

Commercialization of the New Technology

New technical knowledge must be used if economic benefits are going to accrue to the nation. This generally means the introduction into the market of a new product or process by the innovating firm, its collaborators, or other companies that acquire the knowledge. In competitive markets, the producer is typically unable to capture all the benefits of a new product or process, and the consumer reaps part of the benefits. The higher up the supply chain the innovation occurs, the more value-added steps there are before final consumption, and the more intermediate firms in the supply chain may benefit, in addition to the final consumer.¹⁶

Commercialization of Products and Processes— A Critical Step Toward National Benefits

Thirty-three of the projects had already spawned 62 new products or processes when the data for this report were collected. Companies in seven additional projects expected to achieve their first commercialized results shortly, and companies in nine projects that had already commercialized their technology expected to add new products and processes soon. Thus, nearly 80 percent of the projects had spawned one or more products or processes in the market, or expected to do so shortly. Table 4 summarizes the commercialization results.

A Quick Glance at the New Products

A variety of new products and processes resulted from the projects. For a convenient, quick reference, brief descriptions of the new products or processes for each project are listed in Tables A1–A5 in Appendix A, in Column C. For each new product or process, the new technology on which it is based is also listed in the tables, in Column B.

Table 4. Progress of Participating Companies in Commercializing the New Technologies

	Number of Projects	Number of Products/Process
Product/Process on the Market	33	62
First Product/Process Expected Soon	7	9
On the Market with Additional Product/Process Expected Soon	9	10
On the Market or Expected Soon—Totals	40	81

Commercialization: A Critical Step, but Not the Final Word

Commercializing a technology is necessary to achieve economic benefit, but it does not ensure that the project is a full success from the perspective of either the company or the ATP. Widespread diffusion of the technology may or may not ultimately follow the initial commercialization.

¹⁶ For a detailed treatment of the relationship between spillover benefits (knowledge, market, and network spillovers) and commercialization, see Jaffe (1997). He notes: “Market spillovers will not be realized unless the innovation is commercialized successfully. Market spillovers accrue to the customers that use the innovative product; they will not come to pass if a technically successful effort does not lead to successful commercialization” (p. 12). In commenting on spillovers that occur because new knowledge is disseminated to others outside the inventing firm, he observes: “Note that even in the case of knowledge spillovers, the social return is created by the *commercial use* [emphasis in the original] of a new process or product, and the profits and consumer benefits thereby created” (p. 15).

Nevertheless, it is significant that these products and processes are actually on the market.

Rapidly Growing Companies

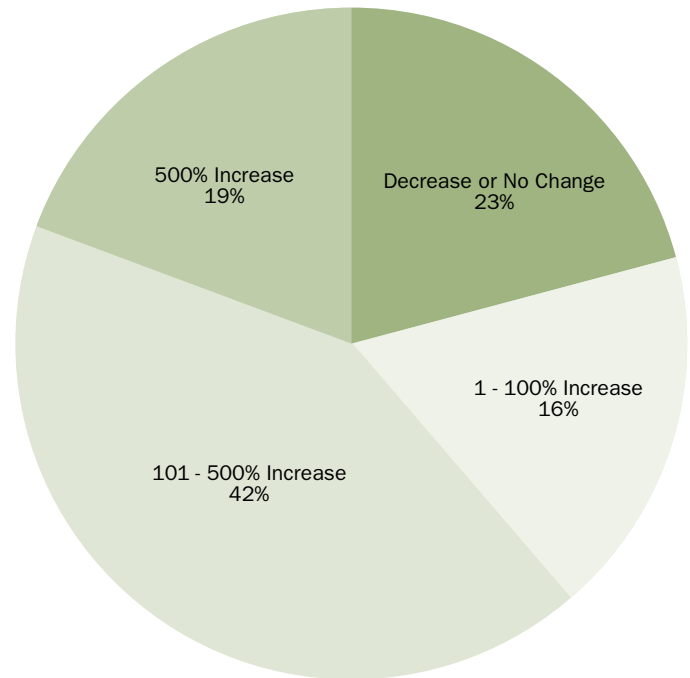
Rapid growth is generally a signal that the small innovating company is on the path to taking its technology into the market. And one dimension of company growth typically is its employment growth.¹⁷

Figure 1.8 shows employment changes at the 31 small, single-company ATP award recipients.¹⁸ Nearly one-fifth of these companies experienced job growth in excess of 500 percent from the beginning of the project to several years after the project had completed. The largest share experienced job growth between 100 and 500 percent.

A recent look at *Fortune's* "Fastest Growing 100 Companies" lists 2 of the 31 then-small ATP-funded companies on the list: Vitesse and Cree. Vitesse now has nearly 800 employees and a market capitalization of \$15.6 billion. Cree has grown to a market capitalization of \$4.9 billion.¹⁹

Not all the small companies have grown. A little more than one-fifth of them experienced no change, or a decrease in staff. But taken as a group, the 31 small companies have grown rapidly. Sixty percent have at least doubled in size; four of them have grown more than 1000 percent. The ATP helped these companies develop advanced capabilities, which they have subsequently leveraged into major businesses.

Figure 1.8 Employment Change at 31 Small Companies receiving a Single-Applicant Award



¹⁷ Employment is considered here as an indicator of the commercial progress of small, award-recipient companies. Assessing employment gains in a macroeconomic sense from the technological progress stimulated by the 50 projects is beyond the scope of this project.

¹⁸ Employment changes in joint ventures, larger companies and nonprofit organizations are less closely tied to the success of individual research projects, and, therefore, they are not shown in the figure.

¹⁹ Market capitalization and employment data cited here are from Hoover's Online Company Reports as of August 30, 2000.