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International Review

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**EXPLORING FOUR
LUCRATIVE
MICRO-NICHES:
ADDITIVE
MANUFACTURING /
CLIMATE CHANGE/
SYNTHETIC BIOLOGY/
DEEP LEARNING**

How As A Firm Leader You Can Harness Innovation

INNOVATION

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Dear Valued Clients and Friends:

As we all look toward 2020 and a brand new decade, I am hopeful that this issue of my *International Review* magazine will contribute to your personal leadership efforts.

Innovation seems to be everywhere these days. We see innovation labs popping up, new innovation roles and job titles, innovation committees and other innovation initiatives. On one level, we should all praise these efforts to actually do something, as opposed to just talking about it. However, most of these efforts and programs seem to fall into the classic "solution in search of a problem" bucket. Truth be told, some of these projects do solve a problem, but the point here is that we may be flirting with the lure of a magic button, that just seems to pull lawyers away from the work that really needs to be done. In the first article in this issue, *How As A Firm Leader You Can Harness Innovation*, I attempt to present 10 decisive actions that you as firm leader need to consider to help navigate this challenging subject.

Similar in nature to a couple of articles in my Spring issue, I'm including here *Exploring Four Lucrative Micro-Niches* where I offer more examples of what I believe are potentially lucrative micro-niche areas of specialized focus – Additive Manufacturing or 3D Printing; Climate Change; Synthetic Biology; and the subject of Deep Learning where I have benefited from my collaboration with Nick Brestoff, a long-time litigator, inventor and the holder of 8 patents in this area, who has a new book, *AI Concepts for Business Applications* that has just been released and worthy of your attention.

Please also have a look at pages 22 and 23 to see examples of what I have been personally working on within just the last 12 months – 4 new books, two of which are over 240 pages in length. And you can download any or all of these at no cost.

In all of this I sincerely hope that you find some usable ideas, tips and techniques that you can put to work immediately. Please send me your observations, critiques, comments and suggestions with respect to any of these articles or my newest books.

Patrick J. McKenna

Editor
(www.patrickmckenna.com)



McKENNA ASSOCIATES INC. Ashridge House
11226 - 60 Street
Edmonton, Canada T5W 3Y8

1.780.428.1052
1.800.921.3343

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HOW AS A FIRM LEADER YOU CAN HARNESS INNOVATION

HERE ARE 10 THINGS THAT YOU AS A FIRM LEADER, INTERESTED IN DEVELOPING YOUR FIRM'S CAPACITY FOR BEING MORE INNOVATIVE, NEED TO KNOW TO TAKE SOME OF THE MYSTERY, AND MISERY, OUT OF INNOVATION.

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EXPLORING FOUR LUCRATIVE MICRO-NICHES:

ADDITIVE MANUFACTURING / CLIMATE CHANGE / SYNTHETIC BIOLOGY / DEEP LEARNING

HERE ARE 4 EXAMPLES OF WHAT I HAVE COME TO CALL MICRO-NICHES - SLIVERS OF LUCRATIVE OPPORTUNITY FOR ATTORNEYS AND PRACTICE GROUPS THAT CARE TO INVEST IN DEVELOPING THEMSELVES AS THE "GO-TO" EXPERTS.



PICK UP THE FIRM BROCHURE OR VISIT THE WEB SITE OF MOST ANY PROFESSIONAL SERVICES FIRM AND YOU WILL SEE SOMEWHERE IN THE CONTENT, “WE ARE ACKNOWLEDGED FOR OUR ABILITY TO FIND NEW, CREATIVE AND INNOVATIVE SOLUTIONS TO SOLVING OUR CLIENT’S PROBLEMS.” AND IN MOST FIRMS THAT STATEMENT IS NEITHER PUFFERY, NOR A CRASS EXAGGERATION.

How As A Firm Leader You Can Harness Innovation

Your leadership challenge becomes one of redirecting some of that innovation that your colleagues just naturally display in solving client problems, to innovation in running the business side of the practice. And why might that be important? In our hyper-competitive marketplace successful strategies are quickly copied by other firms. One need only to look at the evolution of privacy and

cybersecurity services with all kinds of firms jumping into the pool, to evidence a prime example. Without some attention directed toward stimulating ongoing innovations, success can be fleeting.

What that all means is that “innovation” is now being added to the long list of competencies that you as a firm leader are expected to

be conversant with and to eventually master implementing within your firm. You have likely noticed that some firms are creating their own innovation departments and it would even seem that nothing says a law firm is focused on being modern, more than bringing on a C-level professional to aid your efforts – even though such an investment does not absolve the firm leader from their role in owning and championing the initiative.

When compared to the precise management science of something like finance, innovation leadership is an extremely messy affair. One need only observe how it has become fashionable everywhere to host Innovation Jams, Hack-a-thons and Shark Tank competitions; to send folks to design thinking retreats; or to use software to stimulate firm-wide crowdsourcing of ideas. Meanwhile, the explosion of catchphrases is blistering: Lean Start ups; Agile Innovation; Boxes and Whitespaces. These approaches aren't without merit. The rub is that for many highly-disciplined law firm partners, they just don't appeal.

Rather than enhance predictability, innovation as a process embraces uncertainty; and rather than relying on data and knowledge, it requires empathy and insight. To succeed, as the firm's leader you must keep your feet in two places at the same time – executing today's business priorities while also discovering tomorrows. Absent in the small print are instructions on how.

So here are some things that you as a firm leader, interested in developing your firm's capacity for being more innovative, need to know to take some of the mystery, and misery, out of innovation within your firm.

HELPING MAKE INNOVATION HAPPEN

Law firms can innovate successfully, have a

track-record for inspiring innovation, and be rewarded handsomely in the marketplace. Not just that one breakthrough idea, but a continuous stream of innovations; and yet many firms painfully struggle. You need a culture where innovation occurs because of the culture, not in spite of that culture. So what might help your firm become more innovative? Here are 10 decisive actions, which from my experience, are worthy of your serious consideration:

1. *Define Your Innovation Efforts As Your Approach To Solving Problems*

To start, "innovation" or whatever label you prefer to use, is one more tool in your Leader's Toolkit for addressing certain types of problem – and typically, a problem for which no solution is currently available or for which an entirely new approach is warranted. When you define innovation as your approach to problem solving it directs you and your people to begin with asking yourselves a critically important question: *"What is the problem we are trying to solve for which we believe Innovation may provide the solution?"*

From there you can be thoughtful about whether you are addressing a problem that actually matters for your firm; where you are directing your efforts; and whether innovation is actually the best approach to use.

■ **Reset The Barometer For What Your People Think Is Achievable**

Innovation has been something of a side-show in many firms – nice to have and nice to talk about, but not doing much to contribute to really growing the firm's revenues. So, how about this for a problem statement: *"In our firm, we need to have 1/3 of our total revenues, in three years (2022), come from services we do not now provide."* That is precisely the challenges that both

Deloitte & McKinsey have set out to tackle, and from what I understand from friends in both of those firms, they are progressing very well in addressing that challenge!

They know that when you have aspirations that are outlandish, it forces everyone to begin to think differently. When you subscribe to

When you define innovation as your approach to problem solving it directs you and your people to begin with asking yourselves a critically important question: "What is the problem we are trying to solve for which we believe Innovation may provide the solution?"

a stretch goal it provokes the energy to start searching for breakthrough ideas. No one and no firm ever outperforms its aspirations. Whatever your partners think is possible . . . is all they think possible. Our beliefs set the upper limits for what we believe we can achieve. So how might you challenge your firm's future performance?

2. *Invest A Portion Of Your Leadership Time Living In The Future*

All too often, I find that far too many firm leaders are driving toward the future with eyes fixed firmly on their rear-view mirrors.

Consider: the typical firm leader usually does not view his or her role as the locust of new business creation. They most often see their role as the guardian of running the firm's existing practices to meet the firm's budget targets and ensure that all partners are billing to their maximum potential.

Look at the issues that are currently consuming your time. I often ask of managing partners a couple of questions that painfully illuminates where they spend their time. First: *"What proportion of your management time is spent solving problems versus what proportion is spent on exploring new opportunities?"* After a rather awkward reflection period, the answer I will usually elicit is about 80% on solving problems and 20% on exploring opportunities.

I suspect that it is really more like 95% on problems and 5% on opportunities, but let's analyze what this division of time infers. This means that as the firm leader, you are spending 80% of your time and energy looking backwards and fixing things, while only 20% looking forward and creating things. Forgive me being the bearer of some bad news: Firms operating in this mode will never lead in their marketplaces.

So why does this happen? Well, it should be obvious that most professionals are veteran problem solvers. We are trained to resolve the issues, put out the fires, correct the underperformance, and generally "fix" the problem. There is a powerful gravitational pull that unconsciously moves us toward fixing things instead of innovating, toward restoring instead of increasing, and toward reacting rather than being proactive. We need to understand that fixing things, while however noble, simply restores the prior performance or condition, which is comfortable, but limits value. However, if your focus is on improving the condition, on inspiring entrepreneurial

endeavors, on being innovative; then your intent is not on restoring the status quo, but on developing a level of performance that exceeds any previous standards.

