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2011 in Review

Snapshot of Photonics Industry M & A Activity

The whirlwind of Merger & Acquisition activity in the photonics industry continues with the volume of transactions increasing significantly in the first half of 2011. Comparing to 2010 Snapshot, there was more activity in the first half of 2011 than in all of 2010.

The trend of small and middle market consolidation in the highly fragmented vertical market segments enabled by photonics technologies remains. And given the prolonged market volatility and uncertainly around the future role of government regulation, it is likely that organic growth will remain muted and opportunistic buyers will continue to absorb targets - amplifying a pattern of consolidation well into the second half of 2011.

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Capturing Value of Intellectual Capital

Costs of Doing Incorrectly are Enormous

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Valuing Privately Held Businesses

Summer 2011 Private Cost of Capital

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The Year 2011 in Review

Snapshot of Photonics Industry M & A Activity

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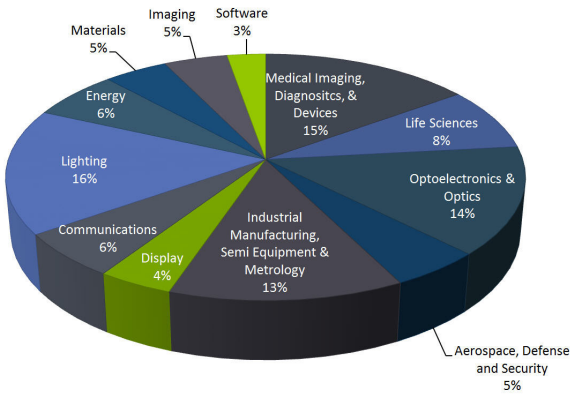
Activity

Lighting saw the most activity - dominated by small market acquisitions of LED based luminaires, automotive, safety and architectural lighting suppliers. *Medical Imaging and Diagnostics* followed with strategic buys of companies with proprietary technology supplying proteomics and cell based diagnostics instrumentation and consumables. Highly fragmented *Optoelectronics* and *Optics* markets, including optical components, materials, lasers, sensors, cameras and subassemblies, followed closely in terms of number of transactions.

Below is a snapshot of activity by market segment.

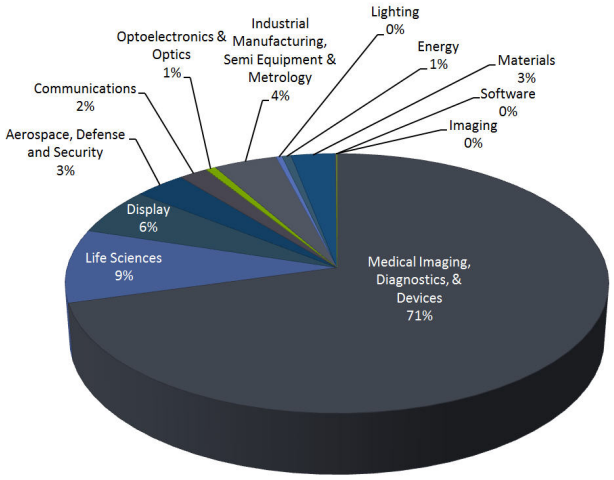
2011 Q1 & Q2 Transactions by Market Segment



The majority of targets in *Communications* were fiber optic and integrated optic components companies, as opposed to networking gear providers. 3-D technologies were prevalent in *Imaging* and *Medical Imaging*.

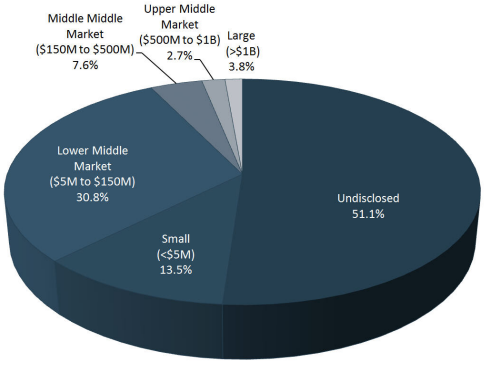
Industrial Manufacturing and *Metrology* includes process control, factory automation, and industrial laser material processing equipment. *Energy* includes solar cell photovoltaics, materials and subassemblies. *Security* includes intelligent sensing, surveillance, personal identification, and trace detection.

