World of Small-Firm Licensing

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Insights into why small-business managers do what they do when dealing with larger corporations

In the past decade research published by David Birchof MIT and others has demonstrated the effectiveness of small-business R&D in creating new technologies that stimulate the economy and bolster American competitiveness. Among the more fertile sources of new technology are independent and small business inventors. From the small-firm perspective, licensing seems, in theory, the optimal method to achieve significant, prompt, sustained revenues and profits.

Indeed, for some technologies licensing may offer the only viable method to complete the innovation process; that is, the systematic progression through the linked steps of technical, market, and business development required to move an idea from technical inspiration to sustained market penetration. (This process is represented in Table 1.) For companies that do not support R&D programs of their own, licensing offers the only access to new technologies at relatively low cost and controlled levels of risk.

Lacking hard data, however, this "logical contribution" of such innovators to larger enterprises through the instrument of licensing remains essentially hypothetical, despite occasional anecdotes that show it sometimes happens. Small firms do not necessarily find licensing to larger firms easy. Indeed, there is a great deal of evidence to suggest licensing between firms operating on dramatically different scales is relatively uncommon, except in specific industries. There is an obvious reason why this is true.

Many small firms approach licensing with different assumptions and goals from those that operate in the world of larger corporations. On one hand, the small businessman's perspective on licensing often appears incomprehensible to the corporate executive of a large firm. On the other hand, the standard practices of corporate America often baffle the managers and owners of small businesses. This paper treats the problem in light of the innovation process, emphasizing the pitfalls and possibilities, and illustrating many of these points with a case study of a particularly successful license between an independent inventor and a going concern.

◄ Highly Desirable ►

Over the past nine years, Mohawk Research personnel, working under contract with the U.S. Department of Energy, Energy-Related Inventions Program, have dealt with more than 350 inventors and small businessmen seeking to commercialize new technologies. Many of these inventors and small-business project managers (approximately 60%) claim licensing furnishes a highly desirable, or even the most desirable, strategy for pursuing their commercialization projects.

Most want to license a much larger firm, usually the "industry giant." Such a heavily favorable bias toward licensing among these inventors and innovation project managers raises a number of issues concerning licensing activity in the small business world. The most important of these follow from the disparity between the expressions of desire to pursue licensing and the likelihood of success. Only a small fraction of small business project managers (and an even smaller fraction of individual inventors) prove able to pursue licensing successfully. This fact coupled with our recent finding that the most successful small-business licensing agreements bring together parties of comparable scale suggests that small business licensing practices differ significantly from those found in the larger corporate world.

The Mohawk Research Corporation experience of dealing with individual inventors and small-business innovation project managers bears this out. From the perspective of familiar licensing practices of larger corporate America, small-business licensing activity appears almost to belong in a different world. From the reasons for seeking a licensee to the kinds of things the two parties bring to the table, small business licensing often works on principles that differ significantly from those that drive licensing among larger firms.

RATIONALE FOR SMALL-BUSINESS LICENSING

When asked to explain why licensing furnishes the option of choice for commercializing their technology, individual inventors and small-business innovation project managers tend to give negative reasons for their strategy. Of course, not all do, but the four most common rationales for small-business licensing can be summarized as follows:

- These people want to create innovations, not manufacture and sell them. In other words they want to avoid being "in business."
- They want to move on to other things. Having created an invention, they are bored with it and believe honestly that all the work is done: "The rest is just detail."

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Innovation Stage: Concept to Engineering Prototype

Technical Steps	Market Steps	Business Steps	Skills Required	People Involved
Concept	Does Market Exist	Decide to Develop	Intuition to Technical	Inventor
Concept Analysis	Define Market	Find Money	Technical to Engineering	Inventor
Working Model	Define Three Points of Difference	Find More Money	Engineering	Inventor Local Technicians Friends as Investors
Engineering Prototype Test Refine	Identify Market Barriers Decide to License or Venture	Find Even More Money Protect Patent/ Trade Secret Start Business Plan	Engineering Legal Market Analysis Capital Acquisition	Inventor Engineer Patent Attorney More Investors Market Analysis Business Planner

