Extreme Competition

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The Business Innovation Dogfight in the Cloud

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Did you ever wonder how a smaller, slower, shorter-range and lower-altitude jet fighter could beat its far more endowed enemy aircraft in a supersonic dogfight?

Well, we could turn to the "Father of the F16," a cigar-smoking, cocky, foul-mouthed guy for answers. Over the years many have written about this fellow, but his lessons are being revisited by smart companies in light of the Great Recession, the new normal and today's hyper-fast rate of change. Some might even say this is old stuff. But sometimes what's old is new again. Following is a recap of some of the current writings.

The late John R. Boyd, a U.S. Air Force fighter pilot trainer, issued a standing challenge to all comers. Starting from a position of disadvantage, he'd have his jet on their tail within 40 seconds, or he'd pay out $40. Stories have it that he never lost. Boyd's maverick lifestyle and unfailing ability to win any dogfight in 40 seconds or less earned him his nickname, "40-Second Boyd." According to his biographer, Robert Coram, Boyd was also known at different points of his career as "The Mad Major" for the intensity of his passions, as "Genghis John" for his confrontational style of interpersonal discussion, and as the "Ghetto Colonel" for his spartan lifestyle. Boyd rarely met a general he couldn't offend.
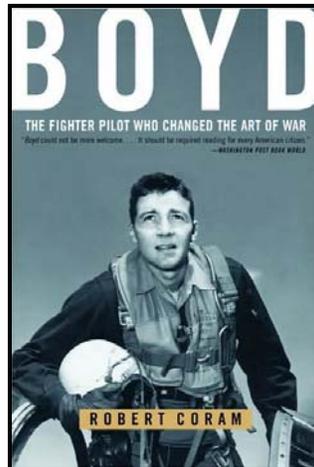
In a dogfight, the F-16 seems to ignore the laws of physical science. Its design allows extreme maneuvers. It turns energy on and off in a second, and despite its light weight, it can withstand nine times the force of gravity, which enables some serious twisting and rolling. The plane is unbelievably agile. The F-16 allows its pilot to *outmaneuver* the other guy, just as a company

would like to be able to outmaneuver its competitors that are bigger, better, stronger and faster. By being able to sense and respond to the changing competitive environment with great speed, the agile business can confuse its competitors, and by the time they have figured out what happened, the agile business again goes on the offensive in the very environment it had just changed.

Boyd didn't have much in the way of defensive strategies, just overwhelming offensive tactics. Boyd is credited for largely developing the strategy for the invasion of Iraq in the first Gulf War. In a letter to the editor of *Inside the Pentagon*, former Commandant of the Marine Corps General Charles C. Krulak is quoted as saying, "The Iraqi army collapsed morally and intellectually under the onslaught of American and Coalition forces. John Boyd was an architect of that victory as surely as if he'd commanded a fighter wing or a maneuver division in the desert." One amazing aspect of Boyd's offensive strategies was the sight of American columns running up both banks of the Euphrates with no apparent concern for securing their rear or maintaining a supply route. It was a completely *offensive* strategy.

During the early 1960s, Boyd, together with Thomas Christie, a civilian mathematician, created the Energy-Maneuverability theory of aerial combat. E-M theory is a mathematical equation that calculated an aircraft's ability to change direction, altitude or speed under specified conditions, and allowed systematic comparison between different aircraft for the first time. In the 1970s, Boyd applied his understanding of energy maneuverability to help design the F-16, bringing together everything he knew about competition. Then he focused on something even grander, a unifying theory of this thing we call *agility.*

Boyd's key agility concept was that of the *decision cycle* or OODA Loop (Observe, Orient, Decide, Act), the process by which either an individual or an organization reacts to an event in real time, or at least in time enough to make a difference. According to this idea, the key to victory is to be able to create situations wherein one can make good decisions *more quickly* than the opponent. The construct was developed out of Boyd's earlier E-M theory and his observations on air combat between MiGs and U.S. Sabre jets in the Korean war. The chief designer of the F-16, Harry Hillaker said of the OODA theory, "Time is the dominant parameter. The pilot who goes through the OODA cycle in the shortest time prevails because his opponent is caught responding to situations that have already changed."