2011 Q1 & Q2 Disclosed Transaction Value by Market Segment



219 M&A transactions with target companies employing photonics technologies and closing dates in the first half of 2011 are researched. 49% of researched transactions disclose the transaction value. Of those disclosed, more than 85% are small and lower middle market companies. This may indicate a trend of consolidation in highly fragmented vertical market segments, such as Solid State *Lighting, Medical and Life Sciences*, and *Semiconductor Equipment*, where photonics plays a differentiating role - as well as continued consolidation of the highly fragmented photonics components market that includes manufacturers of lasers, sensors, optical components, and subassemblies for Original Equipment Manufacturers.

2011 Q1 & Q2 Transactions by Size



Although the vast majority of transactions by volume and value are strategic, private investment firms are active in the first half of 2011. 11% of transactions disclosed involve private investment buyers and 18% involve private investment sellers.

Valuations

The total and average value of researched transactions are $29 billion and $271 million. This is skewed high by the $12 billion merger of Novartis and Alcon and Danaher's $7 billion acquisition of Beckman Coulter.

The simple average of reported Average Enterprise Value to Revenue and EBITDA multiples are 2.8 and 28.1 respectively. Average Enterprise Value to EBITDA is skewed high by two middle market transactions - Finisar's acquisition of Ignis, a fiber optic components manufacturer (259x) and Toshiba Medical Systems acquisition of Vital Image, a medical imaging and diagnostic software supplier (94x).

	# Transactions	% Total	Reported Transaction Value ($USDM, Historical rate)	% Total	Average Deal Value ($M):	Average Total Enterprise Value / Revenue:	Average Implied Enterprise Value / EBITDA:
Aerospace & Defense	8	4%	920.27	3%	115.03	0.59	8.22
Communications	13	6%	1,228.96	4%	175.57	2.66	258.84
Display	9	4%	195.85	1%	48.96	4.50	-
Energy	14	6%	173.44	1%	24.78	0.66	-
Imaging	10	5%	24.74	0%	12.37	-	-
Industrial Manufacturing	16	7%	183.97	1%	20.44	-	-2.12
Life Sciences	18	8%	2,652.11	9%	294.68	2.63	17.53
Lighting	36	16%	117.10	0%	9.76	0.98	-3.21
Materials	10	5%	856.13	3%	171.23	4.15	8.33
Medical Devices	6	3%	12,001.70	41%	2,000.28	-	-1.10
Medical Imaging & Diagnostics	27	12%	8,467.98	29%	769.82	7.13	25.29
Metrology	5	2%	306.46	1%	76.62	0.72	7.54
Optics	15	7%	480.89	2%	80.15	0.84	-
Optoelectronics - Lasers, Sensors, Cameras, Subassembles	16	7%	1,199.92	4%	109.08	-	-1.87
Security	3	1%	78.77	0%	78.77	0.31	6.56
Semiconductor Equipment	7	3%	73.04	0%	18.26	3.87	22.15
Software	6	3%	5.63	0%	5.63	-	-
	219	**100%**	**28,966.95**	**100%**	**270.72**	**2.77**	**28.05**

Comparing a simple average with no adjustments for size, capital structure, or other dissimilarities by market segment - *Medical Imaging & Diagnostics*, *Display*, *Materials*, and *Semiconductor Equipment* realize the highest multiples of Enterprise Value to Revenue. *Communications*, *Medical Imaging and Diagnostics*, and *Semiconductor Equipment* realize the highest multiples of Enterprise Value to EBITDA.

Later Half of 2011

The later half of 2011 is off to an active start. DuPont acquires Innovalight for its silicon ink that boosts photovoltaic efficiency. Newport announced that it will acquire Ophir for $230million and High Q Technologies, an ultrafast laser manufacturer with revenues of $20 million. Halma acquires photonic devices maker Avo Photonics for $9 million cash and an additional $11 million earnout. JDSU acquires critical assets from QuantaSol for concentrating photovoltaic solar-cell systems. nLIGHT, manufacturer of high power semiconductor lasers raises $17.5 million from Oak Investment Partners, Mohr Davidow Ventures, and Menlo Ventures.