Entrepreneurial Stage: Prototype to Production

Technical Steps	Market Steps	Business Steps	Skills Required	People Involved
Production Prototype Scale Up Test Refine Production Engineering Product Safety Engineering	Full Market Analysis and Plan Niches Barriers Pricing Competition Cost Data Distribution Method Alternative Product Applications Risk Analysis Sales Projection	Find Big Money Complete Business Plan Form Business Meet State and Federal Regulations Arrange Insurance Price Production Facility	Engineering Production Product Safety Entrepreneurial Financing Marketing Cost Analysis Legal Management	Inventor (?) Entrepreneur Investors Engineers Production Safety Attorneys Patent Corporate Accountants Consultants Marketing Business Management Financial Insurance Brokers Trade Union Officers
Limited Production Qualification testing Running changes	Contact Customers Commence Distribution Seek Product Endorsements Follow-up Sales Advertise Publish in Technical Journals	Find Big, Big Money Start-up Business Build Plant Buy Equipment Hire Foreman and Labor Arrange Product Service Purchasing Transportation Record Keeping	All of the above -PLUS- Specialty Engineering Systems Engineering Sales Analysis Supervisory	All of the above -PLUS- Foreman Labor Sales People Specialty Engineers Systems Engineers
Full Production Start-up	All of the above -PLUS- Expand Distribution Analyse Competitor Response	All of the above -PLUS- Monitor Costs Finance Cash-Flow Deficit Refine Production System	All of the above -PLUS- Delegation Market Forecasting Strategic Planning Long-Term Financial Projections	All of the above -PLUS- Expanding Management Sales Labor Force
Initial Growth	Increasingly Complex		Increasingly Complex	

Managerial Stage: Production for Major Market Penetration

Technical Steps	Market Steps	Business Steps	Skills Required	People Involved
Product Improvement New Products Sustained Growth	Complexities Intensify		Complex Management	Entrepreneur (?) Fully Bureaucratized management R&D Staff National Investment Firm

Table 1

• Their "cookie jar" is empty. They have no further resources on hand to invest in the project and balk at the idea of raising additional capital.

• Their earlier unsuccessful forays into the business world were unpleasant. They want to avoid repeating these unpleasant experiences.

• Their view of the market is that "only the big boys can do this." Without sufficient knowledge of the resources necessary for commercialization, many small-business managers believe a "big" licensee as their only hope for marshalling those as-yet-undefined resources.

I have listened with unfailing amazement to these kinds of rationales for commercialization through licensing. Besides the overtones of skepticism toward "business" found in such statements, these rationales also reveal serious gaps in the commercialization knowledge these small-business managers command. The hostility and this lack of knowledge are linked, and the first step in assisting small-business managers toward sounder reasoning in planning commercialization through licensing is to deal with these two problems. The starting point for that effort is to point out the role of licensing in the innovation process.

THE INNOVATION PROCESS: SOME SALIENT POINTS

The notion that licensing offers the inventor a way to bypass "business" while pursuing commercialization contains serious flaws. Certainly, new technologies — not the technologists — move through the innovation process (see Table 1). Nevertheless, for any innovation project to move toward sustainable market entry, planning for technical development, marketing, and new organizational requirements has to begin with the first concept analyses. There are any number of ways to emphasize a potential licensor's needs for being "in business," but the following six points bear strongly on the potential for licensing success among smaller businesses. The requirement for "going into business" is explicit in several of these points, implicit in all six:

1. The transition point between the Innovation Stage and the Entrepreneurial Stage offers the optimal moment for small-business licensing. Of course, in the real world not all licensing agreements are undertaken just as the small businessman completes the technical, marketing, and organizational steps necessary to move from the Innovation Stage to the Entrepreneurial Stage. Nevertheless, the basic point holds whenever licensing occurs: Parallel completion of the tasks arrayed in the columns of the Innovation Process Chart dramatically strengthens a licensor's ability to pursue a licensing agreement. By its nature, such parallel progress marks the completion of the steps necessary to present a coherent project during licensing negotiations.

