

The New Paradigm in US R&D: IP-Driven Product & Technology Development

By Mildred A. Hastbacka, Ph.D.
Director, TIAX LLC

ABSTRACT:

This is the first of a series of articles addressing how the R&D organizations in the US are implementing key elements of the "high performance business model." The HPB model integrates Strategy (S), Processes (P), Resources (R), and Organization (O) to deliver high performance business results.

This first article focuses on the "S", Strategy, and introduces what is fast becoming a new paradigm in US R&D management strategy: IP-Driven Product & Technology Development as the basis of sustainable competitive business advantage. Subsequent articles will focus on the other elements (P, R, and O) of the high performance R&D.

THE MEANING OF "IP DRIVEN R&D"

Intellectual property (IP) is an output of R&D. Embodiments of IP can be products, technologies, systems, or services. When sold, these "saleable" embodiments generate income and profits. When protected by patents, which convey the right to exclude others from using the patented IP, saleable embodiments of the protected IP can enjoy a monopoly position in the marketplace. If the protected IP is the output of development which is directed toward providing a solution to a high volume/high value market problem, the income and profits can be both substantial and sustainable.

The meaning of "IP Driven R&D", then, is R&D which is directed toward developing patentable IP that uniquely fulfills a high value market need. In the US, the new paradigm in R&D strategy is based on IP

Figure 1. The New Paradigm for R&D Strategy

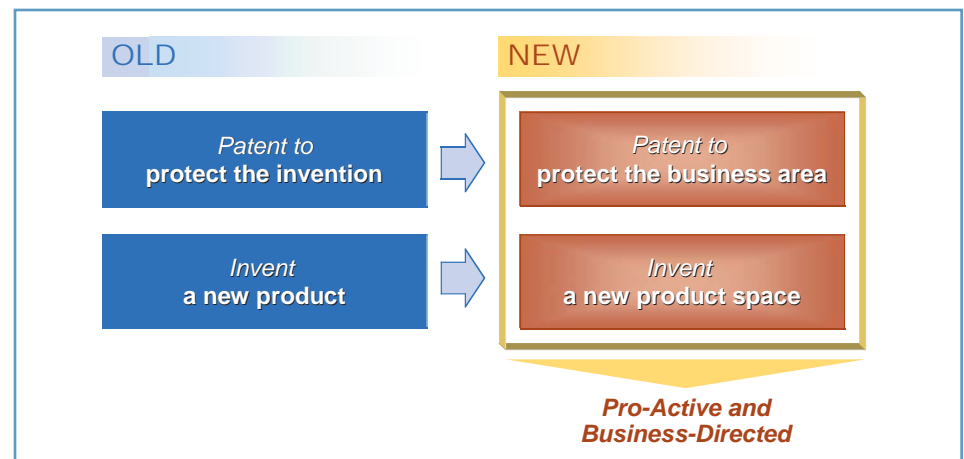
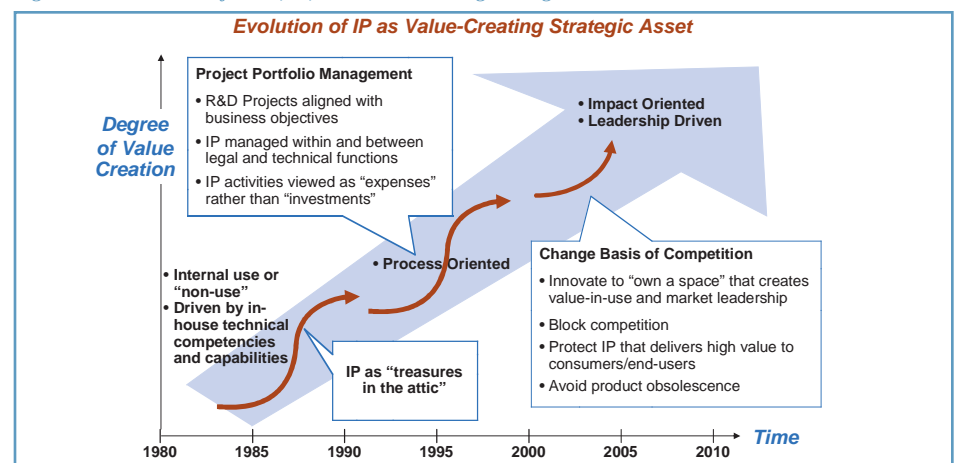


Figure 2. The Product of R&D, IP, is a Value-Creating Strategic Asset



Driven R&D, and the change in thinking, perspective and vocabulary that accompanies this shift is shown in Figure 1.

