

Technology Due Diligence: More than a Survey of IP

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No smart investor makes a decision about a company without examining the company's technology carefully. Mergers, acquisitions and investments require due diligence. Investors need to be sure they have an accurate picture of the target company and its assets before agreeing to terms. From a business standpoint, due diligence includes evaluating the management team and verifying customers and markets. From a financial standpoint, it includes a thorough examination of the books. From a legal standpoint, it involves determining who owns what and who has claims against whom. And, in any deal with a substantial technology component, technology due diligence is another important aspect of the due diligence process. While not all transactions require technology due diligence, the presence of patents can be a strong indicator that the company's technology is worth evaluating.

Technology due diligence includes understanding, in depth, what the company's technology does and does not include how it compares to other technologies in the marketplace and under development, how customers use the technology, and what competing technologies might replace it. Technology due diligence should strive to determine how competitive the company will be in two years, or in five years. Key elements in forming this assessment include:

- the uniqueness of the technology itself;
- how well the technology addresses customers' ongoing needs;
- the relationship of the technology to complementary technologies;
- the barriers to entry in the field (including intellectual property, development costs, and availability of expertise);
- the competitive landscape;
- how easy it is to improve incrementally; and
- the strength of the development team.

There is some crossover between traditional intellectual property due diligence and technology due diligence. Traditional IP due diligence involves cataloguing the IP assets, verifying ownership, and keeping an eye out for any glaring errors that might compromise the enforceability of the owner's IP rights. In comparison, technology due diligence should start with an evaluation of the company's patents, trade secrets, and copyrights. But, such diligence should also attempt to place those IP assets in the proper technological and market context and to evaluate the technical competencies important for development of future products and related IP assets. Thus, a catalog of IP assets, ownership, and enforceability is often a pre-requisite for technology due diligence, but it is not the final product.

Technology due diligence should be performed by persons with specific technical expertise, who also understand the business and IP issues surrounding the technology. Technology due diligence cannot be completed overnight. Indeed, a thorough job may take several weeks to do properly and may be expensive to complete. For these reasons,

such due diligence is generally not performed until and unless the investor is satisfied with company basics, including the management team and market position. In terms of timing, this diligence may be done concurrently with the financial audit and legal due diligence and may be closely linked with the IP due diligence.

Given the time and cost of this type of diligence, the inevitable question is: why invest in technology due diligence? The answer is that a company selling yesterday's flash-in-the-pan technology is in trouble. Technologists tend to be very bullish about their own technology and its prospects and may be of little help in assessing the technology's prospects. Current sales figures and historical growth trends may be able to tell an investor how the next 6-12 months are likely to play out. Beyond that time period, things become more complicated. Customers and competitors will drive the need for product improvement. Nascent technologies may be waiting in the wings to disrupt the market. The resources of larger firms may already be pushing the technology in another direction. Short-lived products and an IP portfolio that covers technology that will not be of use in 12 months are of limited value. Nothing in the financial and management picture will tell an investor what the technological landscape really looks like or whether the company's product offerings will be as strong tomorrow as they are today. Thus the need for technology due diligence.

Information Gathering

Technology due diligence begins with the same sources that underlie traditional IP due diligence. Licenses and contracts are collected, catalogued and reviewed to determine who owns rights to what, what technology has been licensed in and out, what kind of use restrictions exist, and so on. Patent applications, issued patents, and trademark and copyright registrations are organized and analyzed for ownership, coverage, and limitations. Employment contracts, non-disclosure agreements, and security procedures are reviewed with a view to the company's trade secrets. Ideally, the company's IP is evaluated against its actual products, products in the pipeline, and marketing materials to evaluate its scope and applicability. Thorough IP due diligence may also include an evaluation of third party IP assets or products for clearance and enforcement purposes.

The basic information necessary for IP due diligence can generally be obtained from the CFO or other senior management. Many attorneys will stop there—content to rely on boxes of documents and their understanding of the law for an accurate picture of the company's IP assets. For technology due diligence, however, the auditor should also interview technical staff at all levels. Upper management and even project managers will not always know how and from what sources products were developed. It is not uncommon for software developers, for example, to independently incorporate open source or borrowed code without realizing the implications of their actions. Similarly, technical staff may have a better idea of what features of a product are important, what features have been abandoned as the product matured, and who in the organization is really knowledgeable about different aspects of the technology and the competition. Senior management personnel are often surprised to hear comments like, “we don't really

use that any more,” or “no one could get that to work after Susan left.” This is important information for the auditor to find out.

Technology due diligence will frequently rely on a combination of the technical knowledge of the auditor, additional research and experts, company documentation, and interviews with management, technical staff, sales and customer service employees, and even customers themselves. This can be a large and time-consuming project, depending on the complexity of the technology and the scope of analysis desired by the sponsors.