The Transactions

Follow this link to a snapshot of these transactions. **<Q1 & Q2 2011 Photonics M&A Transactions>**

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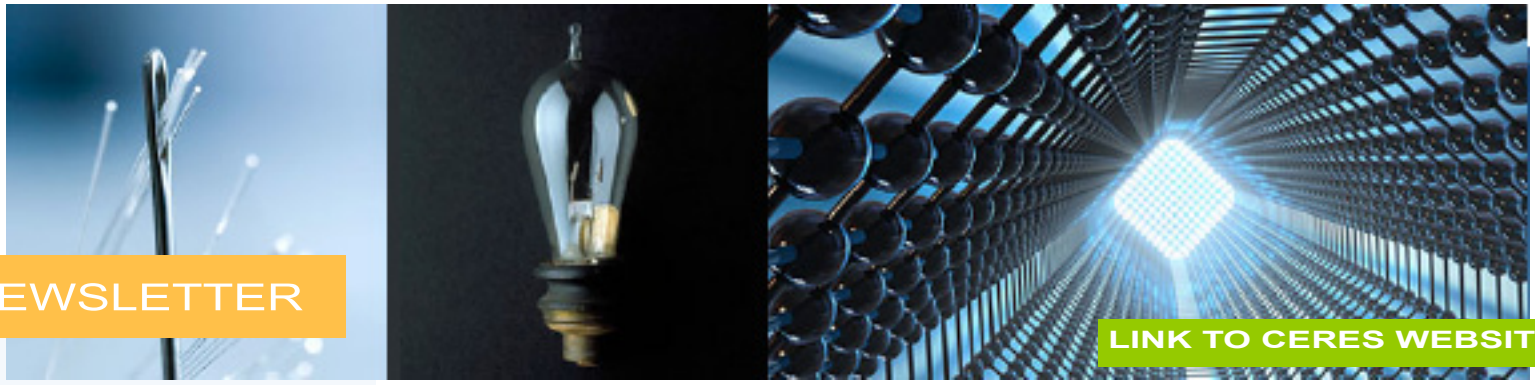

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Capturing the Value of Intellectual Capital

Costs of Doing Incorrectly are Enormous

Why? Because whether planning to sell a business short term or long term, the costs of not capturing the value of intellectual capital are enormous - improper deal structures, lost financial opportunities, assumptions of greater execution risk, over/under payments for asset acquisitions. And without protection, a reasonable buyer would not pursue.

Intangibles, namely intellectual property such as patents, dominate the balance sheet of technology companies - large and small. How is the value of this critical asset captured before marketing the business to potential acquirers? Strategic and financial buyers perform IP audits of a target company. Below are issues that a potential acquirer will consider when evaluating a business and how to address.

CAPTURE VALUE OF IP

Align IP Assets with Business

Dot I's and Cross T's

Address Infringement

Put the Right Team in Place

Align IP Assets with the Valuable Aspects of the Business

Different types of IP provide different types of protection. What types are most important? It depends entirely on your business - your current and future competitive market position, your business model, and industry dynamics. It is critical when creating and capturing value in your business to engage your IP lawyer early in the process so as to understand the nature of your business and how best to protect what is most valuable.

Patents

For most technology companies, patents are the most important form of IP. They can form a barrier to entry for competitors, be a source of potential licensing revenue, and may deter others from knocking on your door to complain about infringement of their patents. When evaluating patent assets, a sophisticated acquirer will look at quantity, quality and flexibility.

QUANTITY

The depth and breadth of the portfolio is critical to many acquirers. If resources allow, seek protection on all potentially valuable aspects of the technology. Filings on multiple aspects make clear that the company is diversified. Also, by protecting numerous aspects of the technology, the likelihood of having protection on aspects an acquirer finds most valuable - applications, markets, manufacturing methods - is increased.

