

Innovation Cartography

Technology Entrepreneurship: Technology Driven and Customer Centric

INTRODUCTION

Faced with poor university technology commercialization success rates (especially regarding venture creation) Drs. Maxwell & McNamee developed a novel approach to explore customer applications and go-to-market strategies that is described as “Technology Driven and Customer Centric”. This process was initially run as a series of training workshops called TechConnect: Idea to Invoice at Temple University and is being more broadly deployed at several universities globally, and with a number of multinational R&D organizations, under Innovation Cartography.

Our process and methodology is particularly useful across a number of settings:

- **Entrepreneurial Engineering Capstone:** Encourage more entrepreneurial engineering capstone projects by including formal roadmaps to explore customer applications/go-to-market approaches for specific technologies.
- **University Technology Transfer Offices:** Increase research impact by embedding technology commercialization considerations into research strategy and technology development paths + faculty / graduate student education.
- **Build Regional Networks and Community:** Engage multiple critical stakeholders in order to build regional networks/communities and catalyze founding teams during the formation of entrepreneurial ventures.
- **Corporate Adjacency Exploration:** Guide organizations through formal process to explore & prioritize adjacencies around core competencies, technologies, & competitive advantage so as to identify high-potential opportunities.
- **Patent Scope / Protection:** Increase value of and scope of patent protection for novel technologies by identifying parallel development opportunities, applications, and potential commercialization channels.

BACKGROUND & MISSION

In 2012-2013 we started to formalize a program and process that reimagined how technology development and commercialization could be undertaken by the university. We believe that university-developed or other ‘shelved’ technologies offer an untapped opportunity for regional wealth creation and specifically the potential to facilitate the launch of technology-based new ventures within the regions surrounding universities. Our approach was motivated by our observation of the lack of commercial potential for our faculty/graduate student research and engineering senior design projects as well as apparent disconnects between technology development approaches and proven commercialization and entrepreneurial strategies.

We realized that there was a critical need—a need so substantial we have started describing it as a moral imperative—to help scientific faculty/students better understand the market and business issues critical to having a

real-world impact with their research and technology development efforts. We observe that, despite the best of intentions, university faculty, students, and frequently technology transfer offices are naively undertaking technology development with limited understanding of what it takes to successfully translate research and bring products and services to market. The loss or suboptimal application of such a substantial portion of societies most advanced intellectual capacity as well as the missed opportunity to create social good is what has elevated this to the level of moral imperative in our thinking.

TechConnect is designed to overcome a number of challenges in the current technology commercialization approach:

- Traditional research and technology development approaches focus predominantly on technical issues and only incorporate market and business considerations at the end of the process.
- Identifying an appropriate commercialization route is complex and challenging. Selecting high-potential technologies and choosing commercialization routes is often sub-optimized within universities.
- The assumption that technology innovators have both aspirations and skills to launch a business (or to apply for and engage in translational research) are often misplaced as most are ill-prepared to address the critical venture creation and business issues that will arise.
- Founding teams, consistently shown to be critical to venture success, form too late in the process which leads to fatal mistakes at earlier phases and can undermine the development of the necessary deep commitment.

Finally, in examining the existing approaches like Design Thinking and Lean Startup we realized a gap in the current process which we sought to fill. Historically, ‘technology push’ commercialization approaches have been criticized relative to customer-centric ‘market pull’ approaches because they do not serve customer needs and because they operate under incorrect assumptions about markets. However, market pull approaches (and many implementations of Design Thinking on campuses) that rely exclusively on market input and customer needs can lead to solutions with limited competitive advantage, and can fail to take advantage of novel technological advances and capabilities that have the potential to disrupt the market. On the other hand, Lean Startup approaches tend to emphasize learning by doing and proceed, pivot, and restart decision points. However, they do not provide a mechanism to decide between potential starting points and pivots or restarts throughout the process are often somewhat arbitrary. We saw a similar gap in the NSF I-Corps program. I-Corps guides faculty through the process of testing market demand but it does not provide the education and frameworks necessary to help faculty select and develop applications that provide the best starting points for the process.

To address these issues we developed Innovation Cartography, a multi-stage, creative problem solving approach that challenges assumptions, encourages divergent and convergent thinking, and provides tools at each stage to guide participants through an experimental approach to formulate and test technological and market hypotheses. Our process expands on and provides a formal approach to the Epicenter of Innovation that builds on capabilities in the left side of the business model as highlighted in the book *Business Model Generation*.

The Innovation Cartography process is based on the academic research of Drs. Maxwell and McNamee, and the application of leading approaches to entrepreneurship, innovation, creativity, design thinking, business models, adoption-diffusion, and lean startup as well as our experience in knowledge mobilization and technology transfer. It has been informed and refined by delivering the process in a variety of formats over the past five years with hundreds of participants and dozens of technologies, using feedback to identify opportunities for improvement that improved process efficacy and encouraged additional applications.

