aspect of engineering education (8-9). Professor Garris cogently argued that the U.S. patent system is an essential learning tool in engineering education to teach industrially-relevant case studies; educate engineers about the legal risks of inventing; raise awareness of the value that engineers create since patents can be valuable property rights; teach students about the broader economic, legal, and ethical environment; and provide a means for faculty to engage industry (9). An interdisciplinary course like Intellectual Property and Business Strategy builds from the important contributions offered by pioneering and far-seeing educators such as Professors Rines and Garris.

The balance of this article is organized as follows. The first section will provide a historical evolution of the course. This discussion spans four academic institutions during a period of ten years. The course evolution will reflect the differing needs and goals of each institutional setting and an epistemological broadening of the subject matter as the course has matured over time. The second section will discuss the knowledge foundations that underpin the course. Three broad knowledge domains will be assessed, including the broader legal environment, stakeholder

analysis, and strategic management. Section three will examine five learning goals that have emerged from the course and the methods for achieving these goals. Following this section, the article concludes.

## HISTORICAL EVOLUTION

Intellectual Property and Business Strategy evolved from an original course offering developed and spearheaded by another educational pioneer, Northwestern University professor James G. Conley, a National Academy of Inventors Fellow who has held appointments at both the Kellogg School of Management and the McCormick School of Engineering.

Professor Conley's vision for a patent-focused engineering course called Innovation and Invention fit the needs of an engineering curriculum program update at Northwestern, Engineering First® (2016 conversation with Professor James G. Conley, unreferenced). The award-winning Engineering First curriculum provides first-year students with engineering experiences, integrates engineering science and mathematics, and emphasizes design and the process of design thinking (10). Professor Conley's proposed course would serve as a bridge in the newly revised curriculum to "establish the critical link... between design, innovation and competitive advantage" and would use in-depth case studies from the patent literature to highlight cases of technology, innovation, and competitive advantage (Memorandum from James G. Conley, unreferenced). In 2003, Professor Conley submitted a proposal to Northwestern University's Murphy Society to develop a new engineering course called Innovation and Invention (Memorandum from James G. Conley, unreferenced). The Murphy Society awards funding for special faculty and student-initiated engineering projects (10). The Society is named after university benefactor, industrialist, and prolific inventor and patentee Walter P. Murphy.

In 2003, Innovation and Invention was approved as a 3-credit upper-division course at Northwestern's McCormick School of Engineering. The course was introduced in 2004 and initially enrolled 40 students. In 2006, I was asked to help re-design and co-teach the course partially to fulfill my duties as a post-doctoral research fellow affiliated with Professor Conley's multidisciplinary research center, the Kellogg Center

for Research in Technology and Innovation (11). The course was initially structured as a ten-week quarter course, meeting once a week for three hours and covering the sequence of topics listed in Table 1. Students were required to purchase a customized course pack, consisting primarily of background legal guides and utility patents.

Innovation and Invention exposed undergraduate engineering students to the major IP regimes, with a heavy emphasis on utility patent-related readings, discussions, presentations, and case studies. The diversity of inventions covered in reading and discussion was designed to illustrate the broad applicability of patents to innovation and to cater to the diverse backgrounds of students representing biomedical, electrical, mechanical, and civil engineering and computer science, amongst other disciplines of applied sciences. The course was also a platform for engineering students to gain additional experience with group projects, oral presentations, and writing assignments.

Thirteen years after its first introduction, the course continues to be offered and remains a popular offering within Northwestern's Engineering First curriculum. Currently, the course is called Intellectual Property and Invention (DSGN 350) and is offered every spring term. The principal change in the course has been the introduction of patents in the fields of social networking and e-commerce to better reflect the state of the art in these important areas of invention. Presently, the course is taught by Clinical Associate Professor Daniel P. Brown, who is a prolific inventor and entrepreneur (12).

I offered a different version of the course in 2007 at my subsequent place of academic employment, Michigan Technological University (MTU). At MTU, I redesigned an upper-division course, Intellectual Property Law, Technology and Society (BA/SS 3650), that had previously been offered. This course was added to the curriculum prior to my arrival in 2006 as a general elective open to all majors across campus. The course was designed to expose students to

