The Commercialization of New Technologies: the Case of DTM Corp.

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Abstract:

Case study of the successful commercialization of a new rapid prototyping process, Selective Laser Sintering (SLS), developed at The University of Texas at Austin and licensed in 1987-88 to the startup DTM Corp.

Keywords: technology transfer; technology commercialization; DTM Corporation

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U.S. industry needs to find faster and more efficient ways to commercialize homegrown technologies, strengthen its global competitiveness, and create jobs.(1) The list of breakthrough technologies produced in federal and industrial laboratories and research universities only to benefit U.S. industrial competitors is long and growing. An important and telling exception can be found in the case of DTM (Desk Top Manufacturing) Corp. DTM Corp provides an example of how new forms of university-government-business alliances are helping to commercialize Texas-developed technologies.

DTM had its origins in the Department of Mechanical Engineering at the University of Texas at Austin. During the mid-1980s, Carl Deckard, a graduate student in the department, became interested in the commercial potential of using computer-aided lasers to build prototype parts. The creation of models and prototypes, particularly those with complex geometrics, presents a major barrier between conceptual design and mass production and commercialization. Traditional manual prototyping methods are slow and labor intensive and involve expensive and time-consuming numerically controlled machining and electric discharge machining. With the support of Joseph Beaman, an assistant professor in the department, Deckard developed the Selective Laser Sintering™ (SLS) process. This process prototypes products rapidly and directly from computer-aided designs without part-specific tooling or human intervention, thereby dramatically reducing time to market for new manufactured products.

In 1980, the commercialization of university-developed research such as Deckard's was facilitated by two federal acts. The Bayh-Dole Act permits nonprofit organizations that receive government funding to keep the title rights to inventions they develop. The Patent and Trademark Amendments Act gives universities rights to federally funded inventions.

These federal policy changes prompted Deckard to look for commercial applications for his research. On the state level, his efforts were facilitated by the establishment of the University of Texas Center for Technology Development and Transfer (CTDT) in 1986 to help speed the commercialization of university-developed research. In 1987 and 1988, the CTDT assisted DTM's founder, Dr. Paul F. McClure, on the licensing of Deckard's Selective Laser Sintering™ process from the University of Texas at Austin. In 1988, start-up was aided by a $50,000 grant from the Small Business Innovation Research (SBIR) Program of the National Science Foundation.

Supplementing this public sector support was an investment from the private sector. In 1989, B.F. Goodrich Co. acquired an equity interest in DTM and became licensed to use the SLS technology. Goodrich is currently developing and certifying special polymers to be marketed for use with DTM's SLS System. Through its association with Goodrich, DTM established a strategic partnering relationship in the area of materials and process development.

By the time DTM became the second member company of the Austin Technology Incubator in 1989, the corporation already had a patented state-of-the-art technology, a management team in place, and a large institutional investor. Nevertheless, DTM gained considerable benefits from joining the ATI. Tangible benefits included subsidized office space and secretarial support, phone service, and office supplies and equipment. However, it was the intangible benefit--the know-how network provided by the ATI--that DTM's founders considered most significant. The know-how network provided access not only to ATI's resident managerial and service staff, the other in-residence entrepreneurs, university professor and graduate student support, but also to experienced pro bono talent in management, marketing, legal, and

accounting services from the Austin business community. The ATI resources gave DTM a base of operation and access to expertise that guided the fledgling company as it negotiated sound business decisions leasing office and manufacturing space, hiring employees, and launching its prototype products. The assistance provided by the ATI helped DTM gain competitive advantage over some thirteen competitors--including half a dozen U.S. companies, two large Japanese firms, and an Israeli company--that have entered the rapidly emerging marketplace of desk top manufacturing. DTM graduated from the ATI in 1990.

In late 1989, DTM introduced its prototype SLS machine to the marketplace. Two service bureaus were opened in mid-1990, one at the company's Austin headquarters and one at Goodrich's Brecksville, Ohio, research facility. These service bureaus provide both a low-cost, low-risk means for customers to use the SLS technology and an opportunity for DTM product designers to learn from the experiences of lead customers. Production units were designed to incorporate the lessons learned from the service bureau experiences. Between 1989 and 1990, DTM's staff increased from ten employees to 53 technical and managerial personnel.

The corporation continued to grow rapidly. By mid-1992, DTM employed over 70 people and occupied 30,000 square feet of office and manufacturing space in the Austin area. New applications will include three-dimensional "telefax" systems with CAD designs transmitted electronically and built at remote sites and "parts on demand" applications wherein fully functional parts are fabricated from bulk materials only as needed. Direct sales of SLS Systems are scheduled to begin in late 1992. With the process already being used in U.S. automotive, aerospace, computer, consumer goods, foundry, and medical industries, long-range plans anticipate profitability by early 1993 and the creation of several hundred jobs to support DTM's worldwide operations by 1997.

From concept to commercialization, the case of DTM exemplifies how new forms of university-government-business alliances are ensuring that U.S. technological and intellectual resources are used to enhance U.S. economic competitiveness, benefit regional economic development, and create high value jobs.

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Note

1. R.B. Reich, "The Quiet Path to Technological Preeminence," Scientific American, 261 (4), 1989, 41-47, and G. Kozmetsky, "The Coming Economy," in Technology Transfer: A Communication Perspective, edited by F. Williams and D. Gibson, California: Sage Publications, pp. 21-40.