Boyd hypothesized that people and organizations undergo a continuous cycle of interaction with their environments. Boyd broke this cycle down to four interrelated and overlapping processes through which one cycles continuously:

■ *Observe:* the lightening-quick collection of *relevant* information about your current environment by means of the *senses* rather than drawn-out data analysis that leads to "analysis paralysis." A huge challenge is picking the "right data" to focus on in order to avoid information overload.

■ *Orient:* the analysis and synthesis of information to form one's current mental perspective. This is the most important step because this is where information is turned into "situational awareness" not unlike what's needed in a 3D chess game.

■ *Decide:* the determination of a course of action based on one's current mental perspective. Again, avoid analysis paralysis, as a dogfight happens in real time.

■ *Act:* the physical carrying-out of the decisions. Of course, while your action is taking place, it will change the situation, favorably or unfavorably. Hence the loop repeats, again and again in real time as nothing is standing still.

Want to see a Dogfight?   http://www.youtube.com/watch?v=lNb-421E-mo
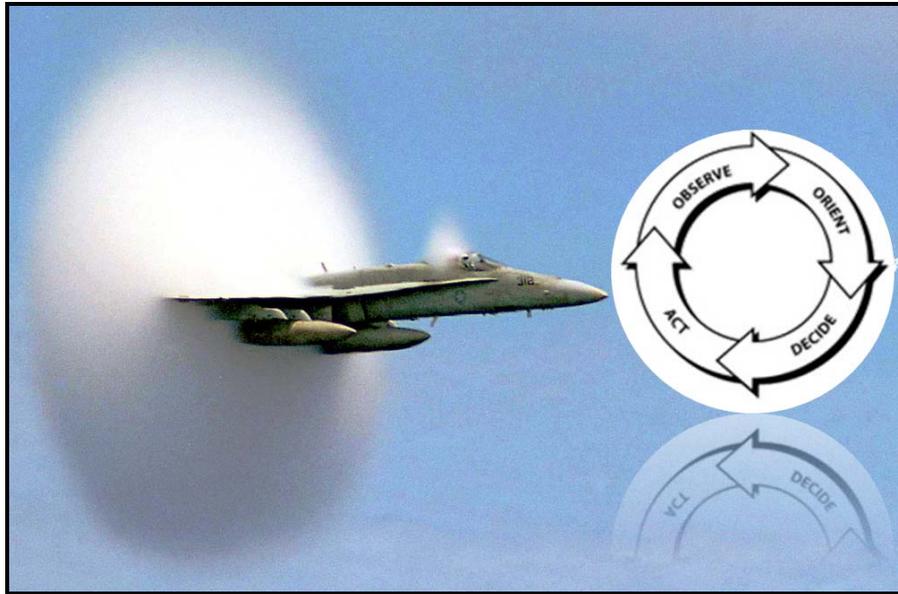
In the course of a dogfight, a pilot will go through many OODA Loops, with the number depending on the complexity of the situation. The pilot that can go through the repeating loops the fastest gains a distinct advantage, especially if he or she can act in ways that confuse the enemy combatant. In other words, the winning pilot is not just dealing with his or her own loops, the pilot is funneling the chaos of the dogfight to overload his opponent's OODA Loops. That is, he or she is operating *inside* an adversary's OODA loop to, as Boyd wrote, "... make us appear ambiguous, and thereby generate confusion and disorder." If the pilot is ahead in what Boyd calls *fast transients,* the opponent slowly loses touch with reality, and gets shot down. Boyd wrote, "The winner collapses his adversary's ability to carry on."