**Table 1:** Innovation and Invention 2006 Course Syllabus

Week	Topic	Description
1	Course, syllabus introduction, pedagogy, deliverables, and student responsibilities	Innovation in the context of invention, competitive advantage
2	General introduction to "How to read a patent"	Introduction to invention, trade secrets, patents
3	Invention history, trade secrets, patent regimes across time. <i>Willy Wonka and the Chocolate Factory</i>	<i>Team presents inventions:</i> B&D Snakelight
4	Patent prosecution strategy	<i>Team presents inventions:</i> Alcoa 7150 alloy
5	Novelty, usefulness, obviousness and patentable inventions. Patentability and the new combination of old ideas, Edison and the lightbulb	<i>Team presents inventions:</i> ASF Unicore bolsters and side frames
6	<b>In Class MIDTERM EXAM</b>	<i>Team presents inventions:</i> Eolas framing of web pages
7	Innovation source identifiers: marks, trade dress, trade names	<i>Team presents a patent:</i> Cox 2 pain inhibitor
8	The expression of ideas: copyrights	<i>Team presents inventions:</i> Fax standard
9	Student presentations of final projects	Student presentations of final projects (cont.)
10	Student presentations of final projects (cont.)	Course review and summary

the legal and public policy implications of innovation and the IP system. Students enrolled are from diverse fields of study, such as electrical and mechanical engineering, physics, chemistry, social sciences, communications, economics, computer science, and business (13).

The 3-credit, semester-long course was offered jointly by the School of Business and Economics and the Department of Social Sciences and delivered using a collaborative team-teaching approach that proved to be effective (13). Students in the course rated the team-teaching approach 4.25 on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) (13). The course was also made available as an elective to multiple engineering programs, such as the interdisciplinary minor in nanoscale science/engineering and MTU's capstone Enterprise Design Program (13). I first taught a version of the course in fall 2007 and enrolled approximately 30 students. The syllabus of the version I taught offered this description:

This course covers the principles of intellectual property law, addressing legal and contemporary policy issues in patents, copyrights, trade secrets and trademarks. The strategic management of intellectual property rights is also a focal concern. Drawing from these two perspectives, significant attention is devoted to how the law impacts the balance among property protections, technological innovation and public access. The course design emphasizes learning through lectures, case studies, group work and exercises.

The content of Intellectual Property Law, Technology and Society differed in several respects since it was tailored to a broader audience of students, many with non-technical backgrounds. The goal was to broaden the subject matter to include societal and public policy topics since IP relates to several important and interesting policy issues. The course covered all the major IP regimes and included public policy topics such as the open source and copyleft movements, digital piracy, traditional knowledge, and patent hold-ups.

The course continues to be regularly taught at MTU using a collaborative team-teaching approach with instructors from social sciences, business, and the university's Office of Innovation and Industry Engagement (2016 conversation with Professor Jim

Baker, unreferenced). A recent course description states that the course "[c]overs principles of intellectual property law, addressing managerial and policy issues in copyright, trademark, trade secret, and patents. Readings and discussions also cover how these property and legal systems impact the balance between property exclusivity, technological innovation and public access" (13).

In 2015, I offered a third version of the course at Florida State University (FSU), my current place of employment. Having taught law-related courses to non-lawyers, I appreciated the broadening impact that such courses could have on students and the curriculum. Unlike the two prior institutions, no such offering was in place when I arrived at FSU, so the task fell on me to create the course from scratch. My plan was to create an elective 3-credit course called Intellectual Property and Business Strategy that would be offered jointly through the graduate business school program and the law school and combine MBA students with law students to stimulate interdisciplinary discussions and projects. I approached my law school faculty colleague Professor Jake Linford, a specialist in copyright and trademark law, to co-teach the course. This offering required some entrepreneurial effort, creativity, and administrative support from our respective colleges (business and law) to facilitate execution. To achieve this, we established two sections of the course, each through our respective colleges as a special topics course, thereby reducing the need for a lengthy course approval process. The course was considered half an overload for each instructor.

Enrollment in the alpha version of Intellectual Property and Business Strategy was almost evenly split between graduate business students and law students. The course was designed to enroll an approximately equal number of students from each graduate program to stimulate interdisciplinary teamwork and discussion. Additionally, two Ph.D.-MBA students with backgrounds in biology and several students with information technology-related experience enrolled in the course, demonstrating its continued appeal to scientists and engineers. Given that the student make-up consisted primarily of non-scientists and engineers, however, we decided to focus primarily on the legal, strategic, and societal issues surrounding IP management rather than

discrete technology-related topics. This focus allowed us to introduce more advanced topics related to legal strategy. For example, we discussed the concept of legal endogeneity, that is, when strategic parties do not take the law as a given and instead attempt to shape legal rules and outcomes using legal, media, policy, economic, and political means (14-16). The course description stated:

This course covers the broad agenda of using intellectual capital for competitive advantage. With globalization, intangible assets such as human capital, intellectual property, brands and relationships have become the dominant proportion of a firm's market value. Yet most firms do a poor job of managing this intellectual capital strategically. This course adopts a "lifecycle" approach to the management of an intellectual asset, covering the creation of the asset, the codification of the asset in the form of intellectual property (IP), the valuation of the assets, the protection of the assets and leveraging of same into future markets for growth. Case studies examine management challenges in entertainment, finance, pharmaceuticals, health care, consumer electronics, agribusiness, biotechnology, consulting, venture capital, telecommunications, software and other contexts. Additionally, the social implications of intellectual property policy are discussed.

