



Market Assessment for Innovative Technologies in Biomedical Sciences

Tech 491

2 Credits

Spring 2020, 7-week Session A

Feb 3, 2020 – Mar 20, 2020

Syllabus

Instructor: Eric Langer

Contact Information:

E-mail: elanger@bioplanassociates.com

Phone: 301 921 9074

Virtual Office Hours: By Appointment

Preferred Method of Communication: Email is often best, call anytime needed

Course Information:

Prerequisites: Basic knowledge of Excel, some knowledge of business vocabulary helpful.

Course Description:

The course provides an introduction to the financial and business aspects of valuation in biomedical sciences. We use practical presentations and case study methods to give students hands-on experience in developing their own valuation project(s). Establishing a value to an innovative technology in biomedical sciences can be challenging: An innovative technology is novel—and therefore has few precedents or established markets. This course helps students identify the assumptions and factors required that creates “value”. We then develop a framework to help prioritize the factors that most affect valuation. Students learn how to assign current and future worth to a technology, a product, or a company, based on elements including market potential, market need, and competition. Students will create their own project involving evaluation of a therapeutic, a diagnostic, or a life sciences tool/instrument. This course provides a framework for making valuations, including:

- Market analysis and market research processes to form assumptions and define the elements that contribute to a technology or a company’s value;
- Market sizing techniques;
- How to assess a biotech company for financing rounds and M&A;
- How to consider future value of a product when assessing value of intellectual property today;
- Use of Excel models such as net present value (NPV);
- Assigning value to intangibles, such as a management team’s expertise and track record;
- Discounting for various types of risks.

Importance of Valuation: An innovative technology may well represent a true scientific breakthrough, but the innovation may have little value if:

- It is not needed by end-users
- Provides only limited value to the medical or scientific community
- There are only a very few end-users
- Small patient populations may not justify the investment.

In such cases, decisions need to be made regarding whether the value of the innovation warrants the cost of development and commercialization. In this course you will learn how to first make the right assumptions for a product (therapeutic, diagnostic, or life sciences tool), in development.

We also discuss aspects like deal terms that can be asked for, how equity should be shared with a new investor, and other questions that demonstrate how valuation is more than just assigning numbers. It involves understanding basic business objectives, the potential of a new product or service, all balanced against the potential risks.

Course Website (Canvas): <https://faes.instructure.com/courses/228>

Access the course Canvas site using your log-in. This site will provide guidance for assignments, online class discussion group assignments, and guest lecture / presentation log-ins.

Learning Materials:

Required and Recommended Texts: Articles of relevance on market valuation of biomedical technologies will be provided in the online class. These will support class discussions. In-class lectures and guest presentations will be used.

Course Goals and Objectives

When you complete the course successfully, you will be able to:

- Recognize the basic factors involved in assessing a technology, market or company
- Discuss the concepts, tools and techniques useful for assessing a market and valuation
- Understand how to manage and present inherently thin market data typically available
- Assess a company prior to the valuation
- Understand key components of a therapeutic product valuation; define value drivers
- Value an idea, platform, technology, or company
- Understand investors' objectives when valuing a biomedical company or technology
- Estimate the value of a technology you are currently working on

Structure of the Course

This 7-week online course is organized by modules. Students learn the basics of technology and company assessments through online readings, discussion sessions, and presentations by guest lecturers. Students will be assigned teams (groups) in which they will participate weekly on assignments, and threaded discussions. Students will select a personal Project based on their interest, or current work. This personal Project will be part of the on-going team discussions and will form the basis for the final graded class project.

The Learning Process

Students learn best by doing, and by working together with peers to create successful outcomes. As your instructor, I will provide models and valuation strategies you can use, and will also introduce globally recognized guest lecturers, who will share with you decades of personal experience throughout this course. But it will be your responsibility to learn *from* this expertise, and form your own methodologies, approaches, and opinions on how to define a valuation project. Although we will explore various Excel models for defining market sizes, and will discuss how a spreadsheet valuation (e.g., NPV) can be used, how these will be used for your class projects will be quite varied. This class is

interactive, and students work in small groups to allow interactive learning. You will also learn from industry insiders:

- Considerations for structuring suitable licensing deals
- How to assess a biotech company for financing rounds and M&A
- How to consider future value of a product when assessing intellectual property today.