There is a follow-up question I will then pose: *"Of the time you spend on exploring opportunities, (remember it was reported to be 20% of the total) how much of that time is directed toward pursuing billable production, winning the next big transaction or responding to a competitor, (the present) versus pursuing the development of entirely new skills, new services, new technologies or new revenue streams (the future)?"*

Again, if I were generous in reporting what I have learned, the average firm leader spends about 60% of their time exploring present opportunities and 40% on future opportunities. That drives a point worth scrutiny: What kind of a future is likely to be created by a firm leader spending about 8% of his or her total management time and energy focused on that future? And this is in firms that have a firm leader who spends ALL of their available time on leadership and management matters. Those who spend less than full-time usually have next to no time for the future, except of course, during that one-day, off-site annual planning retreat. (Is it any wonder why so many of these retreat-generated "strategic plans" are dead on arrival!)

As the firm's leader, attention is your most powerful management tool. So if you want your professionals to focus on innovation, nothing speaks louder about what is of bedrock importance than where and how you choose to spend your time. Where any firm leader spends their time is not a matter of chance. Choices are made daily about what to do and with whom.

Every firm holds numerous meetings, and every meeting has an agenda, whether written or unwritten. The cumulative content of those

agendas clearly signal executive priorities and concerns. The conscious management of your agenda, and your input into meeting agendas, is a powerful signaling device. Most meetings are mere status reports on the present. If you are serious about promoting innovation make sure that each meeting devotes 20% of the time to listening to ideas for improving systems, generating new revenues or developing new services. Also, the things that get your swift and detailed follow-up will always be perceived by your people to be of the highest importance.

Don't burn up your precious time and waste resources looking backward. This is a time for action, not introspection.

3. Help Your People Get Comfortable With Innovation

One of the very natural responses that you may hear from your partners if you should suggest that your firm should focus a bit more time on innovating, a bit more attention to experimenting and being a bit more entrepreneurial, is some variation on: *"We're not comfortable with something we don't truly understand."*

Many of the systems that support innovation may provoke discomfort. The unfamiliar often provokes a negative reaction at first. Research shows that, independent of other factors, the more often people are exposed to something, the more positive they feel about it. So I have often instructed firm leaders that they must first seek to educate, before they seek to change. Here are a couple of things that you can begin to do almost immediately.

- Bring in a regular menu of outside speakers (predominantly from other professions, academics, thought leaders and business entrepreneurs) to attend a monthly partners luncheon (you can easily involve your

various offices by way of video conferencing). Focus your efforts on individuals who are actually taking action to re-shape their own organizations through innovative means. Have them speak to your partners about what specifically they are doing; and equally important, why they are bothering to invest the time in initiating new directions; and what successes they are experiencing.

- Begin your efforts **without** great fanfare (the worst thing that you can do is announce some new program) and make it totally voluntary for partners to attend. *"I happened to be talking recently with this individual and was particularly struck by what she is doing in her firm. So I asked her to join us for lunch. I think you will find it interesting and perhaps of some value to you in your dealing with your own clients."* What you should see after only a couple of luncheons, is some growing interest in why these companies are pursuing innovation, a greater comfort with the concept and the methodologies, and a degree of enthusiasm coming from some of your partners for perhaps trying out some new ideas in your own firm.
- After some initial success with the monthly partner's luncheons you might then consider turning your partner's eyes to new horizons with a "strategic forum" event designed to formally evoke some discussions of the future issues facing your profession. Here is your agenda: *"What are the forces already at work in our profession that have the potential to profoundly transform the way we may be practicing in the next five years?"* Now could you sustain a four-hour discussion some Thursday evening (4:00 to 8:00 p.m. over beer and pizzas) debating the various trends, how they might affect your firm, and what ideas your people might have - not to react to the trend, but to get out in front of the trend so as to capitalize on opportunities?

4. Have Your Leadership Team Stay Alert To Global Trends

Wherever you look across the profession you will see two kinds of firms: stragglers who have fallen behind the change curve and challengers who are more in front of the change curve. The stragglers fail to see the future coming. There is no proprietary data about the future; but there are different levels of understanding of trends and factors that open up possibility. So ask yourself: *"What are the fundamental make-or-break challenges that will determine whether our firm thrives or dives in the years ahead?"*

Innovative leaders work with the members of their executive committees and their elected boards to have those members pay specific attention to the little things, the underappreciated external trends, that are already happening. By way of example, the 10 member elected Board of one AmLaw 100 firm meets for one-day monthly, spending half of the day focused on immediate business issues and the remainder of the day on their near term future.

In my experience there are a few important questions that are worth posing to stimulate your colleagues to zero in on potentially important trends and developments:

- ♦ what are the things that you have read, seen or experienced in the past month that have been surprising, perplexing and/or disconcerting?
- ♦ which of these trends or developments are not yet topics of conversation within our profession or legal media?
- ♦ when you observe the pattern that these trends may be taking, which do you see expanding in scope or accelerating?
- ♦ now if you were to project forward, how do you think these accelerating trends are likely to play out?

- ♦ how might we exploit any of these trends in ways that would work to our advantage?

It is not unusual to see your highly intelligent partners miss spotting disruptive trends as an outcome of three handicaps: because they can not think outside of their current context; because of cognitive biases; or because of personal anxiety – in particular, a fear of any disruption that could possibly devalue their skills. Nevertheless, as the leader of your firm, you have to be tracking trends, (hopefully those your competitors have not yet noticed) and then figuring out ways to capitalize on them.

5. Visit The Places Where Change Happens

Consider as the firm leader: *"How often in the past year have you invested some leadership time in putting yourself into the position where you had the opportunity to see innovation close up?"* Rather than reading about some new development in a business magazine; hearing about a developing technology from some consultant, or getting a warmed-over report from one of your colleagues, why not take the time to experience some innovative initiatives first hand?

Have you shown enough of an interest to visit one of your corporate client's formal innovation labs? How about doing a tour of a tech start-up business accelerator? Have you considered spending an afternoon hanging out at the University talking to some of the professors about their leading edge work in artificial intelligence and deep learning? Have you ever had a 'what-do-you-care-about' conversation with one of the senior researchers in your State's Economic Development Department?

It's easy to discount secondhand data but far harder to ignore what you have learned and experienced for yourself. As the rate of change

continually increases, so must the personal energy that you as a firm leader devote to understanding those changes.

Why not set up an appointment to talk to prospective clients who are not using your firm's services, especially those who seem to be the

pany I'm familiar with has required a broad-based effort over several years. Here are a few of the changes they initiated that seemed to make a significant difference and could be emulated in some form within your own firm:

- ♦ the appointment of vice-presidents of innovation at both the global and regional levels;
- ♦ the creation of cross-functional "innovation teams" in each region engaged in the search for breakthrough ideas;
- ♦ the creation of innovation boards in each major business unit made up of senior people who met monthly to review ideas and projects; set goals, allocate resources and oversee the continuing innovation process;
- ♦ a dedicated IT platform that expedites the spread of new ideas across the company, featuring an online idea bank designed to make it easy for ANY employee to share their ideas;
- ♦ the creation of a group of "innovation champions" in every part of the company who are there to guide, mentor, and assist in the execution of ideas and projects;
- ♦ the organization of communication events called "Innovation Days" where teams can showcase their ideas to others in the company;
- ♦ an annual event devoted to recognizing and celebrating the work of innovators and the various projects that are underway;
- ♦ the creation of a comprehensive set of metrics to continually measure the company's innovation performance; and
- ♦ a dashboard that showed how many ideas were being produced, which parts of the company they were coming from, how fast they were progressing through the pipeline, when they were likely going to be commercialized, and what the future value of each project was expected to be.

Meanwhile in our profession, signs of strategy decay become painfully obvious as we witness firm leaders all reading from the same industry

publications, going to the same legal conferences, and hearing from the same consultants.

6. Reach Out For New Voices

Perhaps the tallest hurdle your leadership must clear in pursuing innovation is to abandon the tightly controlled cliques that dominate most strategic thinking that purportedly takes place on behalf of the firm.

All too often, strategy discussions in large firms have the same 10 partners talking to the same 10 partners for the fifth year in a row. Any hint of innovative strategy died when you know that they can finish each other's sentences. Where in large firms are you going to find the least "cognitive diversity" - usually with people who have most of their emotional equity invested in the past. In many firms, the innovation bottleneck is all too often at the top of the bottle. Without new voices - different ages, different industry experiences, entirely different professions, newcomers, those from the far-flung edges of your firm, you won't hear new ideas.

Consider the approach taken by Deloitte Consulting who believes that you should create an internal competition for ideas and involve the collective brain of the entire firm. Deloitte sponsors contests among all of their professionals for the wildest innovations. They propose: why not offer a cash incentive and allow our people to eagerly compete for a chance to have their personal vision impact the firm's future? One of their more recent events was reported to have stimulated over 176 ideas competing for a \$10,000 cash prize.

■ Call Upon Your Younger Voices

There are a number of areas in any firm where you can hear from new voices. There is the younger practitioner who has grown up in a

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more progressive, demanding type. Go out for drinks with a small group of firm leaders from other professions. Establish an internal committee whose members are, on average, 20 years younger than your real executive committee and give this group the chance to review some of the firm's various activities, decisions, and then present their views directly to your Board.

■ Observe First-Hand What Some Of Your Corporate Clients Are Doing.