The semester-long course was offered once during spring 2015, and course evaluations indicate that it was well-received. The team-teaching method also proved to be successful and well-received by the students. Plans are in place to offer another version of the course that will expand to include students enrolled in the science, technology, engineering, and math (STEM) disciplines.

I offered the most recent version of Intellectual Property and Business Strategy during summer 2016 as a six-week course offered through Northwestern University School of Law's Master of Science in Law (MSL) program (17). The MSL degree program provides focused and practical business-centered legal training to STEM professionals. I was invited to visit during the summer as an adjunct visiting professor to develop a 1.5-credit modular course for the program. I decided to revamp the preexisting offerings to

tailor course material to this unique group of working professionals, most of whom had advanced science and engineering degrees and significant industry experience.

The class met six times. Each three-hour evening class was designed to have a lecture and a discussion-based case study component. Earlier in the program, the students studied basic IP regimes since a prerequisite for the course was a class on IP fundamentals. A greater emphasis was, therefore, placed on strategic management and advanced topics, including IP-enabled business models, litigation strategies, licensing, data mining, regulatory strategies, lobbying, policy, and ethics. As with the prior course versions, a customized reading packet was assembled and comprised mainly articles and cases. The course description for the course states:

To better prepare you as a strategic manager of knowledge-based assets, this course adopts a lifecycle approach that covers the creation of an intangible asset, its codification and protection as intellectual property rights, their leveraging through contracts and other strategic techniques such as litigation, data mining and administrative proceedings. The course also approaches intellectual property strategy from a stakeholder perspective. The effective and strategic management of intellectual property and other knowledge-based rights considers various important constituents that include: external regulators, the courts, administrative agencies, inter-firm departments, top management, partners, customers, competitors, the media and public at large.

The course was well received by the MSL students and received an overall rating of 5.7 out of 6.0. Enrollment consisted of nine students, which was appropriate for this relatively new program targeting the part-time evening program enrollees during the summer months. It was also perceived as a capstone-type course that integrates legal knowledge with the type of applied business strategy competency that STEM students seek to apply in the workplace as future business leaders. As experienced scientists and engineers, the MSL students greatly valued understanding the deeper legal, strategic, societal, and ethical implications of innovation and IP rights.

## KNOWLEDGE FOUNDATIONS OF IP AND BUSINESS STRATEGY

Having taught four different versions of the course at four different institutions during a period of 10 years facilitates critical reflection on the epistemological foundations of interdisciplinary offerings that combine law, technology, and business strategy. During this process, I have determined that three core knowledge domains with their applicable theories and frameworks inform and explain the behavior of strategic actors who exploit knowledge-based assets. My experience is that these knowledge foundations have significant implications for innovators as participants in the value ecosystem and are, therefore, pedagogically valuable. The three key theoretical foundations are the legal environment of business, stakeholder analysis, and strategic management (Figure 2). Each knowledge domain will be briefly discussed next.



**Figure 2.** Theoretical foundations.

The earliest versions of the course focused on the patent regime. Subsequent offerings broadened to encompass other IP regimes, including trademarks, copyrights, trade secrets, and designs. These various IP regimes are just one facet, however, of the much broader legal environment. The broader legal environment encompasses institutions and processes that include the courts, litigation, negotiations, administrative agencies, regulators, statutes, and contracts. As the course evolved and became richer in its content, the emphasis shifted to these broader legal dimensions. From this perspective, technology and the IP regimes are just a starting point for strategic decision-making processes and behavior. For example, in the most recent course offering, a case was analyzed in which an incumbent firm opposed a much smaller competitor's trademark application at the U.S. Patent and Trademark Office (USPTO) and strategically stalled the registration for three years (18). Another case examined how litigation can be used to challenge

existing legal doctrine and to strategically limit a competitor (19). The dynamics and complexity of the U.S. common law and regulatory system can be evaluated and discussed in much greater detail using the context-specific case study method.