What does all this dogfight stuff have to do with business? Robert Greene writes in his book, *The 33 Strategies of War,* "This seemed to me the perfect metaphor for what we are all going through right now in the 21st century. Changes are occurring too fast for any of us to really process them in the traditional manner. Our strategies tend to be rooted in the past. Our businesses operate on models from the 60s and 70s. The changes going on can easily give us the feeling that we are not really in control of events. The standard response in such situations is to try to control too much, in which case everything will tend to fall apart as we fall behind. Those who try to control too much lose contact with reality, react emotionally to surprises. Or to let go, an equally disastrous mindset. What we are going through requires a different way of thinking and responding to the world."

In essence, the *speed of making good decisions* is the critical element in our strategies. Speed, however, is something that is not always fully understood. Speed can be obtained by loosening up the command-and-control structure, allowing for more chaos in the decision-making process, and unleashing the creativity of front-line workers. Speed is not necessarily a function of technology. In war, technology can actually slow an army down. Look at the North Vietnamese versus the U.S. in the Vietnam War—The poorly-armed North Vietnamese fighters crushed America's technological military might with lightning-fast gorilla attacks.

Those who will succeed in the current hyper-competitive global environment know how to embrace change. They *unlearn* their former operating models to stay rooted in the OODA Loop. It's their *mental models* that create advantage, not the size of their assets, number of employees, or number of trading partners.

If a company currently enjoys success, watch out, for there's little time to enjoy success in today's ruthless times. The winning company will re-Observe, re-Orient, re-Decide and re-Act at all times. Call this approach "sense and respond" if you wish to keep it brief.

The convergence of total global competition, global hyper-connectivity, and dynamic outsourcing and supply chaining has changed the meaning and practice of strategy. Walt Shill, former McKinsey consultant and now with Accenture famously stated, "Strategy, as we knew it, is dead. It's now all about operational agility and how fast businesses can seize opportunities. If strategies and forecasts have to change daily or weekly, then so be it." We've moved from return-on-assets to return-on-opportunities, and those opportunities are in constant flux and under constant threat in a rapidly changing environment.

We can turn to nature to learn lessons about competing on *time* as the central variable in the OODA Loop. As the authors of *The Real-Time Enterprise* write (*http://tinyurl.com/62g2qjn),*
"Polar bears have a unique ability to smell (sense) through thin ice to locate their favorite prey, the seal. But they also know that their prey is an elusive target, and that it's knowing exactly when to pounce (respond) through the ice that counts. Pouncing too soon, before maneuvering to the right spot where the ice will break cleanly, or pouncing too late after competitive bears have spotted the prize, will surely mean lost opportunity and continued hunger. It's all in the timing—it's time-based competition for survival in a harsh world."

McKinsey & Company maintains that competitive advantage consists of the progress a company makes as its competitors, paralyzed by confusion, complexity and uncertainty, sit on the sidelines.[i] The key is to be ready to pounce on an opportunity as soon as the company can realign the business processes of its value delivery system, not just to be the first mover, but also to be able to swim hard once it has broken the ice with innovation. Having caught up with the bear and joined in the melee, competitors will only have remnants of the prize to fight over while the innovator moves on, scouting for new opportunities to surprise both its prey and its competitors. In the world of business, a company cannot hope to compete in the arena of time-based competition if it continues to have non-value-added processes, disconnected departmental hand-offs, or broken or anemic business processes. An anemic bear simply cannot compete in the harsh real world—time-based competition demands operational transformation through business process innovation.