Instilling innovation at one Fortune 500 com-

different time with different skills and seemingly different values. We need to recognize that organizational aging encumbers innovation. Your firm's response to embracing innovation changes both as the firm ages and as your senior power partners age. As any firm matures and achieves some measure of success, it unfortunately loses much of its appetite for being entrepreneurial; able to quickly respond to market opportunities, pioneer new service offerings, or initiate change.

Jeff Popova-Clark from PwC posed these questions: How old was Einstein when he revolutionised physics with his special theory of relativity? How old was Isaac Newton when he developed calculus? Darwin, when he conceived of evolution? Picasso, when he added a whole new dimension to the visual arts through cubism? What about Shakespeare when he penned Romeo and Juliet? Karl Marx, when he released his Communist Manifesto? Mozart, when he composed Don Giovanni? Maxwell, when he deduced the relationship between electricity and magnetism? Slightly more timely, how old was Henry Ford by the time he built and sold his first car, Bill Gates when he co-founded Microsoft, Anita Roddick when she set up The Body Shop, or Jeff Bezos by the time he launched amazon.com? No one on these lists were older than 33!

Jeff's proposition (which deserves some serious attention and is painful for even me to contemplate) is how surprisingly hard it is to find any disruptive ideas and creations originating from people older than 35, and how some of the most original, icon-smashing, and valuable ideas have and are being developed by individuals still in their twenties and early thirties. So, how many professionals between the ages of 25 to 35 have you purposely asked to formally participate in the creation of your firm's strategy? And, how likely is it that your firm possess at

least one Picasso, Roderick, or Gates?

In one particular client firm working on their strategic plan, the leadership initiated what they came to call their "2022-25/40 Initiative." In an effort to encourage foresight they called upon all of the lawyers in the firm between the ages of 25 and 40 years of age to volunteer for a project. They then asked the assembled volunteers if they would divide into separate task forces with each tackling the same project.

The project was *"to formulate a written scenario of what the legal profession might look like in the year 2022"*. They would then collectively examine the various scenarios and what implications they might present for the kinds of proactive actions that the firm would need to initiate to get out ahead of the future. I had the honor of participating in the meeting where the three task forces came in to each present their scenarios to the firm's leadership committee. It is no exaggeration to report that these senior partners were blown away!

We need to acknowledge great ideas, no matter where they come from – for example, last summer a young associate, practicing employment and labor law, inspired the leadership at the McNees Wallace firm to announce the launch of their esports practice group. For the uninformed, esports law is an amalgamation of multiple disciplines – labor and employment, contracts, endorsements, sponsorships, gaming, intellectual property and all the things that come with those arrangements. Potential clients are likely to include individual gamers, but also the game publishers, organizations building potential leagues, sports competition venues, media, entertainment, and advertising companies, and let's not forget potential investors and private equities.

When developing innovation, ensure that you include a healthy representation of younger,

newer, and less-experienced professionals in the process. Then you need to create the environment in which these people will feel comfortable expressing and developing their ideas. Placing a token younger professional in a room full of senior partners will not, by itself, ensure that a fresh perspective has been injected into discussions.

■ Hear The Voices Of New Hires

Some of the very best ideas can come from your newest professionals (partner or associate; new hire or lateral). One firm has a specific program called "Fresh Eyes" to tap into that insight. With this program the new hire or lateral gets to give the firm a formal performance review following the first 30 days of his or her tenure. While impressions remain fresh, the professional is called into a meeting with the managing partner to provide a candid review of their initial experiences and ask the hard questions like *"why in the world do you do certain things the way you do; why haven't you done it this way?"*

■ Include The Voices Of Business Experts From Outside Your Firm

When considering how an individual can add value, do not be concerned with how many years of experience they have within your particular firm. Instead, determine if they bring experience from a wide variety of backgrounds, industries, and perspectives. You are not necessarily going to benefit from having a carbon copy of your current management team. Experience can result in less flexibility, greater investment in and protection of established ways of doing things, and less reflection on and questioning of why things are done in certain ways.

In 2017, accounting and consultancy firm PriceWaterhouseCoopers ("PwC") announced

the appointment of two 'outsiders' to its Board. According to PwC Governance Insights Center Leader and partner Paula Loop, *"diversity and addressing the risk of 'group think' were prominent in the PwC decision."* Meanwhile, Grant Thornton LLP, another leading accounting and advisory firm, reports that for the past 5 years, it has included two independent (external) directors on their partnership board. Grant Thornton's external directors serve up to two, three-year terms. So are the practices evident by these leading accounting firms with respect to good governance and innovative thinking not also applicable to law firms?

When thinking of new voices there is also the partner residing in a remote or smaller office, or practicing in a fringe specialty area who sees the entire profession somewhat differently from your typical partner; and there is the occasionally disruptive partner who just sees the world from a different mind-set. All are capable of making a valuable contribution to your firm's quest for innovation – if you care to reach out to them.

7. Take Your Cue From Your Clients

Firms truly devoted to innovation must reach far outside the inner sanctum of their management committees — and sometimes the firm — to even call upon clients, for their fresh insights. Profound client insights come from a cocktail of unexpected problems, novel experiences, random communications and newly discovered facts.

Go into the field, interview clients and where possible, videotape those client's responses – and then find the appropriate time and venue (perhaps a retreat or town hall meeting) to show the interview to all of your attorneys. As the firm leader you can present your views, you can even call in some brain-dead consultant to

address your partners . . . but when they hear directly from clients, they actually start to listen.

In one Pennsylvania-based advisory firm the impetus for the development of it's fastest growing national practice didn't originate from the thinking of any of its professionals. It was actually inspired by the firm's Advisory Board composed of outside business people charged with providing a fresh perspective to helping the firm develop and target its service offerings more effectively. The firm maintains a 12-member advisory board that meets every two months. It includes four clients, four referral sources, and four non-clients. According to their managing director, *"We want to put our resources into developing one or two new products each year that clients really want and the advisory panel has proved incredibly valuable to us, both as an idea-generator and focus group."*

How many law firms actually have Advisory Boards or some formal mechanism for directly involving clients in helping them conceptualize and develop new services that the client might value? All too often, we forgo ever bothering to actually involve clients, or to even pay attention to what their evolving needs might be. It is not efficiency that produces new wealth but insight – insight into opportunities; insight into pockets of emerging demand. A firm that gets an early start in accumulating knowledge and experience serving some micro-niche of client need, and then continues to learn faster than rivals, can build an almost insurmountable lead – irrespective of size.

■ Completely Redefine How You Serve Client's Needs

Too many firms define themselves by what the lawyers do rather than by what the client needs. Imagine if the problem statement you were to put forward as a challenge to your col-

leagues stated: *"How do we redefine the services we provide our clients from simply 'solving legal problems' to offering more of a 'total turnkey solution' for their business needs?"*

One firm I know advanced just such an innovative challenge – which then stimulated some entirely different strategies and structures. While everyone is busy chasing lateral attorneys as their speculative ticket to growth, this particular West Coast law firm has been flying under the radar for some seven years, with little media attention, growing their "subsidiary" practice group to 160 professionals with \$110 million in revenues. Notice that I used the label "professionals" because their practice group is actually a multi-disciplinary collection of 90 lawyers and 70 consultants, all treated equally including the compensation system they use internally to reward performance.

There are obviously many opportunities to innovate and leapfrog competitors by simply collaborating with and being sensitive to the (often unspoken) needs of your clients.

8. Steal The Best Ideas From Other Professions

Innovation isn't always about invention; often it is about stealing great ideas from others. You can't buy your innovation "off-the-shelf, from the same tired old consulting companies your competitors are using. The act of employing consultants to teach you "best practices" is no more useful than providing life-support for brain-dead lateral recruitment strategies.

One of the principles that I have learned about innovation is that it is often the product of someone spotting an old idea that can be used in new places, in new ways, and in new combinations. Taking an idea that is commonplace in one business or profession and moving it into a

context that isn't common, can spark entirely new approaches – if you are paying attention!

Thus as the firm leader, if you want to enhance innovation within your firm, one way is to initiate an internal committee of interested professionals to monitor all new developments and trends going on throughout . . . OTHER professions. Or, have your administration staff monitor the industry and news media, and provide a summary of clippings that highlight the business activities, emerging issues, and new innovations being promoted by firms in related professions.

For example, at Ernst & Young, they hold formal and frequent brainstorming meetings with a collection of academics, clients, and researchers to identify important issues and opportunities – with a specific objective of identifying issues three to five years **before** they appear on the radar screens of most everybody else.

If a systematic emphasis on growth and innovation offers any meaningful payoff, why don't more firms try it? The overarching challenge in most firms is that no one is clearly responsible for innovation leadership. It is unlikely that any firm can initiate and maintain an innovation strategy without dedicated, well-positioned leadership. Some firms may actually need their firm leader to appoint an innovation czar with the authority to shoo off complainers and obstructionists who over-analyze and pick breakthrough projects to death.

One further consideration: In a separate study involving extensive interviews with the Fortune 1000, it was discovered that these companies are using an average of 22.8 different professional services firms of all types (lawyers, accountants, actuarial advisors, consultants, public relations strategists, financial analysts, investment bankers, etc.) The significance

of that is that you likely think that clients are comparing you against some other firm in your profession – wrong! Survey Says: Your firm is being measured against all kinds of other professional firms with respect to the value-added, delivery and client servicing aspects of what you provide. Know this: Whoever you think your competitors are, they aren't.