An expansion of focus to include the broader legal environment facilitates integration of the next knowledge domain, stakeholder analysis. Stakeholder analysis involves assessing the broader business, legal, political, and social environment to identify the groups, institutions, and interests that impact the firm and its innovators (20). Early iterations of the course paid little attention to external stakeholders, and considerable attention focused on a few key institutional actors, such as the USPTO or the courts. A broader stakeholder analysis allows one to recognize and analyze the legal, strategic, ethical, and political forces that shape innovation. From this perspective, the legislature, the executive branch and its administrative agencies, the courts, trade associations, the media, business partners, regulators, and public advocacy groups can impact innovation and strategic outcomes (20). For example, the latest version of the course discusses strategic attempts to influence public opinion related to non-practicing patent entities as a means to weaken patent appropriability in complex technology industries, such as software (21). From this perspective, the role of ethics and norms can be introduced as an important countervailing force against the employment of overreaching strategic behavior (16).

The third key knowledge domain involves strategic management. The introduction of strategic management theories and frameworks helps to explain and guide decision-making within the fields of innovation and IP management. Several perspectives have informed the course over the years. One perspective is that of Michael Porter and his insights related to value chain analysis and the firm's strategic choice to either insource or outsource business activities to achieve cost leadership or differentiation (2). Value chain analysis provides a foundation to examine other important concepts, for example, the role of strategic downstream complementary assets such as manufacturing, distribution, and branding and their relation to innovation and technology appropriability levels (3). The value chain also provides a foundation to

examine the firm's essential internal capabilities and its linkages with external strategic partners through the execution of a successful business model (2,22). For example, in the latest version of the course, IP-enabled business models were introduced and effectively discussed using various case studies, such as those involving Tabasco hot sauce and the Amazon Worlds fan fiction distribution platform (23,24).

Another aspect of strategy involves an emergent area of research, corporate legal strategy. Legal strategy encompasses a diverse range of behavior with differential impact and is predicated on the understanding that not all attorneys and managers have the same legal capabilities (15). The course, in its current form, discusses the concept of rare, strategically-qualified attorneys who work with innovators and managers to transform the legal environment and help firms achieve long-term competitive advantage. A useful framework that integrates all of these strategic perspectives is the value articulation framework (25). This meta-framework integrates value chain, business model, and legal strategy capabilities and provides a strong pedagogical basis to discuss IP strategy cases.

Figure 3 illustrates how Intellectual Property and Business Strategy evolved over time to build on several important knowledge domains.

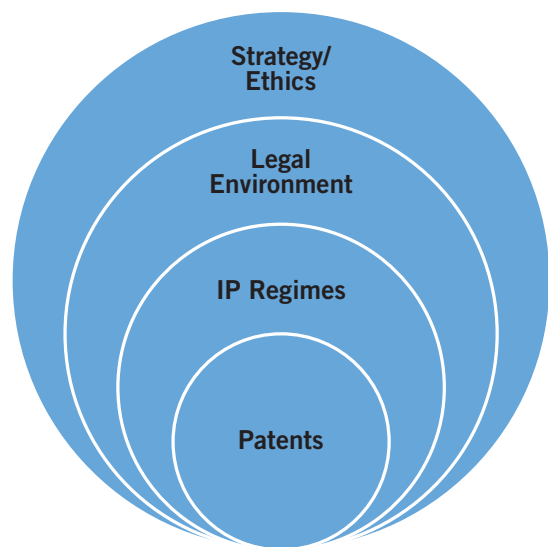


Figure 3. Knowledge domain evolution.

## LEARNING OBJECTIVES AND DELIVERY

As the course evolved over time, I identified the five key learning objectives that are listed in Table 2. These learning goals assume a working knowledge of the various IP regimes. This assumption is not necessary, however, and a sixth learning goal can encompass learning the basic content of the various IP regimes. Alternatively, an entire prerequisite course, such as IP Fundamentals, can be structured to achieve this goal. Depending on the program scheduling and needs, the course can alternatively introduce these property regimes at the beginning. Various useful resources exist that succinctly introduce the IP regimes to non-lawyers (26).

Various cases and reading materials help to achieve the first learning objective. The writings of Teece and Porter, for example, explain the role of appropriability regimes, downstream strategic complementary assets within the value system, and how firms can profit from innovation despite lacking a first-mover advantage (2,3). Industry or technology-specific case studies can illustrate the pitfalls innovators often face as entrepreneurs who often must compete against large incumbents (27). Other case studies that use the value articulation framework illustrate how IP can be leveraged across existing and new value chains, i.e., markets (25). These materials reinforce how, and under what conditions, innovators can be a pivotal source of value creation and subsequent capture.