Just consider Nokia, Apple, RIM, Samsung and Motorola and the other competitors slogging it out in the ruthless smart phone and tablet arenas. Keith Hammonds wrote in *Fast Company*, "Companies in manufacturing, telecommunications, retail—in nearly every business—are discovering that fashion, fad, and fickle customers require constant vigilance and adjustment. We operate in a video-game world where time is compressing, information goes everywhere, and the rules of the game change abruptly and continuously. All of which makes the OODA loop more powerful than ever. Want to outthink and out execute the competition in the air or on the ground, in combat or in business? Want to test out new ideas, get feedback from your customers, adjust your product accordingly, and launch a new version—before your competition even senses the opportunity? Then learn how to make the OODA loop the centerpiece of your strategy process." [ii]

"'In Boyd's notion of conflict, the target is always your opponents mind,' says Grant Hammond, director of the Center for Strategy and Technology at the Air War College. In his own work, Boyd didn't apply his principles to business strategy and market share, says Hammond, 'But the analogy still holds. It's all about rapid assessment and adaptation to a complex and rapidly changing environment that you can't control.' In fact, Boyd's ideas translate seamlessly into business. In a groundbreaking article published in 1988 in the *Harvard Business Review* titled "Fast-Cycle Capability for Competitive Power," Joseph L. Bower of Harvard Business School and Thomas M. Hout, a partner at Boston Consulting Group, actually cited the OODA loop, 'The OODA loop limbers up your organization. It keeps you constantly worried about the next cycle, about making rapid, incremental improvements that throw off competitors."

But in business, it's not one big cycle that needs to be managed, it's multiple overlapping cycles as shown below in a figure from *The Real-Time Enterprise*. The book's chapter on cycle-time management opens with, "Cycle-time management is essential to the effectiveness, agility and overall productivity of any company. Reducing information float, increasing information synchronization and achieving near zero information latency are the ingredients of cycle-time management. Over the years, IT has provided automation support for discrete business functions. Although these business functions (listed on the left of the figure below) are vital, they are not how a company runs its business. What companies want to do is manage their asset-intensive business cycles. They want to manage their purchasing cycle. They want to manage their forecast and planning cycle, the customer service cycle and other business cycles, as illustrated in the figure. Each major business cycle is a complete, end-to-end business process, usually requiring support from more than one company to realize the process." Each major business cycle requires its own OODA Loops as well as the overall orientation that influences all the loops at strategic and tactical levels.
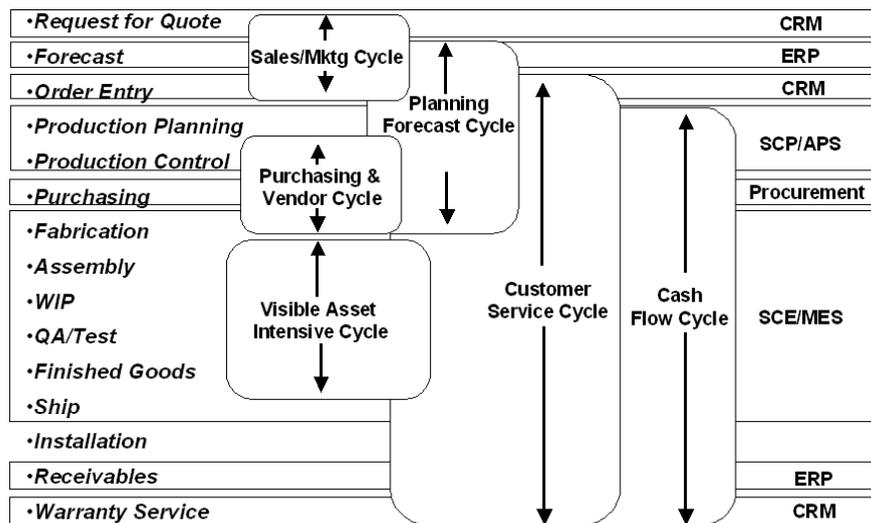
Hammonds continues, "Toyota, studied by Boyd and others, designed its organization to speed information, decisions, and materials through four interrelated cycles: product development, ordering, plant scheduling, and production. Self-organized, multifunctional teams at Toyota developed products and manufacturing processes in response to demand, turning out new models in just three years compared with Detroit's cycle of four or five. Systems like Toyota's worked so well, Boyd argued, because of schwerpunkt, a German term meaning organizational focus. Schwerpunkt, Boyd wrote, 'represents a unifying medium that provides a directed way to tie initiative of many subordinate actions with superior intent as a basis to diminish friction and compress time.' That is, employees decide and act locally, but they are guided by a keen understanding of the bigger picture. In effective organizations, schwerpunkt connects vibrant OODA loops that are operating concurrently at several levels. Workers close to the action stick to tactical loops, and their supervisors travel in operational loops, while leaders navigate much broader strategic and political loops. The loops inform each other. If everything is clicking, feedback from the tactical loops will guide decisions at higher loops and vice versa." (See also, "Fractal Enterprise Architecture" at BPTrends: http://tinyurl.com/4kgax6s).