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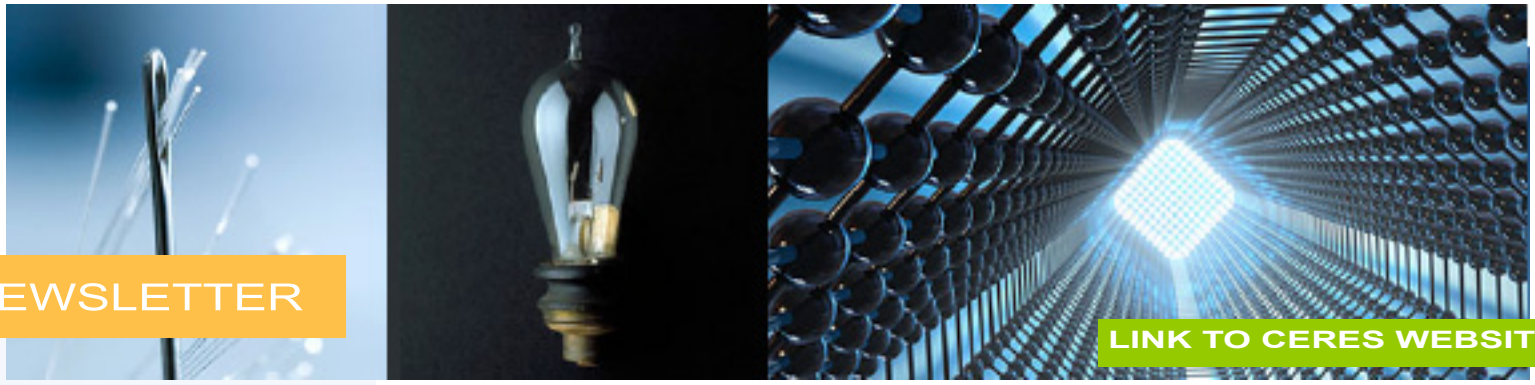

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Align IP with the Business

- Quantity
- Quality
- Claims
- Pending Applications
- Jurisdiction
- Flexibility - Continuations

Quality

A sophisticated acquirer will dig in and evaluate the quality of patent assets. How is quality assessed? Again, it is about the nature of the business and whether the patent assets are tailored to protect what is most valuable.

Patent quality begins when the application is filed. A well drafted patent application does not merely describe technology. It explains the concepts embodied in the technology that are commercially valuable, and makes clear that those concepts are broader than the specific implementation techniques described.

Claims

For an issued patent, claims are paramount. They define precisely what the patent covers. A sophisticated acquirer will not be satisfied to learn that there is a patent on an invention, but will scrutinize the claims to determine how effectively the patent covers what is commercially valuable about the invention. Are the claims narrowly drawn to a specific implementation that can be designed around, or do they broadly cover any commercially viable implementation? The answer is critical to the value of the patent, and hence, to the valuation of the business.

Is it crystal clear what the claims of the issued patents cover? If there is uncertainty, find out before a potential acquirer does. Patent counsel needs to be able to explain precisely what the claims do and do not cover, and then assist in understanding the commercial value of that scope of protection for the business and potential acquirers. This knowledge will be priceless in understanding the value of the patent assets and how they can be competitively positioned with an acquirer.

Pending Applications

A pending application can sometimes provide even more perceived value to an acquirer than an issued patent. While the specification of a patent application is fixed upon filing, the claims are not. Thus, if the claims in an application fall short in protecting what is valuable about the disclosed technology (e.g., they are narrowly drawn to an implementation that could be designed around), the great news is that they can possibly be changed before an acquirer lays their critical eyes on the application. Continuously perform diligence on pending applications and make changes necessary to the claims to ensure that they are aligned with the aspects of the business that are most valuable. When a potential acquirer looks at pending applications, the maximum

potential value needs to be readily apparent, as this will maximize valuation. Making sure claims describe all the valuable aspects in the application as broadly as possible does just that.