I mention this because the subject of “innovation” is appearing in more and more RFP invitations as Corporate Clients themselves are seriously embracing the practice and are looking to see what kind of a commitment and what serious steps your firm can show evidence that you are taking.

9. *Champion Your Intrapreneurs*

Innovations don't always come about because of some direction, intervention, or incentive provided by you or your management committees. They often come about as the result of what Peter Drucker, the father of modern management, first expressed as, “*having a mono-maniac with a mission!*”

There is an incredibly valuable lesson here. If you want to have rule-breaking, wealth creating new ideas come to the forefront in your firm, then you definitely need to identify, nurture and champion those professionals, chomping-at-the-bit to try new ways of doing things. I am absolutely convinced that the maniacs exist, the innovative ideas exist. What is missing is the internal champions.

It is also the reason that I have long advocated to firm leaders that you must view your practice groups as your basic building blocks for constructing your firm's innovation strategy. It is only when you begin to explore “hidden assets” at the practice group level that these opportunities emerge.

■ Consider Fostering Angel Investors

The year was 2014 and I was working with a major Chicago-based AmLaw 100 firm. During my engagement I came into contact with a couple of young partners who were passionate about starting a cybersecurity practice as they perceived the future unfolding. Their only problem . . . they could not get anyone on the firm's executive committee to sponsor their effort, as no one seemed to think that developing a practice in this particular micro-niche could be monetized. 20/20 hindsight really can provide valuable lessons!

Now, imagine that each of your Office Heads and/or Practice Group Leaders could occasionally play the role of angel investor in providing seed funding for ideas aimed at producing new revenue for a particular office or practice group. What if each of those unit leaders, who managed a unit budget were allowed to invest 1% or 3% or 5% of that budget on innovative strategy experiments? Perhaps an Office Head and a particular Practice Leader could form a syndicate to take on a slightly bigger opportunity. Then to the extent that a portfolio produced a positive return in terms of new revenues or even a significant costs savings, a small bonus could go back to those who had provided the investment and served as sponsors. Thus liberated capital could flow to the most intriguing possibilities unfettered by some Senior Partner's protectionist proclivities.

Is there any possibility that such an unorthodox initiative would result in a return on investment for your firm?

■ Rethink Some Of The Assumptions About How You Operate

Every partner carries around in his or her head a set of built-in assumptions, biases, and pre-

suppositions about what clients want or don't want, who the competition is or isn't, and what services we should offer or not, and how he or she should conduct their individual practice. We are all, to some degree or another, prisoners of our past experiences. Nowhere is that more pronounced than in our professional's individual quests to maximize billable production.

In countless sessions that I have conducted with the members of various practice groups in various firms around the country, I have often had the occasion to pose to partners this question for them to brainstorm their innovative answers for: *"How might we find ways of doing our kinds of work, that would incur less cost to us?"*

Now, notice we are separating this from how you bill your client. That is not the issue. The issue is, that with the type of work, deals and transactions that we do, is there a bit of this that's could in fact be done at a lower cost to us.

Now the reason for posing this question should be fairly obvious in that if you can find ways to do something at a lower cost to you, you can either pass the savings on to clients and get hired more often, or you could use the money to increase partner profits.

Unfortunately the very worst reaction is the one that I so often see. After going through this discussion and even after having identified some very viable options for doing some part of the transaction at a lower cost, a number of the partners will immediately conclude that there is absolutely no incentive for any of them to take action.

"Why would we want to do that?" they'll say. *"That's just going to reduce the number of hours that I'll be able to bill the client."* We tend not to explore 'more cost effective ways of getting any particular task done' because we

tend to think only of today.

Look at what Wilson Sonsini has just done to portray themselves as the premier privacy firm in the country. Wilson Sonsini made more than \$100,000 in sales during its first week offering subscriptions to an app that helps companies comply with California's new privacy law. While the firm's lawyers, on average, generated \$1.1 million in revenue last year, Kimball Parker from the firm, said he expects the app will generate millions in revenue as companies scramble to comply with the CCPA by a January 2020 deadline. The cloud-based app, sold by a Wilson Sonsini software development subsidiary, is an example of this law firms' nascent interest in selling subscription-style legal services via an online platform – thereby delivering documents and legal advice straight to clients without a lawyer directly involved. So while competitors were saying, "why would we want to invest non-billable hours developing a resource that then only serves to decrease our billable hours?" And asking, "who's going to compensate me for the lost hours that I spend developing this resource?" Wilson Sonsini has disrupted these firms and is now making money while they sleep,

To explore innovation we need to get on the path of asking questions that challenge the way in which we have been operating - regularly - as part of the way we run our business.

■ Consider Packaging Your Intellectual Knowledge

Building on the Wilson Sonsini example, perhaps you might pose this question to your partners as your innovation challenge: *"Some firms have packaged their intellectual knowledge into a viable commercial product, while others have created subsidiary operations to provide and market services ancillary to their basic legal*

services. Do you have any ideas on what we could do in either of these areas?"

If you were to pose this question, I'm betting that you will likely elicit a pleasant surprise. From my experience, in most cases somewhere between 14 to 22% of your partners have a potentially viable idea in this regard that they have been pondering. Now, is it likely that any of the ideas that these partners have in mind, are of any commercial significance, with the slightest potential for being revenue generating and of value to clients? Absolutely.

Have any of these partners been among those chosen in the past to sit on your firm's core strategy committee? Not usually. Have any of these ideas been mentioned to you as the firm leader, or indeed to anyone on the management committee for serious consideration? Not Likely.

Does anyone see a problem with this picture? One wonders . . . any opportunities possibly exist in your firm for professionals to package what they do for clients, thereby developing an entirely different and profitable redefinition of leverage?

10. *De-risk The Act Of Exploring Unfamiliar Opportunities*

I'm told that an average-sized Silicon Valley Venture Capital firm receives as many as 5000 unsolicited business plans a year. So as a firm leader, how many unsolicited business plans did your Executive Committee get this past year? We need to find the means to let our lawyers imagine entirely new services / industries that do not yet exist; give them birth – then test and tweak their ideas at a speed that leaves competitors in the dust. In order to accomplish that we need to begin with **limited-risk experiments**.

In grade school they teach you that the word experiment and the word experience are derived from the same Latin verb, *experiri* - to try. You try out your ideas in the hope of success, and whether they succeed or not, what happens next creates your experience.

Your best hope of success lies in having numerous projects percolating at once. This ups the odds of one of them boiling over. As Linus Pauling, the Nobel winning chemist once said, "the way to have lots of good ideas is to have lots of ideas and throw away the bad ones." Early successes breed optimism, the enthusiasm to do more and the commitment to try again.

Set up small, relatively inexpensive, minimal-risk, and short-term experiments. Anything beyond six months takes you into the realm of pipe dreaming. Too many things can go wrong. If you have an action plan pushing beyond the six-month limit, break it down into smaller tasks that fit into shorter time frames. This way your firm is continuously knocking down fresh goals and objectives, experiencing success, staying on track, moving quickly, and raising overall motivation to continue.

Small wins breed success and compel us down the path. Field tests, pilot projects, trial balloons, trying something new in a contained environment, and selecting one site or program to experiment with, are all ways to facilitate the innovation process.

■ **Celebrate the individual or team that leads an expedition into the unknown**

Many firms have created innovation ghettos – incubators, business development initiatives and skunk works to pursue ideas. These efforts, often cut off from enabling resources, produce little in the way of new revenue streams and many simply wither away. To institutionalize

your innovation efforts you need to establish a set of measures – an innovation dashboard – from which your Board or executive committee can track the number of ideas moving through the pipeline; the percentage of those ideas that are truly new; and the potential financial impact of each one.

You want to have a transparent process for continually generating, launching and tracking novel strategy experiments in the areas of new services, service delivery, improved efficiencies, and enhanced client service. And then MOST IMPORTANTLY, making the time to celebrate your achievements, no matter how small they may initially seem to be.

WHY NOW?

The world around us has changed. You'll need to find new ways to extract value. New ways to build markets. New ways to organize and execute. You have to be smarter. More agile; more inventive. That's what strategic innovation is all about. You need to help your partners see their practice in ways that can reveal new opportunities. You need to help them see and uncover the hidden costs of standing still. You need to hone your understanding of the real risks and rewards of your current strategy. In a climate like this one, the most important step you can take to ensure your prosperity is to reenergize your thinking.

As firm leader, harnessing Innovation isn't merely a set of tools or techniques; it's about creating a firm-wide mindset. As the firm's leader, you need to become a "venture catalyst".

Understand that Innovation isn't about putting out fires or fixing yesterday's shortcomings; it's about blazing new trails and preparing for a new tomorrow. Albert Einstein once noted, "You cannot solve the problem with the same

kind of thinking that created the problem."

Innovation isn't about developing detailed and inflexible planning documents; it's about creating a compelling challenge capable of inspiring people. Most plans are a little bit too much like quicksand, eliciting a degree of rigidity that impedes a firm's ability to explore an ever-changing world. Few things capture people's excitement more than being part of a vibrant entity and exploring new revenue producing possibilities.