2. For anyone seeking to license a new technology, "freezing" the ideal prototype performance requirements before entering negotiations is essential. Such a point is obvious to licensing executives for larger firms. How else can the licensor and licensee value the technology? How else can they define what is to become the subject of the licensing agreement? For the independent inventor or small-business manager, this need to freeze the product concept is crucial, but it is something he can accomplish only with the help of marketing research and technical development geared to market knowledge. In other words, the innovation process must be carried forward in a logical and coherent fashion to the point of licensing — whether that point comes at an early stage or after market entry.

3. Successful licensing requires "going into business" in the sense that small-business managers, who are often inventors or experienced technologists striking out on their own, must place business interests ahead of their love for technology. Finding pleasure in research and product development is, of course, a useful trait for the manager of a small-business innovation effort. Nevertheless, single-minded pursuit of that pleasure quickly translates to problems in the innovation process.

Every manager seeking to license must face the reality that potential licensees will see the project first as an investment opportunity. He must also face the possibility that at some point sound judgment will require abandoning a technology rather than pouring more money into a doomed project. Planning for that contingency requires establishing reasonable business benchmarks and thresholds as early as possible. Definitions of those benchmarks and thresholds will become part of any good licensing negotiation. The only way to set them is through "going into business," at least to the degree of undertaking meaningful planning.

4. Experience shows that successful small-business licensing depends heavily on finding a product champion within the licensee's firm. Moreover, such a product champion must hold a decision-making position commensurate with the project's needs. Entering licensing negotiations where the potential licensee's representative at the table continually seeks authorization several levels up in the corporate hierarchy invites problems. This point is obvious to anyone involved with licensing in a large firm, but not to the small businessman who believes "bigger is best." For these small-businessmen pursuing negotiations through Byzantine levels of management can even provide a false sense of security. They fail to understand such negotiations very often waste time, and where they do culminate in a licensing agreement, the agreement should carry significant performance guarantees.

5. Successful commercialization, whether in large or small firms, depends heavily on reducing risks outsiders perceive. This principle holds whether those outsiders are customers, potential investors, licensees, or new job applicants. Here, it is important to stress that perception can often exercise more power than reality. The benefits of a healthy cash-flow, for example, can be offset dramatically if potential licensees perceive financial irresponsibility in poorly constructed financials. Likewise, the advantages

of excellent engineering can be lost on a customer who perceives inadequate market knowledge.

The successful small-business innovation manager reduces perceived risks by knowing as much as possible about the market, the production process, and the financial needs of the project. Moreover, the successful manager reduces that knowledge to easily comprehensible, general summaries that convey a solid grasp of technical, market, and business knowledge.

6. The fact that the innovation process requires expert participation from technical, marketing, and business personnel creates a situation in which the small business project manager must take direct responsibility for overall business management. Often, this proves difficult, even for first-time entrepreneurs with extensive background in corporate management. In the small-business environment, it is the project manager who must personally perform the staff work necessary to translate material from specialized technical vocabularies in three professional areas (i.e. engineering, marketing, and business). Without the project manager's ability to perform this function, coordinated progress through the innovation process becomes impossible. In the early days of a small-scale organization the project manager will probably exercise routine decision-making power in at least one of the three professional areas involved in commercialization. In many cases the same person will in fact direct activity in all three areas. Throughout the innovation process, the project manager needs to talk to functional specialists both in order to exercise overall control and to facilitate communication among engineers, marketing professionals, and business personnel.

Mohawk Research Corporation's experience with individual inventors and small businesses pursuing new product development efforts demonstrates that nothing guarantees success in the innovation process, whether through licensing or venturing. Nevertheless, I do believe that a broadened understanding of the innovation process significantly improves chances of success. Certainly, arming project managers with knowledge of the particular nature of small-business licensing activity contributes to their ability to proceed with more soundly reasoned commercialization efforts. In many cases, especially among those pursuing licensing, even a marginal increment in knowledge can work wonders in reducing naivete to manageable proportions.