THE EVOLUTION OF IP-DRIVEN R&D

Most recent converts to the new paradigm of R&D strategy have been motivated by

the desire to avoid repeating past mistakes or by the fear of large and looming downside risks from changing market dynamics.

An example of the former is a US-based developer and marketer of blood glucose monitors (BGM). This company developed and launched a new BGM, which proved

to be commercially successful. Its commercial success drew the attention of competitors. Since the key components of the successful BGM were inadequately patent-protected, the competitors were free to copy and commercialize important and differentiating elements of the BGM. The result was an unexpectedly short product life for the novel BGM, with an ROI that likely fell far short of what was promised to upper management at the time the funds for the project were approved.

An example of the latter is a recent quote from a newly-appointed CEO of a manufacturer and marketer serving the rubber industry: "The last few years have been lean in the rubber business...China is now our biggest competitor...BUT life goes on...R&D is the answer and patents are the tactics...new value-added products is where we are focused."

As the above two examples suggest, there is little distinction between companies traditionally considered "high tech" and those considered "low tech" in regard to the adoption of this new R&D paradigm. Mistakes and market dynamics afflict both categories, with distinctions only in the magnitude and rate of business impact.

It is understandable, then, that the evolution to the new R&D paradigm has been driven by business leadership, i.e., those in the company who are responsible and accountable for business results. For perhaps the first time, "C" level leadership is recognizing the power of IP assets (and the innovation that gives birth to them) to change the basis of competition and thereby to create and sustain market leadership opportunities. This pro-active, market-oriented focus of "C" level leadership overlays the historic and more tactical "project portfolio" approach of the 90's (see Figure 2).

HOW IP-DRIVEN R&D LEADS TO HIGH PERFORMANCE BUSINESS RESULTS

The potential for IP-driven R&D to lead to high performance business results is rooted in the blocking power of patented technology. The more completely a company can "own the IP space" associated with saleable and highly valued embodiments of the IP, the less "freedom to operate" and the less "opportunity for novelty" remains

for alternative competing technologies, whether in-kind or not-in-kind.

For the purpose of illustrating how IP-driven R&D can lead to high performance business results, we will use two model scenarios:

Scenario I: Product ABC developed under IP-Driven R&D paradigm; key components effectively protected by IP

Scenario II: Product ABC developed without benefit of IP-Driven R&D paradigm; IP not protected by patents

Assumptions:

1. All R&D costs, capital investments, and operating costs same for both scenarios.
2. Product ABC profit margins same in years 1 through 3 for both scenarios.

3. *Scenario I:* Product ABC sales continue to grow from time of launch through year 7, when it is replaced by the next generation product.
4. *Scenario II:* One competitor launches a "knock-off" (Product XYZ) of Product ABC in year 4, leading to erosion of market share and price for Product ABC; Product ABC loses half its market share to Product XYZ by year 7.

Figure 3 shows a comparison of the net income from sales of Product ABC in these two different scenarios. Whether the success metric is market share, useful economic life of the product, IRR, ROI, or NPV, Scenario I is superior to Scenario II. As an example, the NPV of the income from Scenario I is \$107 million, versus \$84 million for Scenario II (using 15% internal rate of return). Effectively, the patented technologies of Scenario I accounted for \$23 million of value creation.