Jurisdiction

A last word on quality - patents are granted by governments and are jurisdictionally limited. Thus, a patent must be applied for in every jurisdiction where protection is desired. What jurisdictions matter? Again, it depends on your business. An acquirer will be interested to understand whether the patent portfolio protects the key geographical interests that it deems valuable for the business.

Examine the portfolio with patent counsel and where possible, take action to buttress any weaknesses.

Flexibility – Keep Applications Alive and Options Open

Filing continuations of important cases can be extremely valuable. As mentioned above, while the specification of a patent application is fixed upon filing, the claims are not. Most deficiencies of an issued patent failing to adequately protect the commercially valuable aspects of the technology can be fixed in a continuation application … but only if a continuation application was filed before the patent issues.

No matter how much care is taken in crafting the claims of issued patents, filing a continuation for any important cases will provide flexibility to adjust the scope of protection for numerous unforeseen reasons, including:

- Weakness not appreciated in issued claims comes to light - a weakness likely raised by a potential acquirer
- Market uncertainty results in a different prioritization in determining what is most valuable about the technology
- Potential acquirer sees value not originally prioritized in protecting an aspect of the technology

Filing continuations of important cases can dramatically increase the value of patent assets to an acquirer, thereby increasing the value of the company.

Other Intellectual Capital

While patents are the most important IP of most small to mid-market technology companies, other forms of IP can add significant value. For example, if there is significant market recognition and goodwill in a brand name or mark that an acquirer may wish to retain, consider whether there is proper protection of these trademark rights, as failing to do so can hurt the value of the company. Similarly, there may be value in some technology that the company developed that is best protected as a trade secret, but specific steps need to be taken to ensure that those rights are properly protected or they may be lost.

Determining whether other forms of IP protection make sense depends entirely on the nature of the business. If not already engaged with IP counsel about whether IP is tailored to best protect the business, doing so now can add strategic value short and long term.

Dot I's and Cross T's

Pay due attention to the details in protecting IP. In performing IP audits, it is shocking how often problems with simple, best practice formalities arise that devalue or even crater a deal. Some simple steps include:

- Clearly document all IP ownership by the company - not the inventors or creators
- Establish non-compete agreements with key employees
- Use non-disclosure agreements (NDA) whenever possible when disclosing confidential material outside of the company - suppliers, customers, contract manufacturers

Address Concerns on Infringement of Rights of Others

Most acquirers will be interested in determining whether there are obstacles to their commercialization of the technology. If freedom to operate searches have been performed or patent holders have given notice about potential infringement, be prepared to answer pointed questions about the results and why the coast is clear. If good answers are not there, invest resources to develop answers so as not to be caught off guard in the diligence process. Investing now to develop a well-crafted position can pay huge dividends in alleviating the perceived risk of a potential acquirer and prevent the business valuation from suffering from uncertainty around commercializing the technology.

Put the Right Team in Place

Putting an IP team in place that can cross the finish line with the plethora of issues that come up during the diligence process is critical. The team, headed by a senior IP attorney, needs to have experience in the diligence process and the range of IP issues that can arise - including patent portfolio development, clearance and non-infringement counseling, litigation, and counseling on a host of business related IP issues.

Team members need to be well versed in all key technology areas. Photonics technologies are enabling - generally, more value is captured and higher barriers of entry are created with products and services higher on the value chain. These products are inherently technically interdisciplinary.

Also, issues can be highly technical. Team members need to be well versed in all key technology areas. Photonics technologies are enabling - generally, more value is captured and higher barriers of entry are created with products and services higher on the food chain. These products are inherently technically interdisciplinary. A solid state lighting company may have core material science, optoelectronics packaging, and semiconductor processing IP. A medical diagnostics company may have differentiating proteomics, imaging/spectroscopy/interferometry, surface chemistry and assay content IP. A technically diverse IP team can often best capture the value of a photonics technology business.