Innovation isn't about improving incrementally; it's about daring to pursue strategic breakthroughs.

In a competitive marketplace where there are no time-outs and no commercial breaks, if you are content with being a follower, you will always be eating someone else's dust. The pace of change will suck the air right out of your lungs. The classic saying "Lead, follow, or get out of the way" is being replaced with the reality that you either lead or get blown out of the way. In these highly competitive times, there is little room for firms that simply follow.

Ultimately, we need an approach to innovation that causes us to reach for the highest and best in ourselves, our leadership and our firms!

Join me at the Harvard Club in Boston on November 13 & 14 where I will be co-chairing the 2nd annual Law Firm Innovation Summit with over 30 speakers from a broad range of law firms and legal experts. <https://www.lawfirminnovationsummit.com>

Exploring Four Lucrative Micro-Niches:



Additive Manufacturing

Climate Change



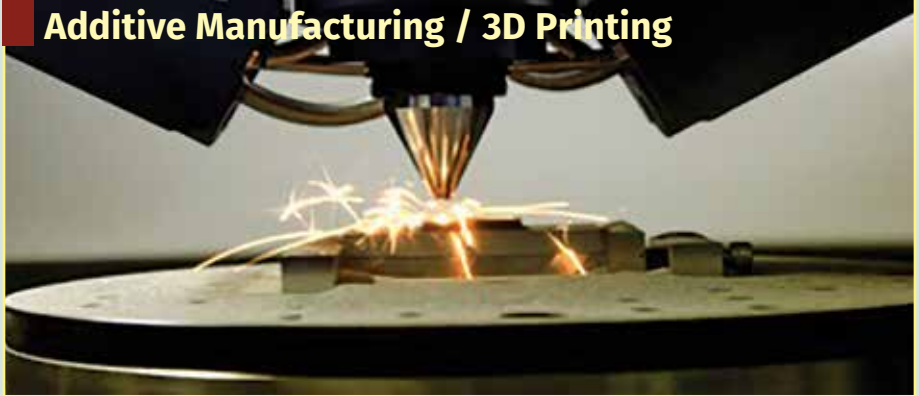
Synthetic Biology



Deep Learning

1

Additive Manufacturing / 3D Printing



This article illuminates a number of areas that I have come to call micro-niches - slivers of lucrative opportunity for attorneys and practice groups that care to invest in developing themselves as the "go-to" experts.

Hints of new emerging areas of opportunity are usually discernable years before they enter the mainstream. For example, The Center for Internet and Society at Stanford Law School hosted one of the first seminars on 3D Printing, entitled "Is The Law Ready For The Future?" That event occurred back in May of 2013. Fast forward six years and one can only identify a few law firms that have targeted this area of opportunity. Robins Kaplan lists two attorneys in their 3D Printing Practice mainly focused on IP and business disputes; while Ice Miller identifies seven in their Additive Manufacturing/3D Printing group who "serve as advisors and counselors to 3D printing think-tanks" and claim to "also own and use 3D printers."

When one hears the term 3D printing, it is just natural to think of it as a way to produce a small plastic desk accessory or toy you might pick up in a gift shop. But 3D printing is instead, part of a broader range of revolutionary technologies known as additive manufacturing (AM). 3D printing is a process where a physical object is created from a digital blueprint of something that's "sliced" into thin horizontal layers

and uploaded to a printer. This mode of printing refers to any kind of production in which materials are *built up* to create a product rather than cut, ground, drilled or otherwise *reduced* into shape. Initially 3D printing was merely 2D printing of layers of material, repeated over and over until a object came to fruition. Today, new methods are being developed that are far more sophisticated and powerful.

AM is now being adapted to a stunning array of different materials that will dramatically disrupt the future of manufacturing and at least 25 other different industries that I've been monitoring. AM is currently impacting architecture and construction; pharmaceuticals; automotive; packaging; firearms; drones; space tech; agriculture; consumer electronics; and the entertainment industry among others. Current 3D printers can produce functional part- and full-color objects from over 250 different materials, including metals, plastics, ceramics, glass, rubber, leather, stem cells, and even chocolate. And the next time you visit London, do check out Food Ink (<http://foodink.io> - which is called the most futuristic gourmet experience in the

known universe), a restaurant where they have 3D printed the tables, the chairs, the eating utensils and even the food!

3D is one more example of what I have come to call a “tech-driven hybrid” in that it does not simply represent a substantive area of law (like intellectual property) or a specific industry (like manufacturing) but rather has potential applications across a wide range of the kinds of clients you are serving. So to simply say that you aspire to be your client’s “trusted advisor” rings hollow, should they ask you what you know about additive manufacturing and all you can muster is a shrug of your shoulders. Alternatively for those who care to explore this as a micro-niche to specialize in, the opportunities are beyond description.

3D printing has emerged from a hobby to an industrial-scale technology that is beginning an exponential growth curve. In 2015, the additive manufacturing industry grew to about \$5.2 billion according to Forbes and by 2021, IDC analysts expect 3D printing’s global spend to be about \$20 Billion. With newly accessible design software, we can customize anatomy-conforming stents, personalized dentistry products, adapted airplane and auto parts, or microscale fabrication products such as sensors, drug delivery technologies, and lab-on-a-chip applications.

Here are a few more different examples:

- 3D printing has expanded rapidly with one of its most notable areas of application being the health and medical industry. Research firm *Markets and Markets* are projecting that the use of 3D printing applications within healthcare will have a value of \$2.1 billion by next year. Innovations include printing everything from medications to human organs, but perhaps the most commercially successful

so far has been prosthetics. Stryker Orthopaedics, a Kalamazoo-based company, is potentially important to the hundreds of thousands of Americans seeking a knee or hip replacement. With annual revenues of \$10 billion it is responsible for building titanium components for joint implants designed to precisely fit the bone structure and musculature of any individual. And many of these orthopedic implants are custom-manufactured by Stryker using 3D printers. The company is now planning specially programmed 3D printers that will create its custom implants right on the premises while the surgeons and patients wait, saving time and money.

- It has been reported that Lockheed Martin is applying 3D printing to aviation, having produced a new composite material that can be used to produce ultra-light, ultra-strong bodies for its F-35 fighter jets. While the F-35 is over 50 feet long and weighs over 12 tons, Lockheed builds the jet’s body and interior panels via an array of printers mounted and moving up and down, and sideways on scaffolds of metal tubes. According to Lawrence Gasman, president of Charlottesville, VA-based industry analyst SmartTech Publishing, “there are no big aerospace companies that do not use 3D printing for major parts in their aircrafts.”

- U.K.-based startup Orbex recently produced what they believe is the world’s largest 3D printed rocket engine, standing at 56 feet (17 meters) tall; roughly one-fourth the size of SpaceX’s Falcon 9. The engine is manufactured in a single piece without joints, creating a rocket that is up to 30% lighter and 20% more efficient and better able to withstand extreme temperature and pressure fluctuations. Orbex is working with engineers from NASA and the ESA, and also partnered with Swiss satellite startup Astrocast to launch 64 nano-satellites to

build a global Internet of Things network.

- One company that made headlines at the 2014 International Manufacturing Technology Show in Chicago was Local Motors, when in front of a live audience they produced the world’s first 3D-printed car – the Strati. I should note that about 75% of the Strati’s components were 3D printed. Items such as the rubber tires, brakes, battery and electric engine were manufactured using conventional methods. The Strati took about 44 hours to fully print and consisted of 50 individual parts – compared to some 30,000 in a traditionally built car. Depending on the features one might select your new 3D printed vehicle retails for between \$18 and 30K.

- Recently, Austin-based ICON unveiled its new “Vulcan II” 3D printer that can print up to a 2,000 square foot house quickly at half the cost. ICON has created proprietary concrete/mortar material which it calls “Lavacrete” that has passed every structural test; is safe for people and resilient to the varieties of conditions it may encounter. The company aims to make homes at a cost of up to \$125 a square foot. Their 3D printing has the ability to cut costs of homebuilding by 30-50 percent compared to traditional construction methods. Time Magazine named ICON one of the best inventions of 2018, while Popular Science named ICON one of the 100 Greatest Innovations of 2018. Meanwhile, the tools and processes are progressing rapidly. Dubai is aiming for a quarter of its new buildings to be based on 3D-printing technology by 2030.

- Personalized footwear is an excellent test case for the production capabilities of 3D printing. A good shoe must be tough and durable, yet flexible and lightweight, and meet your expectations for support and comfort. Imagine shoes custom-fitted to each of your feet, with the style tailored

exactly to your taste. Adidas is showcasing a glimpse of the future of personalized footwear at its pop-up Speedfactory Lab Experience in Brooklyn, NY. The Speedfactory has a souped-up treadmill with data acquisition equipment to provide real-time analysis of a customer's running strides. At the store, Adidas employees acquire information about how you run that would generally be used to help select your optimal running shoe style. Adidas can then use this data to design the perfect running shoe for you.