The second learning goal assesses the broad regulatory and legal system in relation to innovation. Useful materials highlight how the three branches of government may impact the innovator. For example, a rich discussion can be gained from an assessment of the USPTO's internal rules and judicial case law referencing patent and trademark oppositions. Legislative amendments to important statutes such as the U.S. Patent Act can offer a rich source for discussion related to legislation's impact on innovators. The practice of industry lobbying can also highlight the heterogeneous needs among innovators with respect to the IP system (28). Judicial opinions also provide a very rich source of material to illustrate the competing interests of parties and the role of the courts as the social arbiters of the appropriate balance between private and public interests.



**Table 2:** Learning Objectives

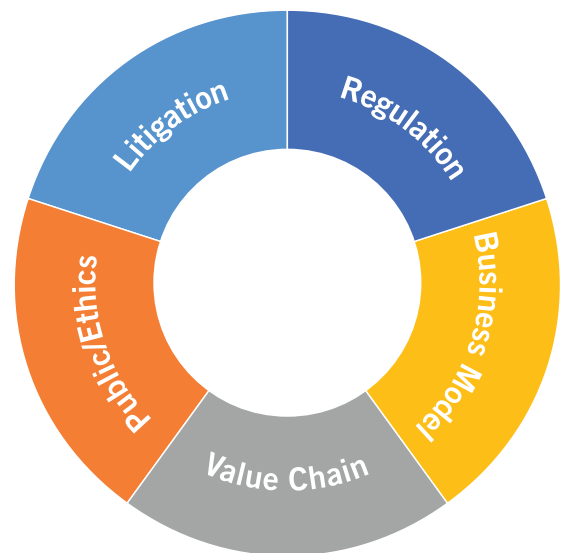
<b>Learning objective 1</b>	Understand the innovator's role in the value chain and the need for strategic complementary assets
<b>Learning objective 2</b>	Understand how public policy and regulation can strategically impact the innovator
<b>Learning objective 3</b>	Understand the innovator's role in developing internal firm capabilities to generate IP-enabled business models
<b>Learning objective 4</b>	Understand how legal strategy, litigation, and other adversarial processes can impact innovation
<b>Learning objective 5</b>	Understand how ethics and public opinion impact innovation-related outcomes

The third learning goal related to IP-enabled business models is best attained with the aid of industry case studies and guest speakers. Effective cases demonstrate internal innovation capabilities that are strategically linked with key external players to achieve long-term competitive advantage. The value articulation framework, once again, provides a useful resource to sample cases (25). Other excellent resources for this topic include the works of Chesbrough (22), Shapiro and Varian (29), and Pisano (14). The topic of IP-enabled business models lends itself to expansive class discussions including the complementary role contractual licensing provisions as a method for exchanging value between parties. Students quickly learn that their success as innovators is often linked to the value that is shared with key external constituents using institutional arrangements such as licensing contracts.

There are ample opportunities to introduce materials related to the fourth litigation-related learning goal since there is no shortage of IP controversies and disputes. A considerable amount of strategic industry insight and information can be gathered from publicly available litigation documents. For example, trade secret, utility patent, and trademark complaints can be introduced to discuss the nature of legal claims and how they relate to competition. This technique also introduces students to the courts, settlement negotiations, the common law process, appellate decisions, and the economic costs of the U.S. adversarial legal system as strategic determinants of business and innovation outcomes (18).

Lastly, the fifth learning goal related to ethics and public opinion can be supported with materials that examine timely topics such as legal bullying, legal crowdsourcing, and patent hold-ups in technology standard-setting environments (19). Materials and case studies should reinforce the impact these normative forces often have on innovation-related outcomes. Figure 4 provides a visual depiction of all five learning goals.

## Key Learning Objectives

**Figure 4.** Summary of learning objectives.

## CONCLUSION

The process of writing this article was a reflective exercise that focused on the evolution of one interdisciplinary course related to law, business, strategy, technology, and ethics. This exercise, however, also allowed me to reflect more broadly on my role as an educator. Along the way, I realized that one of my main motivations in the classroom is to adequately equip students for a world ahead that is characterized by environments that are increasingly subject to competitive pressures. The demand to innovate in these environments is likely to increase over time. In my opinion, the successful innovator is a person who can span functional work areas to create and capture value collaboratively with key internal and external partners in both the private and public spheres. This process quickly moves beyond technical areas of expertise and crosses into the domains of law, business strategy, and ethics. A course like Intellectual Property and Business Strategy has evolved to prepare innovators for this type of environment, where *connecting the dots* may be a fundamental determinant of innovation-related success.

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