Scientists Learning to Deal with Poor Market Data: Scientist-learners have been trained to seek accuracy and precision. In business, there is often limited available market data, and all too often there are far too many variables to *cost-effectively* predict a given outcome. This systemic lack of good data can be difficult for some scientists to accept. But more often than not, 'directional' market data may be all that is available. Learning how to accept (and report) large potential errors is part of the shift toward a business orientation.

Accepting Risky Data: Taking calculated risks in making your estimates and building an evaluation strategy means you need to defining assumptions (and accept and report on the inaccuracies in your assumptions). Market assessments are invariably 'new territory', so you will need to establish your own methodologies for creating assessments; this means getting comfortable handling risky data. Risk-taking is also reflected in the learning process for this course. Creatively coming up with ways to define factors or justify assessments is critical to market assessments and valuations. And this creativity also valued in the course assignments.

Time commitment: Expect to put in around 6 hours per week for this course. This may include: Reading class materials, online researching topics, participating in online threaded discussions and preparing assignments. *NOTE! This is a short class and missing a week will likely result in loss of opportunity to develop your final project(s) and to participate in class discussions.*

Important Dates:

Drop deadline (see Academic Calendar for specifics regarding Feb 21 date)

Audit and withdrawal deadline (see Academic Calendar for specifics regarding Apr 10 date)

Holidays (President's Day Feb 17th)

Communication:

Reply to email: I will respond to emails within 24 hours

Reply to voicemail: I will respond to voicemails within 24 hours

Preferred time to call: Most any time East Coast time zone.

Canvas Q&A Discussion Forum: You will participate in weekly online discussions and exercises.

Etiquette:

Email: In an online environment, we don't have the luxury of being able to instantly clarify a mis-spoken request, or to retract a 'humorous' (obnoxious) comment. If you receive something frustrating, it is important to assume the best intentions on the part of your sender. Emails are often sent informally without review—therefore, if you receive a 'frustrating' email from a group member, assume the best intentions, and simply ask for clarification. Group etiquette: The same caveat should be applied to your group work. When in doubt, ask. Further—you'll find that some of your team members don't share your approach or level of dedication. It may be useful at the beginning of a team project to spell out team members' expectations, and responsibilities. If one team member seems to be

not meeting expectations, ask early on if there may be a gap between what is being done, and what you *think* is being done. Communicate early and often, rather than waiting until the end of a project. Remember, you will be individually grading your team members' participation, and this will be part of their participation grade for the course.

Policies:

Academic Policies

This course adheres to all FAES policies described in the academic catalog and student handbook, including the Academic Integrity policy listed on page 11 of the academic catalog and student handbook. Be certain that you are knowledgeable about all of the policies listed in this syllabus, in the academic catalog and student handbook, and on the FAES website. As a student in this program, you are bound by those policies.

Copyright

All course materials are the property of FAES and are to be used for the student's individual academic purpose only. Any dissemination, copying, reproducing, modification, displaying, or transmitting of any course material for any other purpose is prohibited, will be considered misconduct, and may be cause for disciplinary action. In addition, encouraging academic dishonesty by distributing information about course materials or assignments which would give an unfair advantage to others may violate the FAES Academic Integrity policy. Course materials may not be exchanged or distributed for commercial purposes, for compensation, or for any purpose other than use by students enrolled in the course. Distributions of course materials may be subject to disciplinary action.

Guidelines for Disability Accommodations

FAES is committed to providing reasonable and appropriate accommodations to students with disabilities. Students with documented disabilities should contact Dr. Mindy Maris, Assistant Dean of Academic Programs.

Dropping the Course

Students are responsible for understanding FAES policies, procedures, and deadlines regarding dropping or withdrawing from the course or switching to audit status.

Harassment

FAES adheres to the NIH's harassment policies, which can be found at the following link:
<https://hr.nih.gov/working-nih/civil/statement-workplace-harassment>

Faculty and students in FAES courses are responsible for being familiar with the NIH's harassment policies and adhering to them.

Attendance

As noted, this is a participation-based class, and if you think you may miss more than a few days' participation, you should sign up for a future semester.

