

## Technology Commercialization Prospectus

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The breadth, depth, and speed of current global technology development are generating a torrent of potential new business opportunities. A critical success factor for engineering innovation and entrepreneurship is determining which of these opportunities can actually support viable products, processes, and services, i.e. which technologies have a strong potential for effectively and efficiently solving critical customer problems.

The “technology commercialization prospectus” (TCP) is the primary deliverable for the ENMA 6020 Engineering Innovation and Entrepreneurship course. The primary purpose of a technology commercialization prospectus is to identify technologies worth commercializing by providing answers to questions such as:

- *If this is such a great technology, why aren't we using it now?*
- *How would you make money by using this technology?*
- *Would you take a second mortgage out on your house to finance development of the technology?*

For ENMA 6020 TCP projects, students perform a red-yellow-green light assessment (described below) to determine whether a technology can support viable business opportunities now or in the foreseeable future. The TCP consists of three critical elements:

1. What is the problem we are trying to solve, and why do we need to solve it?
2. How does the technology being assessed solve the problem, and why is it better than any current solutions?
3. What are the primary challenges to creating solutions based on this technology?

It should be noted that the TCP is *not* a business plan. While financial issues typically impact all three elements of the TCP cited above, it is not the purpose of the TCP to quantify how much money a new technology-based opportunity can generate, or specifically how that revenue could be generated. Rather, the goal of the TCP is to provide an initial assessment that can help determine whether or not a detailed business plan is worth developing (red-yellow-green light assessment). A green light result indicates that commitment of additional resources to develop a detailed business plan is justified. A yellow light indicates that re-assessment of the technology in the future would be appropriate based on some specified change in conditions. A red light signifies that additional expenditure of resources is not appropriate for the foreseeable future.

It should be noted that for the TCP, it is essential to provide a “big-picture” assessment of problems and solutions vs. a technology-centric analysis. While technology issues may provide hurdles to commercialization in some cases (e.g., battery technology for plug-in electric vehicles), in many cases it is social, cultural, and a host of other non-technical hurdles that are often the deciding factor in successful technology commercialization (e.g., impact of ethanol-based fuel production on food prices in underdeveloped countries). The purpose of the TCP project and the purpose of the ENMA 6020 course is to give students the tools and opportunity to expand their vision beyond technology-related problems to the host of issues that impact successful technology commercialization.

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### Examples of TCFP Projects

Below are some examples of past TCP projects:

- **LED Lighting:** The sponsor manufactures custom commercial and residential lighting fixtures, but does not currently have any designs which use LED lighting. The customer was receiving questions from customers regarding LED lighting, but had no knowledge of whether LED lighting was appropriate for its markets. The sponsor wanted to know whether it would be worthwhile developing LED versions of their products.

- **Cellulosic Ethanol Production:** The sponsor manufactures instant-heat equipment for chemical processing systems. The sponsor had determined that their technology could be beneficial in cellulosic ethanol production. The sponsor wanted to know whether it would be worthwhile developing products using their technology for this market.
- **Automatic External Defibrillator:** The sponsor was an M.D. who was instrumental in development of AED technology, products, and legislation for use of AEDs. The sponsor was interested in identifying specific hurdles to the widespread distribution of AEDs (“like fire extinguishers”).
- **Nuclear Power Generation:** A team of Navy ROTC instructors with nuclear navy experienced was charged with identifying hurdles to expansion of nuclear power generation.
- **Electronic Flight Bag:** The sponsor designs and manufactures aerospace avionics equipment. The sponsor has developed a unique “electronic flight bag” to replace the bag of charts, manuals, etc. that commercial pilots are required to carry. The sponsor was interested in exploring other applications for their EFB technology.

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### **Team Projects Vs. Personal Projects**

For ENMA 6020, each student will be assigned to a team working on an industry/business sponsored TCP project. The deliverables for the team project are described below. In addition to team TCP projects, each student will execute a personal TCP project. This project will be identical to the team project, but limited in scope. Students are free to select the technology of their choice, or can work with their instructor to select a topic.

All team deliverables will be presented by teams in class on the dates shown on the course schedule. As time permits, individuals may also be asked to present personal project deliverables in class on the due date.

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### **Team Project Deliverables**

The following is a brief description of TCP team project deliverables. Links to detailed descriptions of each deliverable are provided.

1. [Problem Statement](#): Clearly state the specific problem solved by the technology being studied from the perspective of the primary stakeholders of the problem and solution.
2. [Market Segments](#): Using scenario planning, identify future markets in which the technology must successfully solve customer problems.
3. [Customer Needs](#): Using quality function deployment, identify and rank primary customer needs for any solution to the primary problem, and compare to any currently-available solutions.
4. [IBIS Analysis](#): Identify: potential alternative solutions to the primary problem; supporting and opposing arguments for choosing each solution; and critical information needed to support each argument.
5. [Prior Art Search](#): Conduct a detailed search of ways that the primary problem have been solved, including a preliminary patent scan.
6. [Technology Gap Analysis](#): Identify technology gaps that need to be overcome for successful commercialization of the technology being studied.
7. [New Concepts](#): For particularly challenging problems associated with the application of the technology being studied, generate “out-of-the-box” solutions.
8. [Final Presentation](#): Prepare red-yellow-green light recommendation for pursuing commercialization of the technology being studied.
9. [Supplemental Materials](#): Capture all documents used in the project that could support a business plan for commercialization of the technology studied.

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## **Personal Project Deliverables**

Because of the limited scope of personal projects, the deliverables for personal projects will differ somewhat from team project deliverables, as outlined here:

1. **Problem Statement:** Same for personal project as team project. Base deliverable on personal experience vs. sponsor input.
  2. **Market Segments:** Same as team project, but need only 1-3 sentence description of scenarios.
  3. **Customer Needs:** Same as team project, but can be based on personal experience vs. customer/sponsor input.
  4. **IBIS Analysis:** Same as team deliverable.
  5. **Prior Art Search:** Same as team deliverable, but no need to consolidate team inputs.
  6. **Technology Gap Analysis:** Same as team deliverable, but only need to identify “entire world” gap.
  7. **New Concepts:** No deliverable required
  8. **Final Presentation:** Same as team deliverable.
  9. **Supplemental Materials:** No deliverable required.
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