White Paper

Technology Roadmapping:
A Rapid Design to Facilitate Commercialization

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The Need for Speed

Speed to strategy, speed to money, speed to commercialization, and speed to revenue are all critical to the survival of a tech company. Compounding that is the difficulty of communicating a typically complex strategy—and the need for funding. Taking technology from a concept to a product is all a race against the clock.

Assembling the Tech Team

In 2002 the Michigan Small Business Development Center decided to set a focus on tech—and even renamed itself for a decade as the Michigan Small Business Technology Development Center (SBTDC). An SBA FAST Grant was used to fund the center’s initial development, and four people with private sector tech commercialization backgrounds were hired to counsel new tech start-ups. I was fortunate to have been an early member of the team. After two years the state’s legislature decided to deploy $1 billion of its tobacco settlement funds into technology development, and the SBTDC was one of the recipients of grant funding to support what is now called the “Tech Team.”

Each member of the team brought a specialty to the group (marketing, finance, sales, legal, etc.), and we were also required to be generalists. Our job was to guide companies through the commercialization process: developing a strategy, business model, funding plan, marketing plan—and anything else required to get a concept into the market. A significant amount of our time was spent driving to and from our “clients” —the state’s early technology companies—and we passed those companies back and forth depending on their needs. Copious notes about the interactions were kept in a database, and we found the approach to be somewhat effective but very inefficient.

In 2004 we were able to make some additional key hires, and one of the most critical was Dave Grossman. Dave had retired from his position as Director of Global Technology Planning for General Motors and was looking for a way to keep busy and give back to the community. One of Dave’s responsibilities at GM was building technology roadmaps, and he thought he could apply that roadmapping knowledge to early stage tech companies. The difference was that at GM a tech roadmap could take months and many people to build, and start-ups could easily be dead in that timeframe.

Over the next few years Dave worked with us to learn more about the development process of early stage tech companies while mentoring us on the art of tech roadmapping. He started with the process developed at the Cambridge University Institute for Manufacturing, used some basic software tools, and created templates. The figure below shows the format for a technology roadmap.
Typically we found that in a maximum of four 4-hour sessions a living document, or technology roadmap, could be produced that would communicate a path to commercialization. One modification that we made to the Cambridge roadmap template was to add annual revenue for each market. This created a business context for the technology development and commercialization plan—a “One Page Visual Business Plan.”

**The Nuts and Bolts of Roadmapping**

Dave’s background was automotive product design and development, but the SBTDC Tech Team worked in many other industries. It is amazing how a process developed initially for manufacturing has served hundreds of other types of companies over the past 12 years including software, biotech, agro-tech, and materials businesses.

Marketing and finance were the two skillsets that were needed to complete almost every roadmap, and those two backgrounds were almost always missing in the early tech companies. In the roadmapping model employed by the Tech Team there were typically 3 members of the team on board to help facilitate the commercialization process. One member’s job was to “drive” the facilitation, and the other two were needed to support the discussion—using their expertise to address critical issues.

The SBTDC’s roadmapping process follows the subsequent steps:
1. Begin with a business plan template using Mindjet MindManager\textsuperscript{2} software. The software offers much needed flexibility and—as Dave likes to say—when a mindmap\textsuperscript{3} is displayed on a wall for discussion it allows the human brain to process 100 different data points and connections for decision-making. (Typically, we are capable of keeping 4 to 6 factors in our heads without visual aids.) Mindmapping also makes it possible to put together the key elements of a business plan and strategy without the “word salad” (another Daveism) of a 50-page document. It also helps identify knowledge gaps that need to be addressed along the way. The first roadmapping session is a diagnostic tool to determine if the company just has a technology concept or if they also have a business model that has been validated by customer discovery\textsuperscript{4}. The vast majority of tech companies that we encountered initially told us “all we need is money.” That was very rarely true. Quite a few were missing a deep understanding of customer needs, a marketing plan, and a viable path to obtain funding. After initial contact with the Tech Team, many clients who went through this process recognized the need for and ended up procuring mindmapping software.

2. In the next session the facilitators walk the company through a market attractiveness analysis comparing its own internal business drivers and matching them with markets that are the best fit. Companies may be looking for markets that make decisions quickly, have a short time to revenue, are a strategic and/or technical fit, etc.

3. By the third session, the principals in the company should start to gain a better understanding of the company’s needs and shortfalls, and the next step is a product/market fit assessment. Using a custom Excel spreadsheet and a scoring format, walk the company through the process of matching product features with customer benefits and target markets. This helps identify not only the best market fits, but also areas of focus on product features and those that aren’t necessary. Defining the “Minimum Viable Product” and target market is critical.