Participation

Participation in online discussions and group projects is critical for a successful grade in the class.

Assignment Submissions

- *Due Dates:* See online class assignments list, and the Syllabus calendar.
- *Late Submission Policies:* Late submissions will not be accepted. Accommodations may be made in special circumstances, if the instructor is informed beforehand. However, to be fair to those who turn in on time, a half-letter grade/day deduction will be made for late submissions.
- *Assignment Formats:* See online class assignments.
- *Citation Format:* Any reasonable citation style can be used. Much of our research will be online, so common website citation, including date accessed, can be used, when applicable.
- *Discussion Board Policies:*
 - Typically, a weekly assignment will be given.
 - Students are expected to post timely, high-quality, relevant, and succinct responses.
 - Students will then be expected to read other students' posts and respond to these
- *Due dates:* A week normally begins on Monday. Your initial weekly postings will be due according to the thread instructions (typically due Wednesday); your responses to your classmates are due by Saturday.
- *Guidelines for Submitting Assignments:* Turn in assignments through Canvas, and/or email to the Instructor.
- *Instructor's feedback on assignments:* Typically, assignments will be graded and posted 1 week after submission.

Major Assignments:

Grading Component	Percentage
1) Outline Approach to New Technology Evaluation (<i>Team</i>)	15%
2) Excel Modeling Sheet: Defining your Project process, (<i>Individual</i>)	20%
3) Major Project Final Paper & Excel	30%
4) Major Project Investor PPT Presentation	15%
5) <u>Class Participation</u> (quality of online threads, participating Guest Lectures, etc)	10%
Total	100%

Grading Scale: 98-100%=A+, 93-<98%=A, 90-<93%=A-, 87-<90%=B+, 83-<87%=B, 80-<83%=B-, 80%=C, <70%=F

Assignments:

1) Outline Approach to New Technology Evaluation: Each *Team* will prepare an outline of their approach to developing a new technology evaluation. (See Grading Rubric. This can be one of the students' work projects. Team participation is part of the class participation grade).

2) Excel Modeling Sheet: Students will individually develop an Excel model intended to support their Major Project and provide a framework for creating a valuation, including quantitative analysis, and assumptions used to estimate factors (we'll cover how to set this up in class). This sheet is only an outline, and will NOT include your actual data. (See Grading Rubric)

3) Major Project Final Paper and Excel: A brief paper defining your product/technology market valuation, along with the Excel data used to analyze and model your market/technology. *At this point, your Excel sheet will contain results of your research into market sizing.*

4) Major Project PPT: A professionally prepared brief PowerPoint, including spreadsheet data analyses and assumptions to define your product market to potential investors. Because investors' attention span can be short, this should be short, as well.

5) Online Class Participation: Participation grade includes students' participation in any online projects, presentations, etc., discussion forums regarding readings, team projects, and other related work.

BIOMEDICAL TECHNOLOGY VALUATION COURSE OUTLINE SPRING 2020

Week	Date	Topic	Comments
1	Feb 3-9 M-Sun	Introductions, Assigning Teams, Course Explanations	Introductions, online class discussion; assign teams
2	Feb 10-16	The Market Evaluation Process and Market Sizing Models Processes for Market Evaluation, where to get market information	Class Online Q&A Session <u>TUE Feb 11 7:00pm EST</u> <i>Discussion Thread: Challenges and Problems in Market & Tech Evaluations</i>
3	Feb 17-23	Market Sizing Process & Opportunity Assessments: New Technologies and Life Science Tools; Review of Methods #1 Assignment: Def. Strategy for New Tech) <u>Due Mon Feb 17</u>	Class Adobe Connect <u>Tentatively Tue FEB 18, 7:00pm EST</u> <i>Online discussion—Reviewing Evaluation Models (Team)</i> <i>(Assignments Posted on Discussion)</i>
4	Feb 24 Mar 1	Market Sizing and Evaluation: <u>Therapeutic</u> Guest Lecture: Kalm Group #2 Assignment: Excel Modeling (Individual) <u>Due: Mon Feb 24</u>	<i>Online class discussion: Examples of</i> <u>Tentatively Tue FEB 25, 2:00pm EST</u> <i>Successful Evaluations, and Impact of Failed Assessments</i>
5	Mar 2-8	Market Sizing and Evaluation: <u>Diagnostic</u> Guest Lecture: Kalm Group	<i>Online class discussion:</i>
6	Mar 9-15	Review of Modeling and Refining your Data Guest Lecture: Samuel Shafner, Investment for Therapeutics #3 Assignment: Major Project Paper/Excel <u>Due Mon Mar 9</u>	Class Adobe Connect <u>Tentatively Tue Mar 10, 7:00pm EST</u> <i>All participants listen in; will be recorded</i>
7	Mar 16-20 M-Fri	Presenting an Investor "Deck" - Your PPT #4 Assignment: PPT Presentation <u>Due Monday Mar 16</u>	<i>Provide Online Feedback to Classmates</i> <u>By Friday Mar 20</u>