LICENSING AMONG SMALL FIRMS

There are patterns and regulations in small-firm licensing practices, but its quirky and idiosyncratic nature always grabs my attention first. Imagine the following scenario. The CEO of a small firm (less than $10M in sales per year) based in New England is calling on a customer in Sweden. The New England firm manufactures steam turbine components. The Swedish customer asks if the CEO knows anything about an inventor from New England who wants to commercialize a new steam turbine component. The CEO has never heard of this inventor or the device, which is being developed less than 200 miles from his own plant.

Back home, as the CEO tells his Vice President of Sales and Marketing the story, he learns that the inventor and the Vice President know each other because they had both worked for the same division of a major corporation. The CEO decides to seek out the inventor and try to reach a licensing agreement. At first, the inventor is not interested because he wants to license an industry leader. He had worked for one of these firms for 30 years. Although the component still requires production engineering, the inventor wants a large up-front payment and the industry's "rule-of-thumb" royalty of about 5% on sales. The CEO who has just completed a turnaround with his once struggling, now modestly prosperous small firm, cannot take a license on those terms. Things do not look good.

The CEO keeps communications open. The Vice President and the inventor speak the same language because of a common engineering education and their shared background in industry. Their personal chemistry is good from the start, and the CEO uses that fact to continue negotiations with the inventor. The CEO hopes the inventor will become a creative force in the firm, thereby expanding the product line.

Gradually, the two sides move toward an agreement in principle under which the inventor will accept a small up-front payment, guaranteed consulting fees, and a royalty of 20% on sales — four times the industry standard. At that point it is time to prepare a formal agreement. The inventor has no lawyer; the CEO insists he retain one to review and finalize the agreement they drafted. Everyone is satisfied.

This is a story with a happy ending. The small New England firm doubled its sales in the first year of the license. In that first year, the inventor received very substantial payments in combined royalties, consulting fees, and upfront payments. Currently, the CEO keeps the inventor busy developing new products for the firm. But there was no guarantee of a happy ending. Things could have gone wrong at any number of points.

The inventor — an MIT engineer and a 30-year veteran of corporate America — was at first uneasy with the entrepreneur. He had no real commercialization plan beyond "license to a major manufacturer under the standard industry terms." Indeed, he had already approached seven major firms in the industry. Despite 30 year's of industry experience, he knew relatively little about the production engineering or marketing required for commercializing his technology.

The CEO, at the same time, saw both this inventor and his technology as potential assets for his firm. He set out to strike a licensing agreement that would produce a "win-win" situation for his firm and the inventor. The new component was an obvious fit in his existing product line and the inventor represented a potentially significant addition to his firm's R&D capabilities. He set out to acquire

both the technology and the technologist, which explains his willingness to sweeten the deal as much as possible within the constraints of his business's capability. He found it impossible to strike a standard "corporate" deal with the inventor, but when the two parties finally did reach an agreement each felt his side had reached more than would have been possible under a standard arrangement. Indeed, it appears they are both right.

This story had its happy ending primarily because both parties ultimately sought to reduce perceived risks. The Vice President of Sales and Marketing eased the initial contacts, but the CEO and the inventor soon found other ways to forge a relationship. Both brought valuable commodities to the table; both proved willing to compromise. At one level, their story furnishes a remarkable tale of happenstance and accident. In that sense it demonstrates the vagaries of licensing practices among small firms.

At a deeper level, however, it also demonstrates consistent patterns found among all innovation efforts. The need to reduce perceived risk is only the most obvious of those patterns. Indeed, virtually every one of the six points listed in the previous section appears in this story. Successful small-business licensing depends on things such as licensing at the appropriate point, articulating the real objective of the licensing agreement (more than a product in this case), yoking technical development, marketing, and business structure, and placing "business" first. Beneath the surface appearance of an odd, idiosyncratic licensing agreement, this firm and an individual inventor structured an intricate deal that served the best interests of both very well.