Figure 3. How IP-Driven R&D Leads to High Performance Results

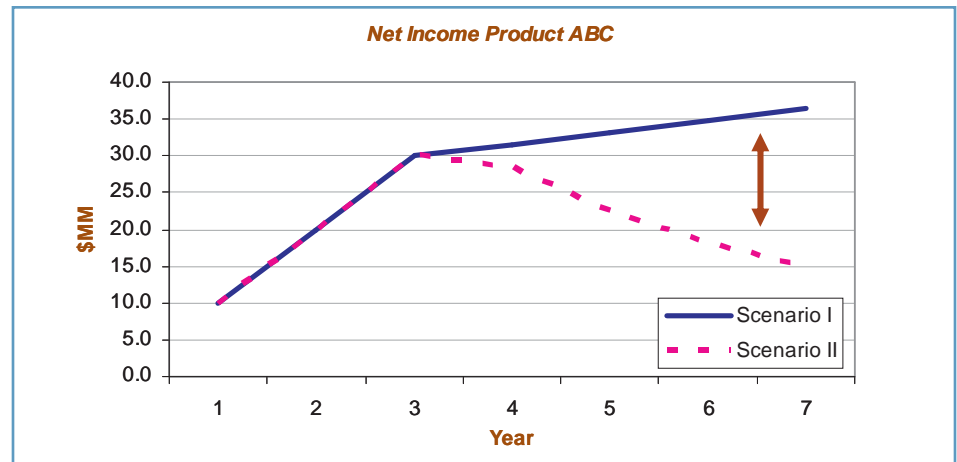
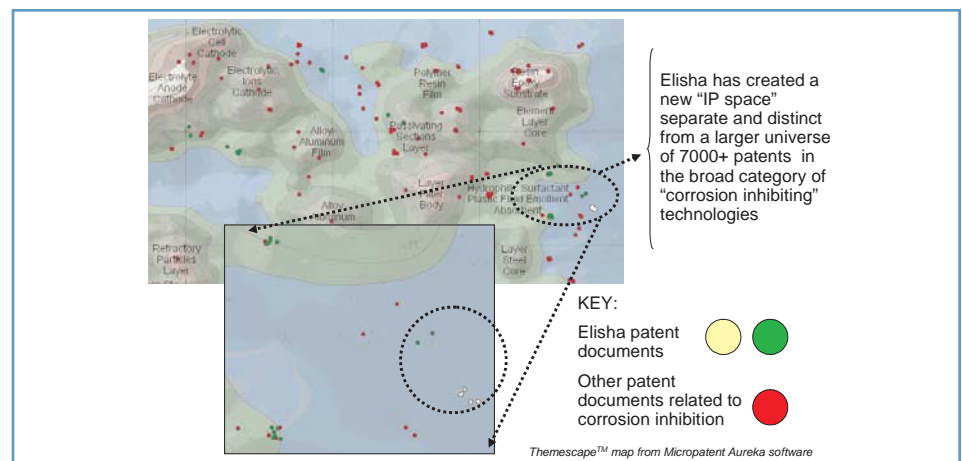


Figure 4. IP Landscape for "Corrosion Inhibiting" Technologies



CASE EXAMPLE: CORROSION INHIBITING TECHNOLOGY FROM ELISHA TECHNOLOGIES LLC

Elisha Technologies LLC is a privately held member of the Orscheln Group in the US. Elisha is focused on developing innovative, environmentally benign solutions to corrosion problems. One result of their work is EMCTM electrolytic mineral coating, demonstrated to inhibit corrosion in a variety of applications. A novel silicate-based technology, Elisha recognized the potential for the benign EMC technology to become a new industry standard by displacing conventional chromate-based solutions to corrosion problems.

So, consistent with the new paradigm of IP-driven technology and product development, Elisha's invention strategy was to "engineer to own" the non-chromate based IP space for corrosion inhibition. Figure 4 shows a snapshot of Elisha's success in creating and protecting its non-chromate corrosion inhibition IP space (Figure 4 generated using AurekaTM software from Micropatent LLC). The larger "map" is a visual distribution of more than 7000 patent documents published since 1991 relating to an array of corrosion inhibiting technologies, with each dot representing an individual patent document. Elisha's inventions are almost literally "off the map," indicating they have created new IP space, away from the areas of most crowded art. The smaller map insert is a close-up of Elisha's distinctive area, illustrating that even at this "close-up" view, Elisha stands alone.

The rest of the Elisha EMC technology story is the business impact of this successful "engineering to own the space"SM exercise. Elisha Technologies LLC is a technology developer, with a licensing-based business model. The change in value of Elisha's technology from its earliest stage (e.g., pre-1998) to the point in time at which Elisha effectively "owned" the high-value non-chromate corrosion inhibition space was of the order of tens of millions of dollars. Owning the IP space has positioned Elisha for high performance business results.

THE FUTURE OF IP-DRIVEN R&D

Business dynamics for US-based companies continue to generate new pressures on business performance. For example, consumer willingness to purchase generic or private label brands threatens the premium pricing that large brands have enjoyed up until the last few years. To offset the negative impact of this trend, some US-based consumer companies are shifting their strategy to include more robust technology-based innovations, linked to their existing premium brands, in an attempt to change the basis of competition and/or to prevent "fast followers." Another example relates to the price erosion that US chemical companies have allowed over the past few years in an attempt to maintain market share and volume. At least one US-based chemical company has migrated to "zero-based" budgeting for its R&D programs, so that only those R&D programs with outputs targeted to fulfill needs that customers value will be resourced. To the extent that companies experience in a significant way the negative impact of one or more of these business dynamics, the solution will involve IP-Driven R&D.



15 Acorn Park
Cambridge, Massachusetts
02140-2390
Tel: (617) 498-5000
www.TIAXLLC.com