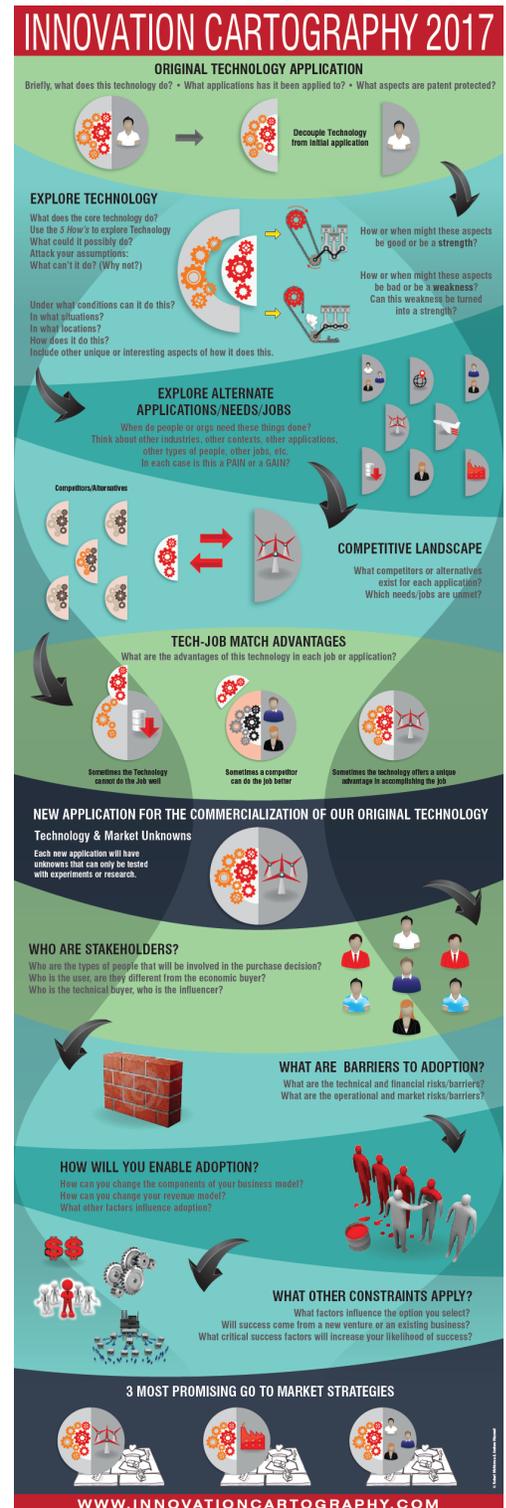
HOW IT WORKS

Our approach moves teams through a series of roadmaps that start by challenging the initial assumptions about a specific technologies capabilities and applications. We start the journey by decoupling the technology from its initial application so that we can explore how the technology works and what it can do - including strengths, weaknesses, and unique features. We then explore relevant applications in which the technology can offer value for users' jobs. This enables multiple applications for a given technology to be uncovered and assessed, or, alternatively, assists in the recognition of technologies with a low chance of commercial success.

As the process evolves through a series of stages (similar to Stage-Gate as well as the Creative Problem Solving or Design Thinking Process), the focus changes from understanding the technology, to understanding user needs / jobs and how to develop a unique value proposition, to understanding the ecosystem and stakeholders interests, to identifying the most promising go-to-market strategy and path forward. In developing the go-to-market strategy, our process focusses on understanding stakeholders' motivations and barriers to adoption so as to identify the most promising customer segment, revenue model, and technology format. We focus on constraints specific to founder, organization, industry, and technology as we seek paths that minimize commercialization barriers (e.g., costs, regulation, time, etc...) and guide decision making about venture creation vs. licensing.

Some elements of the Innovation Cartography brand and approach:

- **Innovation Journeys:** A creative process can move a person, group, or community from any point A on the commercialization path to another point B. Innovation Journeys explicitly highlight both Point A and Point B as well as the waypoints and critical decision points along the route.
- **Regional Roadmaps:** These roadmaps outline a broader process that is undertaken across a workshop or throughout a specific segment of a course. These typically showcase a series of divergent and convergent phases.
- **Local Roadmaps:** Our local roadmaps are templates or worksheets for a specific creative approach that is utilized at a step in the overall process.
- **Innovation Compass:** A series of specific decision making tools that can be deployed at various stages throughout the journey to deciding among or prioritize available options.



CURRENT AND ONGOING DEVELOPMENT AND OPPORTUNITIES

Our current priority is to scale up the process and to expand our impact by deploying online and hybrid educational models, enhanced through a train-the-trainer approach with a certification process for trainers and university-partners.

Past and current formats that have been designed / delivery:

1. Two-evening, one-day, or two-day in-person workshops (utilizes TTO or partner technologies)
2. One-day training program for Corporate R&D personnel or faculty (using example technologies)
3. Technology development program for Corporate R&D (3 in-person day-long sessions spread over 3 months w/ weekly WebEx facilitation/discussion and outside team research towards milestones and deliverables)
4. 90-minute executive workshop demonstrating Technology Driven & Customer Centric approach to explore adjacencies and white spaces
5. Introductory class session (one or two 90 minute sessions) for capstone graduate / undergraduate students
6. 12-week hybrid or online course for academic credit (being developed and to be deployed Spring 2017)
7. Introductory / Overview Video Series (being developed and to be deployed Spring 2017)

Under-development & Forthcoming Programs:

We are seeking collaborators to help guide the next phase of development of our programs. We have some tentative plans and priorities but are open to engaging the VentureWell community for feedback and insights on what would be most valuable to you in your university settings. Two examples of current paths forward are included below:

- **Entrepreneurial Engineering Capstone / MBA or MS Business Course:** Our current priority is to develop / deploy a complete 12-week course-based version of Innovation Cartography for use in academic courses worldwide. This is being developed in a hybrid format w/ online video lectures and in-person exercises as well as instructor guides and supporting materials.
- **University Technology Transfer Offices:** We envision a partly self-guided model with weekly webinars and mentorship to support TTO offices and faculty scientists as they develop commercialization plans and apply for research funding (i.e. NSF I-Corp, SBIR, STTR, I2I). This approach can also be utilized for patent enhancement and to address critical issues around licensing versus venture creation.

We hope that you can join our workshop, experience this approach, and provide your thoughts on how we can add value for technology entrepreneurship at your university.