4. The fourth and final session is putting together the technology roadmap. We tried working through this in an electronic format and displaying it on the wall as in the three previous sessions, but this session is more effective using a whiteboard and post-it notes. This method allows multiple people to engage in the discussion, place their own critical element on the board, and visually work through a timeline of product development. The energy level is usually very high for this session as the company team members get excited to see their preparatory work from the other sessions put to use. It is exhilarating and fulfilling to see a completed technology roadmap—although no roadmap is every really done; it’s just a snapshot of the current thinking for commercialization.

**The Keys to Success**

- There needs to be an introduction to the process that shows where the roadmapping session is heading and why it is important. We started by identifying
whether the company was a “Market Pull” or a “Technology Push”—meaning whether there was a customer asking or a solution (pull) or a solution looking for a customer (push). When the roadmap is complete it should not be obvious that it was generated by a “Market Pull” or “Technology Push.”

- It is very difficult to conduct a roadmap with a “team of one.” At least two people are needed to represent the company and one of them must be the CEO. Buy-in from key team members is critical and will not happen if they aren’t participating in the strategy development. It also follows that in order to create a good roadmap there should be freedom to address inherent problems, and one person should not dominate the conversation. A funder could join the discussion—it depends on the comfort level of the team.

- Sometimes a company doesn’t go through all four planned sessions—the process may only take one or two—and that’s fine. Sometimes a company will decide to shutter because the product or market doesn’t render itself to a fundable strategy. That’s also fine.

- Engineers and scientists love the roadmapping process because it uses a quantified decision process. The facilitator of the sessions must be careful not to let them “game” the system. The process depends on combining both quantitative and qualitative data. They may need to be reminded that marketing decisions are made based on solid logic in a structured decision.

- Four hours is about the maximum amount of time a group can think hard and remain engaged. The time spent between sessions thinking and reviewing is also important. Recall that there are knowledge gaps that are identified in the process—oftentimes around some details in customer discovery. Serious companies are productive in filling the gaps between sessions.

- Companies can use the one-page technology roadmap to secure funding and strategic partners. We warn businesses to review each item on the roadmap before sharing anything with a potential investor or supplier to ensure that each item is important to and consistent with the story they are telling about the company.

- Over time, four roadmap sessions have replaced what used to be at least six months of work. Those four sessions have made it easier to counsel a company that has a strategy and vision—even though the roadmap can change over time.

- The discussions that take place while creating the roadmap are probably more important than the actual roadmap.

- The technology roadmap is a “One Page Visual Business Plan.” It does not replace financial pro formas, but it does place technology development in a business
context. It also improves communication between technologists and business-oriented people.

The Finish Line: A Summary

Technology Roadmapping is one of the most effective tools used in Michigan to help companies strategically plan out their development, business model, funding strategy, and market launch.

Because nothing replaces experience and expertise, securing the involvement of key participants is the toughest barrier to this approach; like any good tool, roadmapping is only as good as the mechanic working it. Fortunately facilitating technology roadmapping is a skillset that can be developed over time, and it’s one with proven results: the technology roadmap process has been used successfully with more than 300 Michigan early stage technology companies to date. The SBDC Tech Team has grown from four members to 8, and it has helped early stage tech companies raise more than $60 million each year.

About Paula Sorrell
From 1997 – 2011 Paula Sorrell served as Vice President of Marketing for successful tech start-ups, mostly in Michigan. From 2002 – 2006 she contracted with the MI-SBTDC Tech Team (now SBDC) to provide business advisory and strategic planning sessions for early stage tech companies. From 2011 – 2015 she was Vice President of Entrepreneurship, Innovation & Venture Capital for the Michigan Economic Development Corporation. Today she is an independent consultant working with universities, economic development organizations, and investors to build out technology economies and create an environment where companies can succeed. Paula serves on a number of non-profit boards focused on entrepreneurship and technology commercialization and is a part-time lecturer at the University of Michigan’s Center for Entrepreneurship in the College of Engineering. She is based in Ann Arbor, Michigan where she still occasionally facilitates technology roadmapping sessions.

About Dave Grossman
A degreed mechanical engineer, Dave worked in various positions at General Motors—his last title being Director of Global Technology Planning—until his retirement in 2002. After retirement, Dave went into private consulting and was hired by the Michigan Small Business Technology Development Center (now the SBDC) as a technology business consultant. While working at the center Dave explored his theories about the application of technology roadmapping to support small technology businesses with the Tech Team at MI-SBTDC.

References
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