Authored by Rich Giunta and Tommy Franklin of Wolf Greenfields' Electrical Technology Practice Group with expertise in optics and photonics

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Valuing Privately Held Business

Private Cost of Capital

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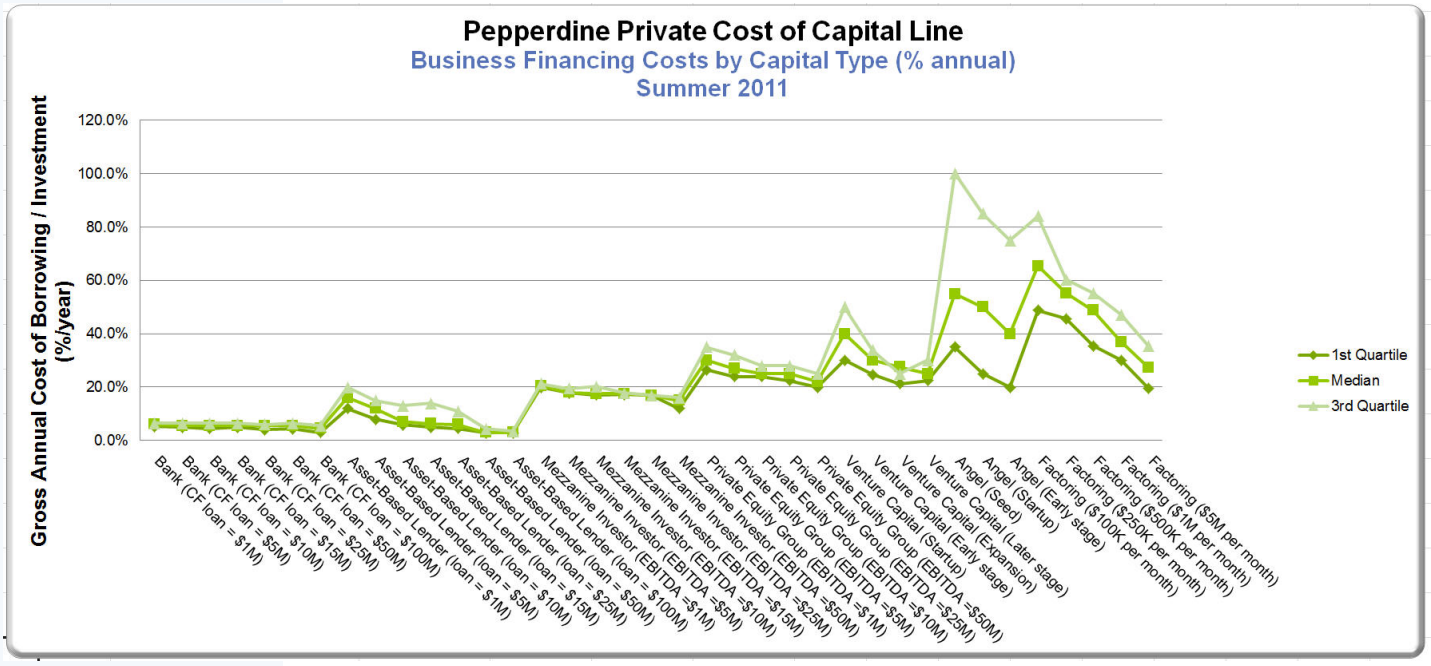
Pepperdine PCOC Survey

The Pepperdine private cost of capital survey is a web based survey of tens of thousands of capital providers including banks, asset based lenders, mezzanine investors, private equity groups, venture capitalists, factoring companies, business owners, investment banks, and business valuation professionals.

The survey below, released in July of 2011, investigated for each private capital market segment the important benchmarks that must be met in order to qualify for capital - amount of capital typically accessible, required returns for extending capital in the current economic environment, and outlooks on demand for various capital types, interest rates, and the economy in general.