"Think of the loop as an interactive web with orientation at the core. Orientation—how you interpret a situation, based on your experience, culture, and heritage—directly guides decisions, but it also shapes observation and action. At the same time, orientation is shaped by new feedback. An effective combatant, Boyd reasoned, looks constantly for mismatches between his original understanding and a changed reality. In those mismatches lie opportunities to seize advantage. And reality, Boyd understood, changes ceaselessly, unfolding 'in an irregular,

disorderly, unpredictable manner,' despite our vain attempts to ensure the contrary. 'There is no way out,' Boyd wrote. 'We must continue the whirl of reorientation, mismatches, analyses/synthesis over and over again ad infinitum.' The OODA loop persists endlessly."

"On the other hand, it may be that technology compresses just one part of the loop, that the wide, instantaneous availability of data creates an environment of complete transparency. In such a world, it would be impossible to gain advantage from observation, since all competitors would see the same thing. *Orientation*, then, would grow even more important: The data is worthless without interpretation. And that means Boyd was more right than even he could have imagined."

Robert Lewis, president of IT Catalysts, brings some balance to the discussion of OODA Loops, "As generally conceived, an OODA Loop is used to win the battles you fight, but not necessarily the way to choose the wars you wage. And in fact, one way of understanding what went horribly wrong in the second Iraq war is that the folks who decided it was a good idea were focused on their OODA-driven ability to win it, leading them to ignore the question of whether it made sense to fight the war in the first place. Had they allowed some of that analysis paralysis to take place they'd have figured out that removing Saddam Hussein from power would eliminate the main counterbalance to Iran in the region."

Because we are dealing with multiple OODA Loops in any complex system such as a business, we need to keep front and center the notion of schwerpunkt to provide overall focus. Strategic OODA Loops may indeed cycle slower than tactical loops, and a lot more emphasis may be needed in the Observe phase. Strategic as well as tactical OODA Loops require continuous cycling regardless of their speed; feedback loops are *all* in a world of continuous change. If a leading manufacturer of 8-track tapes didn't Observe the megatrend that was about to hit it (compact disks), it may have continued to use tactical OODA Loops to compete against other 8-track tape companies instead of getting the hell out of Dodge City. Ditto for the compact disk makers with the advent of MP3 players.

The key to gaining true business agility isn't just about mastering techniques related to OODA Loops, it's *cultural*. Ajit Kapoor, IT industry veteran and former Enterprise Architect at Lockheed wrote, "This reminds me of a meeting that Gandhi and God may have had some time back, say 50 years after his demise from earth. Frustrated with the situations in India, Gandhi asked God, 'Why are Indians, who loved him dearly, then are not listening to what he gave his life for?' God replied and asked Gandhi if he would like to go back and fix the problem. But he added further that it's like a movie set, "Scene 1, take 1 million. See Mr. Gandhi, humans do not change easily. They continue with their old ways and expect different results.'"