- Consider the new 4G smartphones. In order to transmit signals at the higher frequency bands manufacturers will likely require a shift from aluminum bodies to stainless steel. Because it's stronger than aluminum, less is needed. And that means less interference and more room for the battery. But here's the challenge. Switching the material from aluminum to steel takes 10 times as long to machine, because the steel is so much stronger than aluminum, it's hard to cut. Enter Desktop Metal with a 3D metal-printing system that could be competitive with traditional manufacturing in this situation. The Burlington-based company uses a jet of metal powder and an oven to fuse the printed metal. The system boasts what the company is billing as the fastest metal 3D printer in the world, at 12,000 cubic centimeters of printed output per hour—100 times as fast as older, laser-based 3D metal-printing techniques.

- And finally, there is Jabil Inc. Jabil is a Florida-based company with over 100 production facilities in 28 different countries. Jabil, now the third largest contract manufacturer prints thousands of machined parts for companies in industries from consumer electronics to aerospace; pharmaceuticals to home appliances.

3D printing has seen impressive adoption

rates across the manufacturing industry, but suffered slow printing speeds. However, earlier this year, researchers at the University of Michigan developed a new 3D printing method that can produce complex shapes at up to *100 times* the speed of traditional 3D printers. And using synthetic liquid resin and CT-like scanning technologies, scientists at the University of California, Berkeley have developed a 3D printer that can produce replicas of nearly any scanned object in record time. Both innovations, capable of printing with a number of new resins, prove the technology has tremendous potential to commercialize high-speed and high-resolution additive manufacturing.

Additive Manufacturing is poised to revolutionize the global economy in ways that most experts are failing to grasp. What makes AM so revolutionary is that:

- it builds a product in a precise shape as dictated by a sophisticated software program;
- is easy to make the item fully customized to the needs of any particular user;
- dramatically reduces material waste, energy consumption, and market inefficiencies;
- it can mass-produce goods with quality and speed; and
- any future 3D manufacturing "factory" no longer needs to be a giant plant built over some protracted period of time, at a cost of hundreds of millions of dollars, but rather a small warehouse containing a few printing systems quick to set up, and easy to disassemble and move if and when needed.

An innovation once considered a gimmick is proving itself to be a formidable giant. One of the leading experts in AM is Avi Reichental, former CEO of 3D Systems, the largest publicly traded 3D printing company in the world and part of the core faculty at Singularity University, where I am a member of their online global network. Within the next five years Avi predicts that:

- 50% of all manufacturing companies will

have 3D printing operations in production;

- 40% of all medical surgeons will practice with 3D models; and
- 50% of all consumer businesses will have revenue-bearing 3D printing operations.

AM represents the complete digital transformation of the manufacturing process (you may want to access an earlier article I wrote on Digital Transformation) giving traditional manufacturers vastly greater flexibility, speed, efficiency and responsiveness – and AM developments can be found all across America. For example, General Electric's former CEO Jeff Immelt was determined for the company to be a major player. Today, in Westchester Ohio, GE has 130k square-foot facility with 70 industrial additive printers producing a steady white-noise hum; while in Pittsburgh, 50 engineers clad in a strange mix of steel-toed boots and protective suits work intently producing state-of-the-art components. It seems rather ironic that a company like GE is building their billion dollar business in old steel towns like Cincinnati and Pittsburgh – the very cities AM is most poised to disrupt.

From helping companies open additive manufacturing facilities, protect their intellectual property, forge partnerships with AM companies, invest in start-ups that own promising new technologies, defend potential product liability issues, understand and comply with government regulations (e.g. FAA and FDA), to hiring and retaining talent with a deep understanding of these new methodologies, there are lots of opportunities for those attorneys who choose to focus on this micro-niche.

For those looking for even more information, you might check out the Association of 3D Printing (<http://associationof3d-printing.com/about-us>) a "conglomeration of executives who saw the need for the industry to have its own voice" where, as of the last

time I checked, there were a grand total of NO lawyers listed amongst their over 150 member firms.

2 Climate Change



In 2016, the nations of the world created the Paris Agreement, an international call to action in the battle against a rapidly changing climate. It outlined limits to greenhouse gas emissions and other major changes to economies and infrastructure—the kinds of things that might be inconvenient but worth doing when the alternative is widespread climate catastrophe. Nearly every country in the world signed the agreement. But today, nearly every country in the world is falling short of its commitments—and the science behind those commitments is getting scarier.

In a related development, some of the largest oil and gas companies now find themselves defending legal suits over their industry's role in this same climate threat. This wave of legal challenges washing over the industry, demanding accountability for climate change, started as a ripple after revelations that ExxonMobil had long recognized the threat fossil fuels pose to the world. Now at least 14 US cities, five counties, one state and a group of children are suing some of the these companies for selling products that contribute to global warming while misleading the public (reminiscent of tobacco litigation) about their harms. Most of these cases are still undergoing pretrial legal motions; while lawsuits brought by

the cities of Oakland and San Francisco had been dismissed, but are currently being appealed.

The "group of children" consisted of 21 young people, including two University of Oregon students all between the ages of 8 and 19, seeking to compel the government to take more aggressive steps to reduce carbon dioxide emissions. They are arguing, in this high profile climate rights case, that their constitutional rights have been violated because federal agencies have failed to protect "essential public trust resources." They allege that the government created a national energy system that is doing long-term damage to the environment, imperiling their futures. According to Paul Sabin, a professor at Yale, "this is only the beginning."

With a flurry of lawsuits starting to be filed across so many jurisdictions, the likelihood of climate cases getting to a trial grows. According to Rhode Island Attorney General Peter Kilmartin, "Big oil knew for decades that greenhouse gas pollution from their operations and their products were having a significant and detrimental impact on the earth's climate. Instead of working to reduce that harm, these companies chose to conceal the dangers, undermine public support for greenhouse gas regulation, and engage in massive campaigns to promote the ever-increasing use of their products and ever-increasing revenues in their pockets." Kilmartin has announced that his state is suing companies like Exxon Mobil, Chevron, BP, and Royal Dutch Shell.

The argument in most of these cases is that these oil and gas companies have known for decades that their products release greenhouse gases that warm the planet (but hid the information), which in turn harms the public with rising seas encroaching on shoreline properties and drier weather increasing wildfire risks for homes. At the same time, the plaintiffs say, coal miners and oil drillers obfuscated their products' impact on the environment despite their own internal research showing that carbon dioxide from burning fossil fuels is warming the planet. The

bottom line: 'You made this product. You knew while making this product that it was going to cause these horrific problems. And you did not tell anyone,' according to an interview with David Bookbinder, chief counsel at the Niskanen Center. And ironically, oil companies have even requested government funding to build sea walls to protect their own coastal refineries from these same climate change impacts!

Meanwhile, this is also fast becoming a global issue. It is estimated that over 1400 climate change litigation cases have been filed to date around the world, covering 25 countries and a variety of issues, claimants and defendants. The key drivers for this kind of litigation include:

- compensation for the costs of adaptation to climate change;
- challenging climate change-related legislation and policies, or their application;
- preventing future emissions and contributions to climate change;
- requiring governments or regulators to take action to meet national or international commitments; and
- raising awareness and exerting pressure on corporate actors, regulators or investors.

This current wave of litigation is raising new legal questions in the context of climate change for the first time. For local governments suing oil and gas companies, the fight is over who's on the hook for paying for the damages stemming from rising average temperatures. In the children's lawsuits, the key issue is whether a stable climate is a civil right.

Oil companies are taking these cases very seriously. Exxon Mobil, the world's largest, launched a million-dollar push in 2018 for carbon tax legislation that includes immunity from climate change-related lawsuits. Exxon is also facing lawsuits for allegedly misleading investors about the risks of climate change to its business as well as the risks of future climate regulations.

Claimants are beginning to use probabilistic

arguments and combine individual emitters' climate impacts with event attribution – example; rising sea levels in one geographic area causing damage in some way to another area. The courts are being asked to deal with

"It is estimated that over 1400 climate change litigation cases have been filed to date around the world, covering 25 countries and a variety of issues, claimants and defendants."

arguments and facts related to climate change and climate science that were previously not presented with cases arising in the context of constitutional and administrative law, human rights, shareholder activism and consumer protection.

There are a number of com-

plicating factor in all of this. One is that every tier of government has pursued policies that have encouraged the use of fossil fuels, from building highways to subsidizing airports to constructing greenhouse gas-emitting power plants. So if an oil and gas company can be held liable for carbon dioxide emissions, so too perhaps can city governments, power companies, and automakers.

Another complicating factor may occur where a plaintiff may have difficulty demonstrating a particular injury since climate change is something that affects the whole world in intricate ways . . . unless perhaps you are a fisherman or farmer. In one case launched by a group of Oregon and California fishermen against 30 fossil fuel companies these fishermen can point to direct monetary harm that has already occurred from warming.

From the legal community, most plaintiff attorneys (like firm Sher Edling acting on behalf

of the state of Rhode Island and suing 26 companies for Baltimore, and Hagens Berman in the NorthWest) are operating under contracts that award them 20% or more of any judgment or settlement; the type of contingency-fee agreement that yielded billions of dollars in fees in tobacco litigation and hundreds of millions more in lawsuits by government entities against drug companies and polluters.