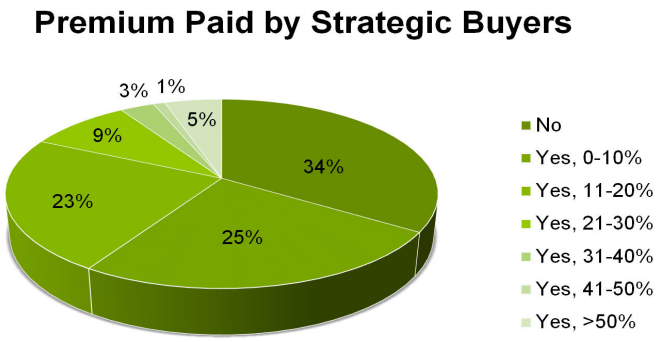
166 private equity firms responded to the survey. Approximately 43% reported typical investment size to be in the $10 million to $25 million range. According to respondents, the most important factors to consider when investing and determining the company specific risk premium are future prospects of the company and management team. Private Equity firms reported the following deal multiples of EBITDA paid in manufacturing industries - generally up from prior 6 months.

	$1M EBITDA	$5M EBITDA	$10M EBITDA	$25M EBITDA
Winter 2011	4.0	5.0	5.0	6.0
Summer 2011	4.5	5.5	5.6	6.0

284 investment banking firms responded to the survey. They reported the following deal multiples of EBITDA paid by financials buyers.

	$1M EBITDA	$5M EBITDA	$10M EBITDA	$15M EBITDA	$25M EBITDA
Manufacturing	4.0	5.0	6.0	5.3	6.0
Technology	5.0	7.0	8.0	9.0	8.0
Health Care	5.0	6.5	6.8	6.0	6.0

Investment bankers were asked if purchasing premiums were present when strategic buyers were involved. Approximately 34% of respondents did not witness any premium paid by strategic buyers, while 48% saw premiums lower than 20%.



50% or more of investment bankers surveyed believed that deal multiples, exit business opportunities, and strategic buyers making deals increased slightly over the previous six month period and would continue to increase slightly in the next 12 months.

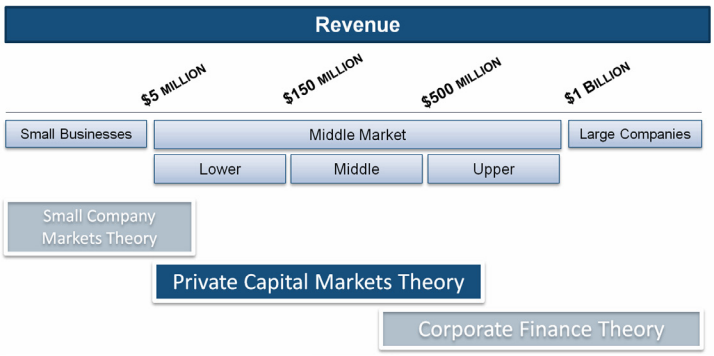
Public and Private Capital Markets are Not Substitutes

Today, public return data is used by appraisers to derive costs of capital for private company valuation. Corporate Finance Theory, grounded in assumptions around a single efficient public market, is also used by appraisers to value private companies - private companies that have no access to public markets and never plan to IPO.

Public companies use a C-Corporation with a goal to maximize profit. Their owners have limited liability, are well diversified, and employ a professional management team. On the contrary, private companies also use an S-Corporation, LLC or other entity. Owners have unlimited liability, are undiversified with typically one primary asset, and are often managing the business.

These fundamental dissimilarities make questionable the application of Corporate Finance Theory to valuing private businesses. They call for the development of new theories and compliance guidelines to predict risk and return, rational market behavior, equilibria, and utility for both small company and private capital markets.

The PCOC model derived from Private Capital Markets Theory applies to private companies with sales from approximately $5 to $500 million.



Private Cost of Capital Model

The Private Cost of Capital model is based on the principal of substitution and mirrors how private capital providers make investment decisions. The relevant market of investors is the market that determines the cost of capital. Discount rates emanate from the return expectations of the relevant capital providers. Referencing the PCOC model below,

$$PCOC = \sum_{i=1}^{N} \left[(CAP_i + SCAP_i) * \frac{MV_i}{\sum_{j=1}^{N} MV_j} \right]$$

Where N = number of sources of capital
MV_i = market value outstanding securities i
CAP_i = median expected return for capital type i
$SCAP_i$ = specific CAP_i risk adjustment for capital type i

the first step in determining the appropriate CAP is to review the credit boxes described in the most current Pepperdine survey. Next, select the appropriate median CAP from the survey results. Then, adjust the survey CAP by $SCAP_i$ to reflect the company specific risk based on a comparison between the subject company and the survey. Use the upper and lower quartile returns as a guide to this adjustment. Determine the market value of each CAP and derive the percentage of the capital structure for each CAP. Finally, add the individual percentages to derive PCOC.