Grading Sheet

Grading Component	Description	%
1) Outlining Approach to New Technology Evaluation (<i>Team</i>)	<p>Each Team will prepare an <i>outline</i> (3-4 pages; not the full, actual evaluation) of their approach to developing the evaluation of a new technology. This can be for a relevant new product or technology selected, or being worked on by ONE of the team members (team selects which), alternatively, your instructor can assign a technology. This Word document will include:</p> <ol style="list-style-type: none"> Overview of technology Market description (who could be likely buyers, a range of how many buyers MAY exist, what could be competitive products, etc) An overview of how your team would begin the process for assessing the market for this product. Lists creative ways you might collect information List creative ways you might estimate (guesstimate) market sizes (e.g., identify surrogates for actual spending: # patients, # tests done, # of labs/users) Summarize how you may correlate various approaches into a clearer view of the market for the technology. <i>This will form the basis for your Excel modeling.</i> <p>Grading is based on:</p> <ol style="list-style-type: none"> Thoughtfulness of the approach to the analysis Creativity in how the data will be obtained Reasonableness: ability to find and/or develop data Defining how modeling of inputs will be done Professionalism of the presentation and approach 	15%
2) Excel Modeling Sheet: Defining your Project process, (<i>Individual</i>)	<p>Individually, you will prepare an Excel sheet for your own selected product, therapeutic, or service. You do NOT yet have to <i>complete</i> the information you'll define as being needed, but you will need to input rough data points (place-holders, etc) to confirm your Excel analysis model 'works'.</p> <p>Grading is based on:</p> <ol style="list-style-type: none"> Spreadsheet ease of understanding flow and logic (e.g., ability to identify 'input' vs 'calculated' cells.) Comprehensiveness (covers main points) required to establish a market value Clear notation where errors <i>may</i> ultimately affect market size estimates. 	20%
3) Major Project Final Paper including Excel Model	<p>Individually, you will prepare a Word document (5-10 pages, including Excel sheet(s)) describing your project (may generally follow the Outline you prepared earlier). You will also include the Excel sheet for your selected product, therapeutic, or service. You will have <i>completed</i> the information required to define your market(s), including estimated data (as best you are able: This is not about perfect data, but rather the process, estimations, and approach you use to establish your valuation).</p> <p>Grading is based on:</p> <ol style="list-style-type: none"> Overall approach to evaluating your selected market Description of the market and market size and value for your product Depth and logic in your research into your market sizing Your valuation <i>process</i> analysis of your new technology (Excel) Notes that explain the process used to create your model and valuation method <p>Discussion of error factors in your estimates</p>	30%
4) Major Project Investor PPT Presentation	<p>Prepare a PowerPoint presentation describing your project based on your Word document. This will be intended for investors potentially interested in your technology. Typically no more than 5-10 slides. You will follow the general 'rules' provided in the class regarding How to Present to Investors.</p> <p>Grading is based on:</p> <ol style="list-style-type: none"> Efficiency in getting to what investors want to know (see sample in Class docs) Especially outline the market potential for investors (size, value), and your rationale Your valuation for your new technology Your general market assumptions (from Excel) Professionalism of presentation 	15%
5) <u>Class Participation</u>	Quality and frequency of your online thread postings, participating with Guest Lectures, team work, etc.	<u>10%</u>
Total		100%