Meanwhile, Baker McKenzie were recognized as the only Band 1 ranked lawyers in the 2019 Chambers Global Guide for their work in Climate Change, with other BigLaw firms like Lathams and Reed Smith scoring high praise; while Jones Day claims to be a pioneer (dating back to Chambers Europe 2009) "in the climate change field." Arnold & Porter has been innovative in partnering with Columbia Law School's 'Sabin Center for Climate Change Law' to provide a US database on Climate Change Litigation. [<http://climatecasechart.com/us-climate-change-litigation/?cn-reloaded=1>]

ON A SEPARATE NOTE

As climate disruption continues, insightful attorneys might also expect to see (and serve) a huge groundswell of startups aiming to help save the planet while making a little profit for themselves. In March a firm called Jupiter Intelligence raised \$23 million in funding and is headed by an impressive team that includes a Nobel Prize recipient and two members of the C-suite with ties to Google. Jupiter is a provider of AI-powered weather prediction data designed to help its clients — such as insurance companies and governments — know when and where climate disasters might strike. Hurricanes and massive floods can cause billions in damage, and Jupiter offers a chance to mitigate some of that risk.

Until now, the focus of many efforts has been on storing carbon dioxide. Three companies—Switzerland's Climeworks, Canada's Carbon Engineering, and the US's Global Thermostat—are building machines that, at reasonable costs, can

capture CO2 directly from the air. And some are pursuing ideas for how to both capture and transform CO2 into everyday products. For example, as strange as it might sound, the University of Michigan is backing new technology that captures carbon dioxide emissions from the air and turns them into beer, lipstick and concrete!

Yet other climate-focused startups are continuing to raise cash to pursue novel ideas for creating negative emissions, or other ways of dialing back our current rate of warming. If there's one thing worth investing in, it's the literal future of our planet.



What is "synthetic biology?" At its most rudimentary level, synthetic biology is the engineering of biology: the synthesis of complex, biologically based systems, which display functions that do not exist in nature. That said, the technology is evolving so quickly that there are multiple definitions for the field.

So, for an insightful perspective one has to travel to Australia to hear from Dr. Alison McLennan whose PhD (awarded in 2014) involved an investigation of the legal issues in regulating emerging technologies, especially biotechnologies. Author of *Regulation of Synthetic Biology*, just released this past December, Alison explores the interplay between regulation and emerging technologies in the context of synthetic biology, a developing field that she believes promises great benefits,

and has already yielded biofuels and medicines made with designer micro-organisms.

For law firms this field offers opportunities to help clients in intellectual property; environmental; regulatory; risk assessment; biosafety and biosecurity among other areas. Alison says, *"I think the field of synthetic biology is hard to describe because it is really a collection of different approaches to engineering biology, and it includes a variety of enabling technology, tools, processes and applications."*

More companies turn to synthetic biology for innovation

"Biology is already changing the way we live, eat, manufacture, and treat human health. In the next few years, synthetic biology – a \$40 billion industry will be the premier technology of the 21st century that will be used to solve real-world problems facing millions."

- **Meagan Lizarazo**, EVP at iGEM, a non-profit foundation advancing synthetic biology innovation

Synthetic Biology represents what I have come to label a *tech-driven hybrid* in that it can be a technology disruptor to many conventional industries such that if you are serving clients in a particular industry, you do not want to be the attorney who is asked *"What do you know about Synthetic Biology?"* and not have some kind of reasonable answer. Here are some brief examples where the application of engineering principles to biology via manipulation of DNA are already having an impact:

- **Industrial Chemicals** – engineering bacteria to produce paints / adhesives / cleaners
- **BioFuels** – new renewable energy sources from microbes
- **Software** – more efficiently designed DNA sequencing (e.g. CRISPR editing)
- **AgriBusiness** – enzymes to improve crop yields / pest resistance
- **Consumer Products** – bacteria capable of producing collagen which is then bundled to

produce a leather hide

- **Food and Drink** – production of synthetic wine without grapes
- **HealthCare** – discovery of new pharmaceuticals, treatment diagnostics

For example in HealthCare today, genetic engineers want to make bio-pot, for fun and health. Synthetic-biology company Amyris believes it can genetically engineer organisms to manufacture cannabinoids, the active molecules in marijuana, more cheaply than by growing plants. If it works, cannabinoids could end up everywhere, in new forms, and reaching new people. Despite some moral qualms, the biotech industry is increasingly embracing the legal cannabis sector, which is growing rapidly on the back of spreading legalization in the US and beyond.

Meanwhile, we can also view synthetic biology as it's own emerging industry wherein innovative entrepreneurs are exploring how new cell-produced products might replace traditional industrial and chemical processes. Here are but a FEW examples of the kinds of companies you could be working with if you were developing a practice in this particular micro-niche.

ALTERNATIVES TO PLASTIC

Ambercycle is working on cell-based alternatives to many of our polluting petroleum products including plastics. Ambercycle focuses on making plastic recycling profitable and sustainable by using synthetic biology to engineer custom-tailored organisms that can degrade plastics into its chemical components. The new technology harnesses engineered enzymes to degrade plastic bottles, such as PET soda bottles, and transform them into PTA. The process lowers the cost of recycling PET plastics utilizing organic processes with no carbon footprint to generate PTA. Plastic producers will be able to make high quality plastic from renewable feedstocks with Ambercycle's products, thereby removing it from landfills and away from petroleum, all at a cheaper cost than current methods.

BIOFUELS & OILS

A bacteria found in the gut of a rabbit can now help cars run in a more eco-friendly way. The bacteria, identified by biotech start-up **LanzaTech**, helps turn factory carbon emissions, a.k.a. pollution, into ethanol, an alcohol that is blended with gasoline to reduce the amount of fuel used by cars. Meanwhile, **C16 BioSciences**, based in Boston, is a YC-backed company makes a lab-grown alternative to palm oil, which it claims is 20% cheaper and isn't destructive. The environmentally-devastating palm oil that is a common ingredient in many consumer products.

COSMETICS

Geltor, is a US start-up using synthetic biology techniques to engineer micro-organisms to produce animal-free collagen for the cosmetics industry. And, last March, a German company, **AMSilk** introduced a liquid-silk coating (made from modified E. coli bacteria), used for medical and cosmetic implants, that scientists believe could be a safer alternative to silicone. AMSilk also created the first breathable nail polish.

MULTI-PRODUCT: LAB-GROWN MEAT & LEATHER

Zymergen in San Francisco Zymergen researches, develops, and manufactures microbes for Fortune 500 companies. It develops molecules for agriculture, chemicals, materials, pharmaceuticals, electronics, personal care, and more applications. **Ecovative Design** is a biomaterials company in New York that provides sustainable alternatives to plastics and polystyrene foams for packaging, building materials and other applications by using mushroom technology. Ecovative is working to use mycelia, the hair-like network of cells that grows in mushrooms, to help build everything from lab-grown meat to 3D-printed organs to biofabricated leather.

NUTRITION

Calysta is a multinational biotechnology firm based in Menlo Park, California. The company is chiefly involved in the development of industrial processes that utilize microorganisms to convert methane into protein for seafood and livestock feed and other useful products like fuel and plastics. The global demand for seafood is rapidly outpacing the industry's capacity. Aquaculture is still highly dependent on fishmeal, which is sourced from commercial fisheries. Calysta's proprietary technology provides a proven, scalable solution, using gas-fed fermentation to produce feed-quality protein with high nutritional value. The company claims to be creating Future Fit Food - high value fish, livestock, and pet nutritional products to improve global food sustainability and security

TEXTILES

Bolt Threads focuses on harnessing proteins found in nature to engineer renewable fibers and fabrics with both practical and revolutionary uses, and works in developing spider silk. Because spider silk's strength is comparable to steel – scientists believe it actually can stop trains – synthetic spider silk has long been the ultimate goal of textile research.

Bolt Threads is growing artificial spider silk, something that scientists around the world have been trying to do for decades. Spider silk is known for being extremely soft and strong, and it could make long-lasting, lightweight and desirable clothes. The global fashion industry, at roughly \$2.5 trillion, is giant and terrible for the environment: Low-cost synthetic fibers like polyester are polluting the oceans, and even natural fabrics like cotton require large tracts of land and chemicals to produce. Spider silk, by contrast, as a bio-material, is sustainable.

Now if you are interested in exploring this particular micro-niche, you may want to consider

attending the next **SynBiTech** event, an international forum that takes place annually, for experts engaged in synthetic biology research, commercialization, investment and policymaking. SynBiTech 2019, held this past June in London, focused on the key opportunities and challenges for building a **multibillion-dollar** synthetic biology industry that will contribute to the fast-growing bio-economy. It offered two days of intense presentations, even featuring a few presenters from the investment community ... but not a single lawyer at the podium – a true sign of this still being an “Emerging” niche.



The amount of data we generate every day is staggering—currently estimated at over 2.6 quintillion bytes. 2.6 quintillion! It's a number so large that 2.6 quintillion pennies would, if laid flat, cover the entire Earth ... five times. And that number is only growing with the increasing number of devices being made available and being used.

If data is the new oil, what new products can we make? That's where deep learning comes in.

So what is deep learning? Deep learning is a micro-niche of artificial intelligence (AI). It uses mathematic procedures called algorithms to learn and recognize patterns. It's nested below AI, Machine Learning, and “neural networks” because it's a *multi-layer* neural network. What's amazing is that deep learning enables computers to learn. Since we're awash in data, we stand to benefit from learning how our clients are using it.

The basics are simple. The first challenge is to identify the types of problems that are most susceptible to being solved with this technique. In general, we mean data (numerical or text-based) that fit a category, classification, or label. The next step involves identifying a good supply of high-quality examples of that category, classification, or label.