Takeaway

What's this all got to do with business innovation and the Cloud? Everything! Let's quickly explore the key Cloud delivery models and their impact on *executing* on business innovation:

■ Infrastructure as a Service (IaaS) - Startups requiring the power only supercomputers can provide are able to deploy the resources of massive data centers without one dime in capital investment. With funding from family and friends, Animoto was started by a some young techies that worked for MTV, Comedy Central and ABC Entertainment who knew how to make professional quality video animations. Now their Cinematic Artificial Intelligence technology that thinks like an actual director and editor and high-end motion design bring those capabilities to anyone wanting to turn their photos or videos into MTV-like videos. At one point, aside from some monitors and an espresso coffee machine Animoto had few actual assets. That's because everything, including server processing, bandwidth and storage, is handled by cloud computing, a pay-as-you-use model. So when the Animoto application launched on Facebook, causing the number of users to soar from 25,000 to 750,000 in four days and requiring the simultaneous use of 5,000 servers, business carried on as usual. Without the ability to handle a spike like that, their business couldn't exist. Meanwhile, it's not just youngsters using IaaS. The *New York Times*

processed four terabytes of data through a public cloud by simply using a credit card to get a new service going. In a matter of minutes it converted scans of more than 15 million news stories into PDFs for online distribution—$240! Look, Ma, no New York Times IT infrastructure needed. Both Animoto and the New York Times *observed* new opportunities made possible in the Cloud, and acted decisively.

■ Platform as a Service (PaaS) - With PaaS, software developers can build or "mashup" Web software without installing servers or software on their computers, and then deploy those software applications without any specialized systems administration skills. PaaS service providers not only incorporate traditional programming languages but also include tools for mashup-based development, meaning that deep IT skills are not needed to build significant software. The implications for business innovation center on rapid development and rapid testing via multiple OODA Loops in the Cloud, making it possible to bring new products and services to market without the traditional 18-month IT development cycle or capital expenditures. Innovations that don't pan out can be shut down, allowing a company to fail early, fail fast. Remember, innovation must allow for failure, else nothing really *new* is being done. On the other hand, innovations that prove successful can be scaled up to full Web scale in an instant. In short, PaaS takes traditional IT software development off of the critical path of business innovation.

■ Software as a Service (SaaS) - With SaaS we are witnessing a huge shift from IT to BT (Business Technology). In the past, IT was about productivity. But now, BT is about collaboration, a shared information base and collective intelligence (the wisdom of crowds, social networking and crowdsourcing). SaaS is the delivery of actual end-user functionality, either as "services" grouped together and orchestrated to perform the required functionality or as a conventional monolithic application (e.g., CRM, ERP or SCM). The real driver for SaaS isn't the traditional IT application; it's the "edge of the enterprise" where business users require a flexible model to deploy new technologies to improve front-office performance. As a growing number of business units tap SaaS offerings without going through their central IT department, we have the advent of "Shadow IT." The key significance is that while IT has a major role in the enterprise back office (transaction processing and systems of record), these new requirements are directly associated with "go-to-market" activities and will be subject to constant change via OODA Loops. These new requirements must be met very quickly for competitive purposes; some are likely to endure for only a few months; and their costs will be directly attributed to the business units consuming the needed "services" and paying as they go.

Now consider operational innovation inside a huge company like GE blending both internal clouds and going beyond the firewall to reach out to suppliers in the Cloud. GE's supply chain is huge, including 500,000 suppliers in more than 100 countries that cut across cultures and languages, buying up $55 billion a year. GE wanted to modernize its cumbersome home-grown sourcing system, the Global Supplier Library, build a single multi-language repository, and offer self-service capabilities so that suppliers could maintain their own data. So did CIO Gary Reiner and team start programming? The short answer is "no." GE looked to the Cloud for a solution. GE engaged SaaS vendor Aravo to implement its Supplier Information Management (SIM) SaaS that would ultimately become the largest SaaS deployment to date. GE is deploying Aravo's SaaS for 100,000 users and 500,000 suppliers in six languages. When GE goes outside its firewall to innovate, you can bet that other CEOs will be asking their CIOs lots of questions about harnessing the Cloud for operational innovation.