Technology on its Merits

The core technologies underlying the company’s products and products in the pipeline must be identified to frame the technology due diligence. Analysis of the products themselves, review of any patents or patent applications, and interviews with the technical staff can also be used to define the scope of the technology to be analyzed. The analysis may or may not be limited to the planned product implementations: for example, the auditor may be asked to consider alternate fields of use for future development or licensing potential.

The technology that is the subject of the due diligence should first be evaluated on its scientific merits. This analysis is based upon the auditor’s research and experience, company technical data, interviews with the technical staff, and, for some projects, formal or informal consultations with other experts in the field. The credibility of the solution should be tested and the limitations of the technology should be identified. A given speech recognition technology, for example, may be extremely accurate in lab conditions but only 60% accurate when conditions are not tightly controlled. This kind of information is especially important for evaluating early-stage technologies that have great claims of market applicability -- but have not yet been truly tested.

The product strategy for the technology should then be evaluated. Pre-market products are inherently risky, but even products with beta or actual customers are by no means risk free. The product should be analyzed for the customer problem it is solving and how well the solution treats that problem. The product should be scrutinized against the status quo and alternative solutions. Competing products and technologies will help clarify the strengths and weaknesses of the solution. Particular attention should be paid to limitations of the technology and how they will play out in real-world applications. Thus, if a company wanted to sell the above-described speech recognition technology, either: (i) the market application must provide controlled conditions, or (ii) the current technology it is replacing must be more inaccurate enough that even a product with 60% accuracy would be a great improvement.

When reviewing product strategy, attention should also be given to aspects of the technology that may impact the cost, distribution, or regulation of potential products.

- Can the technology be cost effectively mass-produced?
- What are the quality control and customer support issues?

- Does it rely on regulated materials or markets?
- Are there companion technologies or standards required to make the technology useful?

The answers to any of these questions may profoundly affect the value of the technology and the company that relies on it.

Sustaining the Advantage

Once the present state of the technology is understood, the auditor assesses the technology's sustainability. Assessing the future worth of a technology involves a complex analysis of technical significance, market maturity, market potential, organizational competence, and IP protection. No measure of technical, legal, and business savvy will reliably predict future success. But, a careful analysis may be able to alert stakeholders to significant risks.

The following factors may indicate lower present and future value for a given technology:

- Incremental and feature improvements (rather than fundamental technologies that are a significant break from past methods).
- The existence of alternate solutions on the market or in development.
- Technologies that cannot be updated or improved.
- Technologies with rapid product cycles and high turnover.
- Failure to comply with industry and regulatory standards (unless coupled with predicted modification of those standards).
- Monolithic products (i.e., those that cannot be used, integrated or updated modularly).
- Crowded markets with large, well-funded, and/or innovative competition.
- Technologies without ready markets—there is such a thing as being *too* cutting edge.

Obviously, no one of these factors tells the whole story, but all are worth considering.

Another important aspect of assessing the future value of a technology is the strength of the development team. Entrepreneurs and inventors can end up lost in their own ideas as science continues to develop without them. Staying current with industry literature, attendance at scientific conferences, knowledge of competitors' products and patents, hiring of recent graduates, and relationships with university researchers are all positive indicators of a "plugged in" development team. Auditors should be particularly conscious of older technologies that have not been improved upon (and may not even be understood) by the current development team. Auditors may also want to evaluate the redundancy of the development team's knowledge. There should be at least three members of the team who know the technology well enough to sustain and improve it, in case there are personnel changes or other circumstances. A strong development team will

be well integrated with the marketing, sales, and customer service teams to ensure that they understand the market, the competition and the customer.

More Than Just IP Due Diligence

At this point, the auditor should be able to provide the stakeholders with an accurate picture of the company's technology and to identify its limitations and risks. Analysis may now return to the IP assets protecting the company's products and plans. With a thorough understanding of the technology and the product strategy, the scope and significance of any patents, copyrights, trademarks, and trade secrets can be reassessed. The auditor can now determine how well the patents and trade secrets protect the most important aspects of the technology. The scope of claims and their applicability to the products and product pipeline can be evaluated. Any shortcomings in the IP protection that may impact the value of the transaction can be identified.

The stakeholders may wish to go beyond due diligence and consider a complete IP audit (though perhaps not until after the deal is closed). Based upon the technology due diligence, auditors will be able to determine the offensive, defensive and qualitative values of the IP portfolio. Strategies for filling gaps in portfolio coverage and improving IP acquisition going forward can be devised. The auditors can assist in developing licensing and enforcement strategies for promising technologies. Finally, patents and other IP that have become irrelevant to the marketplace or of limited utility to the company's strategy can be made candidates for abandonment, donation or sale.

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