Compliance vs. Relevancy

Contrasting the PCOC model to Capital Asset Pricing Model and Build Up Method, questions around both fundamental theory and compliance arise. How will minority interest discounts be calculated? Is there a need for control premiums and discounts for lack of marketability? How will minority interests be calculated? Are there robust sources of private capital? Do they price risk? Is it possible to learn return expectations of individual private capital providers?

Applying private capital market risk in business valuation can move business valuation more toward market relevancy. According to the survey, 80% of business owners are not generating a return on investment greater than their cost of capital. As opposed to solely documenting business value for compliancy, the PCOC model promises to help business valuation professionals advise business owners in making better investing and financing decisions.

Sources: Slee, Rob and Paglia, John. "Private Cost of Capital Model." The Value Examiner. March / April 2010.; Pepperdine Private Capital Markets Project - Survey Report IV - Summer 2011

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News

Linda Smith Honored as SPIE Member of Distinction

Needham, Massachusetts - July 5, 2011
Ceres Technology Advisors, a corporate finance advisory firm focusing on photonics businesses, is proud to announce the recent election of Linda Smith, Founder and President of Ceres, to SPIE Senior Member.

SPIE is the international society for optics and photonics. SPIE Senior Members are Members of distinction who are honored for their professional experience, their active involvement with the optics community and SPIE, and their significant performance that sets them apart from their peers.

"The annual recognition of Senior Members provides an opportunity for us to acknowledge Members for their outstanding technical contributions and services to SPIE," commented Katarina Svanberg, SPIE President.

As an active member of SPIE, Linda started and served as the Conference Chair and Editor for SPIE's first Lab-on-a-Chip conference. She served as Life Sciences Symposium Chair for Optics East. She authored several papers on modeling fluorescence and phosphorescence applied to in-vivo small animal imaging, solar energy collectors, molecular spectroscopy, and Light Emitting Diodes (LEDs). Linda also served on SPIE's Scholarship Committee. Most recently, she is a course instructor for valuing technology companies and intellectual property.

"Since I began my career in optics, SPIE provided readily accessible venues to engage with customers, explore intellectual interests, connect with thought leaders in technical disciplines far outside of my own, and now share my knowledge of technology commercialization and finance," says Linda. "I am honored with this recognition and encourage others to be active in the society."

About SPIE

SPIE, the international society for optics and photonics, was founded in 1955 to advance light-based technologies. Serving more than 180,000 constituents from 168 countries, the Society advances emerging technologies through interdisciplinary information exchange, continuing education, publications, patent precedent and career and professional growth. SPIE annually organizes and sponsors approximately 25 major technical forums, exhibitions and education programs in North America, Europe, Asia and the South Pacific. **www.spie.org**

NEWSLETTER

We all know people near and dear to us who have battled cancer. Because of the love and superhero efforts of researchers, doctors, fund raisers, patients and their supporters, cancer can be prevented, diagnosed early and curable in our lifetime.

The PMC is the largest contributor to Dana-Farber Cancer Institute and donates 100% of every rider-raised dollar directly to the cause.

Team Dassault rode routes from Sturbridge to Provincetown, MA to raise $500,000 this year.

If you would like to make a donation, please follow this link: http://www.pmc.org/profile/LS0128.

Interested in joining the team as a rider or volunteer? It is an opportunity to channel energy into something much greater than the athletic accomplishment - it is an opportunity to make a real difference in the lives of millions whose lives are touched by cancer.

Thank you for your continued support.

Linda

5,112 riders cross the start line

Team Dassault

Thank You Corporate Sponsors!

Friends and colleagues rallying to support Pan Mass Challenge - raising $500,000 for Dana-Farber Cancer Institute

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