The next step involves identifying a good supply of high-quality examples of that category, classification or label. If you can identify both the problem category and data-based examples of it, a data scientist can create a deep learning model. And with that, deep learning becomes “just software” that can, from new data, identify the *patterns* you'd like to see in order to either increase revenues or decrease costs.

“Not surprisingly, early adoption of deep learning has happened in companies with access to massive amounts of data which can be analyzed to solve their problems,” says [Pankaj Goyal](#), vice president of Hewlett Packard Enterprise's artificial intelligence business. “This data might be in the form of text, image, voice, or video. These problems could be automation, new customer experience, or new product innovation.”

Your legal clients already are starting to use deep learning (and blockchain) and that mean you should start thinking about the problems that may arise from their use. For example, clients may have to show a court how their internal deep-learning system works; whether bias exists; and whether anyone's privacy has been compromised. Moreover, you should be aware that courts may be sensitive to the revelation of patterns in *their* rulings. Earlier this month, the French government banned the publication of data related to rulings by French judges. A five-year prison sentence awaits anyone violating the law.

That said, we'll switch to a few of the Client Industries you or your firm may serve that are

working with deep learning. They include:

• **Aerospace and Defense**

Companies in this industry are employing deep learning for facial recognition for security-screening purposes, remote sensing, object detection and localization, spectrogram analysis, network anomaly identification, and malware detection. Deep learning is also being applied to manual tasks and pilot operations in the cockpit as well as wearable computing for soldiers.

• **Automotive**

The way an autonomous vehicle understands the realities of the road and how to respond to them whether it's a stop sign, a ball in the street or another vehicle is through deep learning algorithms. For example, Audi and other auto makers use deep learning algorithms in its camera-based technology to recognize traffic signals by their characters and shapes.

• **Financial Services**

Failing to properly identify and prevent fraud is an expensive proposition that costs the financial industry billions of dollars per year. As advancements in computing technologies and the expanding use of e-commerce platforms dramatically increase the risk of fraud for these financial companies, many are turning to deep learning to uncover transactional anomalies or suspicious patterns.

• **Manufacturing**

Deep learning's capacity to analyze very large amounts of high dimensional data can take existing preventive maintenance systems to a new level.

• **Media and Journalism**

With deep learning, machines can learn the punctuation, proper grammar, and style of a piece of text and can use the model it develops to automatically create entirely new text with the proper spelling, grammar, and style. Everything from Shakespeare to Wikipedia entries have

been created. Deep learning is also being used to identify text that may incite terrorism or hate or text which constitutes deceit or misinformation.

• **Medical and Pharmaceutical**

From disease and tumor diagnoses to personalized medicines created specifically for an individual's genome, deep learning in the medical field currently has the attention of many of the largest pharmaceutical and medical companies.

• **Retail and Entertainment**

Ever wonder how Netflix comes up with suggestions for what you should watch next? Or how Amazon comes up with ideas for what you might want to buy next, and those suggestions are exactly what you need but just never knew it before? Those recommendation systems are, once again, deep learning algorithms at work.

In this way, Deep Learning can be a valuable tool for customer service management and personalization challenges. For example, deep learning analysis of audio allows systems to assess a customer's emotional tone; and, in the event a customer is responding badly to the system, the call can be rerouted automatically to human operators and managers.

• **Robotics**

Deep-learning applications for robots are plentiful. They can teach a robot to do something (like housekeeping, greeting guests, stocking shelves, and picking apples) by observing a human completing a specific task. Drones flying down rows of crops can learn to identify the weeds, and to use the weed killer only where necessary.

• **Conducting Litigation**

More to the point, when you drag and drop in a complaint of a specific type, they'll write an answer and spit out a first set of discovery requests, too.

• **Preventing Litigation**

No one looks at yesterday's emails to see if a

"smoking gun" for a specific litigation risk is present. As we've said, there's too much data. But one of us (Brestoff) contends that deep learning may enable us to do what currently cannot be done.

With a focus on the business-relevant and high-frequency NOS codes, his startup's system ingests yesterday's batch of emails, and processes the emails through a deep learning model to see which of the emails pattern-match to a litigation risk. Only the emails "related" to a risk category are returned for review by members of the in-house team. By using deep learning as a filter, the in-house staff may spot a risky email in time to nip the risk in the bud.

TO CONCLUDE

What's important to remember is that deep learning is in its "Emerging" stages but is developing rapidly. General business managers and lawyers of the future will need to understand when problems are likely to be susceptible to a deep learning approach, and how to manage the diverse teams with more technical skills that will need to be pulled together to solve them.

Co-Author of Deep Learning:



NELSON E. (NICK) BRESTOFF holds engineering degrees from UCLA and Caltech and a law degree at USC. He was a California litigator for 38 years and is an inventor on eight patents that use deep-learning to identify and provide an early warning of either risks to avoid or financial advantages to obtain. He is also author of *AI Concepts for Business Applications*, a book to be published later this year. You can reach him at: nickbrestoff@yahoo.com

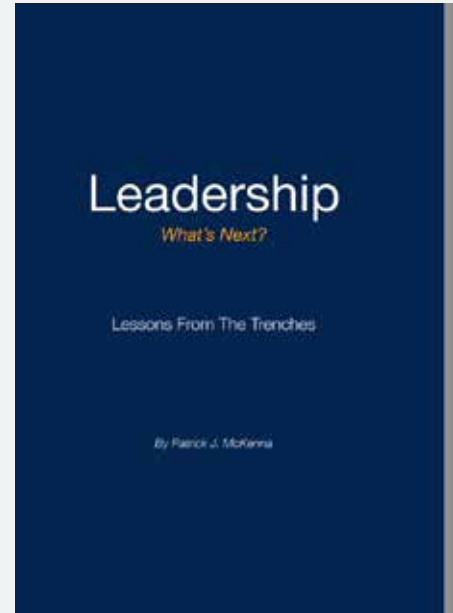
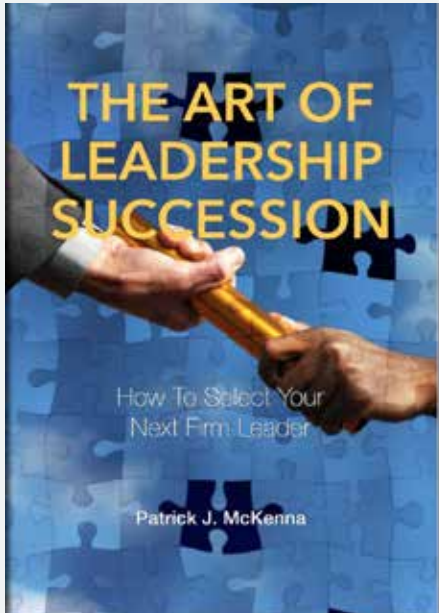
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PATRICK J. MCKENNA

P R O F E S S I O N A L P R O F I L E

An internationally recognized author, lecturer, strategist and seasoned advisor to the leaders of premier law firms, Patrick has had the honor of working with at least one of the largest firms in over a dozen different countries.

Patrick authored a pioneering text on law firm marketing, *Practice Development: Creating a Marketing Mindset* (Butterworths, 1989) recognized by an international journal as being "among the top ten books any professional services marketer should have." His subsequent works include *Herding Cats: A Handbook for Managing Partners and Practice Leaders* (IBMP, 1995); and *Beyond Knowing: 16 Cage-Rattling Questions To Jump-Start Your Practice Team* (IBMP, 2000).

A prolific writer on the challenges of firm leadership, his book (co-authored with David Maister), *First Among Equals: How to Manage a Group of Professionals*, (The Free Press, 2002) topped business bestseller lists in the United States, Canada and Australia; was translated into nine languages; is currently in its seventh printing; and received a best business books of 2002 award. In 2006, his e-book *First 100 Days: Transitioning A New Managing Partner* (NXTBook) earned glowing reviews being read by leaders in 63 countries and culminated in Patrick being asked to conduct a one-day masterclass for new firm leaders. Over 80 leaders from AmLaw 100, AmLaw 200, accounting and consulting firms, hailing from four countries graduated from the program. According to Hugh Verrier, Chairman of White & Case, "I was struck by the synthesis of the issues you

presented. It was amazingly clear and comprehensive, given the breadth of the topic and the short time available. I was delighted to attend the event and I learned a lot from it."

Acknowledged in *American Lawyer* as "a long time succession consultant and coach to new firm leaders," Patrick's most recent books include, *The Art of Leadership Succession* (LBW Publishing 2019) and *Strategy Innovation: Getting To The Future First* (LBW Publishing, 2019). Obsessed with innovation, Patrick was instrumental in introducing the first global (InnovAction) awards initiative in 2003, in conjunction with the College of Law Practice Management, to identify and celebrate global law firm innovation achievements.

McKenna's decades of experience led to his being the subject of a Harvard Law School Case Study entitled: *Innovations In Legal Consulting* (2011) and he is the recipient of an Honorary Fellowship from Leaders Excellence of Harvard Square (2015).

Patrick serves on the Advisory Board for a number of companies including Intraspexion Inc. (legal tech); Legal Business World (international media); and The True Balance Longevity Institute Inc. (health care).