SMALL-FIRM LICENSING PRACTICES

Licensing involving individual inventors and small businesses often proves complex and intricate. Although the Mohawk Research experience with small-business innovation project managers clearly shows the existence of definite patterns and practices, it is important to tread cautiously in trying to reach firm conclusions about how small firms license technology. Currently, there is virtually no literature on small-business licensing and even our work must be described as preliminary. Nevertheless, certain patterns in small-business licensing practices do seem to hold fairly well across the board. I think such patterns warrant reporting:

- Individual inventors and small firms are much better in their licensing endeavors when they target potential licensees incrementally larger than themselves. As one of my colleagues says, "Technologies fare better if they pass up the corporate food chain one level at a time." There are many reasons for this, but all actually flow from the fact that similarity in organizational scale eases communications and understanding of manufacturing, marketing, and business problems.
- Almost as a corollary to this first point, licensing agreements tend to work best and are arrived at more easily) when the language and culture of the licensor and licensee are similar. The "corporate culture" barrier is almost always a factor in the difficulties individual and small-business inventors face as they try to license to very large corporations, but these language/cultural factors can also play extremely important roles in specific geographic regions and in certain industries. In some parts of the country a handshake will still make a deal. In some industries, potential licensees will give a sympathetic hearing only to an inventor with the correct intellectual pedigree. Whatever the specific variants, compatibility in language and culture smooth negotiations simply because the principals find it easier to be comfortable with each other.
- For small-businesses and individual inventors, technologies handed off to a small-firm product champion who understands applications, technical implications, and the market stand a far better chance of success than those that enter large corporate product development efforts.
- The size of the market constitutes a critical factor in targeting potential licensees. A $20 million market may not furnish enough return for a large corporation even to consider production. At the same time, the same market may overwhelm the production capabilities of a firm that is too small. Somewhere in the middle there is a firm for which this market is ideal. The critical nature of this market "scale" factor makes it imperative for small-business innovation managers to carry out what amounts to a double-edged market analysis as they pursue licensing agreements. They must carry out a standard market analysis with precision sufficient to approach potential licensees with reliable data. They also need to carry out an industry analysis to identify the market thresholds their potential licensees will seek.
- Technology needs to be "handed off" at an appropriate stage of development. That stage will vary depending on the industry and the technology, but it will be at a level where genuine commercial potential is apparent, perceived risk is reduced, and production feasibility documented. Of course, holding onto a technology beyond the point where those criteria are met may waste resources. This seldom occurs in practice, however. Most small-business innovation project managers who are planning to license fail to calculate the best "hand-off" point and tend to enter licensing agreements too early.
- Industry-specific inventors — those who invent in a single industry where they have considerable work experience — tend to have greater success than inventors without comparable industry experience. Whether success springs from greater credibility, more sophisticated understanding of the industry's technical needs, or from greater market knowledge is unclear.

Perhaps it derives from various combinations of these factors. Whatever the source, however, industry specific inventors have decidedly greater licensing success than other inventors.

CONCLUSIONS

For individual inventors and small firms pursuing commer-

cialization of new technologies, licensing often appears as a very attractive (or, indeed, the only possible) commercialization strategy. While the reasons for this desirability are broadly comprehensible, the specific rationales, practices, and requirements for small-firm licensing are poorly understood. Mohawk Research's experience in dealing with more than 350 small firms engaged in innovation projects has provided a series of insights into the world of small-firm licensing. The most important findings are that small business managers often pursue licensing because they are unfamiliar with (or uncomfortable in) the "business" world. Very often, such attitudes derive from misinformation or a lack of perspective on the innovation process.

A broadened perspective on the innovation process constitutes an important component in helping first-time innovation project managers to plan for commercialization. The world of small-business commercialization, especially through licensing, works in ways that often appear quirky, idiosyncratic, and highly particularized. Yet, treated from a perspective of greater understanding of the innovation process, many oddities of small firm licensing become comprehensible. With rare exceptions that are industry specific or depend on particular circumstances, individual inventors and small-business innovation project managers do much better when seeking licensees among firms that are relatively close to their own size — firms where they can find product champions who share a common set of assumptions while working within overlapping ranges of expertise and knowledge.