■ BPM as a Service (BPMaaS) - Business Process Management (BPM) is what sets "enterprise cloud computing" apart from "consumer cloud computing." Because the average end-to-end business process involves over 20 companies in any given value chain, multi-company BPM is essential to business innovation and maintaining competitive advantage. Bringing BPM capabilities to the Cloud enables multiple companies to share a common BPM environment and fully participate in an overall end-to-end business process. BPMaaS can be implemented as a "horizontal" Business Operations Platform (BOP) that has a Business Process Management System (BPMS) at its heart. This is similar to PaaS, but rather than programming tools being

accessed, the BPMS is being accessed for full process lifecycle management and specific process services such as process modeling and business activity monitoring. For example, using a Business Operations Platform from Cordys, Lockheed Martin has deployed a Cloud-based Collaborative Engineering system to orchestrate the work of hundreds of subcontractors that have disparate product lifecycle management (PLM) and CAD/CAM systems. This represents one of the world's most complex enterprise computing environments now being addressed by cloud computing. Meanwhile, Dell, Motorola, Boeing, Avon, Panasonic, IBM and other multinationals use e2Open's Business Network to provide complete demand and supply chain management in the Cloud.

Nowhere is the OODA Loop more applicable than in supply chain management, especially if you consider the massive disruptions that resulted from the tsunami in Japan or the need to bring new products and services to market with great speed. While BPMaaS can enable companies to manage business processes more efficiently, it's real business innovation impact is that it can also empower entirely new business models that dynamically integrate demand-supply chain partners into virtual enterprise networks that offer compelling value to customers. Jasmine Young, a Facilitator at the Haas School of Business Institute for Business Innovation, summarized, "The Cloud is about leverage, the way credit is leverage in the financial industry. Businesses need to think about how they can leverage their suppliers and partners—and customers. And that's how the case toward innovation in the Cloud can best be driven." By aggregating more and more offerings for their customers, industry boundaries become blurred as smart competitors enter markets outside their primary industries. ExxonMobil is in the gourmet coffee business. Starbucks is in the Internet business. Wal-Mart is in retail banking. Microsoft is in the telephone business with its acquisition of Skype.

We could spend hours exploring how the OODA Loop fits into cloud computing or embracing the Cloud for business innovation (read the book when it comes out). Or we cold compare it to Design for Six Sigma (DFSS) or the PDCA model originating with quality management guru, Edwards Deming. According to the author and veteran enterprise architect, Thomas Tinsley, "For Deming the outcome was improved quality, where OODA is about survival."

For now, let's just leave it that all this OODA Loop activity happens in the Cloud, for it's not Industrial Age assets that must be managed, it's *digital immediacy* and the weaving of a digital tapestry among our customers and trading partners that counts in the 21st Century business innovation dogfights.

Leading companies are taking the unsystematic approach to business innovation and turning it into repeatable, managed business processes—think Innovation Process Management (IPM). IPM can be compared to the rise of the total quality movement in the1980s, where leaders such as Toyota taught the lesson of quality-or-else. Some companies have already implemented systematic approaches to innovation management. GE calls it CENCOR (calibrate, explore, create, organize and realize) and it centers on Design for Six Sigma. The Mayo Clinic calls it SPARC (see, plan, act, refine, communicate). The renowned design firm, Doblin, uses an Innovation Landscape™ diagnostic method to show 10 types of innovation and reveal that the most sophisticated innovation strategies combine these in thoughtful ways.

Although leading companies and innovation consultants have many innovation process roadmaps, OODA Loops and Energy-Maneuverability theory provide the baseline, a unifying theory of agility, for any business innovation process worth its salt.

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[i] McKinsey Quarterly, 2002 Number 2, *Just-in-Time Strategy for a Turbulent World*

[ii] http://www.fastcompany.com/magazine/59/pilot.html

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