Towards Deliberate Innovation

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Does Innovation Have to Fail?

Attempts at innovation fail so commonly that most people involved with work that requires it, like venture capital investing, take failure for granted and hardly even notice it as a problem - except when it's their own. Meanwhile, we are easily deceived by survivorship bias. We see innovations from established enterprises on store shelves all the time, but don't register that 95% of all new products fail in the marketplace. We hear the outsized success stories of newly minted billionaires of Silicon Valley but don't know that fewer than one in two hundred startup companies ever get funded to begin with, and more than 70% of even the select group that gets funding still fail. Government statistics seem to show a rosier picture; about half of new business establishments survive for at least five years. But, the overwhelming majority of these successes aren't innovative; they are corner stores, restaurants, contractors, franchises, and other businesses built on well-known templates. The epidemic of innovation failure goes beyond businesses; nonprofits with new ideas, new government policies, and even new individual pursuits all have high failure rates. There are many paths to new business failure, but, ironically, innovation is the surest one.

Why? For innovation to be successful, "customers" have to have some reaction to it. You can't have innovation success without achieving some behavior change. When innovation doesn't matter to its audience, when it's met with indifference, the project ends. Failure is the result of *indifference*. Most innovations fail, to quote T.S. Eliot, not with a bang but with a whimper.

You could say that the opposite of indifference is demand. There's plenty of attention to indicators like costs of customer acquisition, churn rates, conversion rates, click throughs, sales funnels. But the concept of demand itself is rarely scrutinized.

This is true even of the most serious business thinkers on the subject. Ted Levitt tells us that when we see people buying ¼" drill bits what we really see is people drawn to have ¼" holes[1]. Steve Blank and Eric Ries tell us that if you suppose that people are drawn to have ¼" holes, you should figure out what to make by iterating with minimum viable products that create holes[2]. Clay Christensen generalizes these ideas, positing that whenever we see people buying something they are hiring tools that relate to a "job to be done."[3] But in these narratives the authors inadvertently start with the answer to the question that we are all really interested in. The question we all really want to answer is, where does demand come from, and can we find it?

[1] Marketing Myopia by Theadore Levitt
https://www.academia.edu/10810150/MARKETING_MYOPIA_By_Theodore_Levitt
[2] Four Steps to the Epiphany by Steve Blank and The Lean Startup by Eric Reis
[3] Competing Against Luck by Clayton Christensen

The Center for Deliberate Innovation and Flashpoint

The four authors of this paper come from different perspectives. Matt Chanoff is an active Bay Area angel investor, Merrick Furst, PhD, is a computer science professor and former dean who has founded multiple startups, Danny Sabbah, PhD, is a retired senior executive at IBM who was in charge of some of their largest software initiatives, and Mark Wegman, PhD, is a senior research scientist at IBM and member of the National Academy of Engineering who has overseen many of the companies innovations. Each of us have been personally involved with both innovation failures and successes.

In 2011 Merrick, with Matt's support, founded the Center for Deliberate Innovation at Georgia Tech (the CDI), to systematically examine how cognitive illusions and biases got in the way of innovation, with a focus on outcomes. They followed up with Flashpoint, a company which worked directly with startups and other enterprises to put the Center's findings and methods into practice. Mark and Danny saw in the Center's methodology a useful new way to overcome dilemmas facing global businesses like IBM. Today, this work is built on three core principles:

- A clearer understanding of demand, what we'll describe later as *Authentic Demand* and what it means to be a customer through the "not not" approach.
- Making distinctions among the three types of innovative challenge: Informative, Transformative, and Formative, and using appropriate methods for meeting each one.
- The crucial importance of developing and sticking to systems and practices for innovation that account for and manage biases and cognitive illusions held by innovators, potential customers, and other stakeholders.

This article focuses on the first of these principles: Authentic Demand and the not not approach to uncovering it.

To date, the CDI has worked with over 90 enterprises, including startups, Fortune 500 corporations, and nonprofits, as well as several cohorts of faculty and administrative members of the Georgia Tech community. The work of the CDI builds on practical, day-to-day experience with several hundred entrepreneurs, "intrapreneurs," and would-be change-makers from the academic and nonprofit worlds. It is informed by the findings of several established academic fields, notably the "immunity to change" theory developed by psychologists at Harvard, and lesser known disciplines like ethnomethodology and phenomenology. But above all, it is informed by behavioral economics the field at the intersection of psychology and economics that was launched in the 1970s by figures like Nobel Prize winners Daniel Kanheman and Richard Thaler. Behavioral economics (and behavioral decision theory) studies the effects of psychological, cognitive, emotional, cultural and social factors on the decisions of individuals and institutions. The Center uses insights from all of these both to better understand demand and to manage the cognitive errors and biases of innovators. The cases of the Humminbird Fish Finder company and of IBM's Websphere initiative illustrate the problem of authentic demand and the not not approach to uncovering it.

Humminbird Fish Finder: Fishing in a $50 million market and catching $120 million in annual sales instead

The Humminbird Fish Finder company, located in Eufaula, Alabama, started in the conventional way – a hard working entrepreneur, a clever idea, and some technical knowhow. Their product was an adaptation of a Heathkit, a DIY sonar device, repurposed to be an underwater fish locator for recreational fishermen. This was something new: up until that point, only commercial fishing vessels could afford fish finders. There was clear demand and soon the company had $1 million in revenue. The inventor and CEO, a motorcycle driving maverick with the improbable name of Yank Dean, brought on a young Harvard Business School educated banker named Jim Balkcom. Over several years, Dean and Balkcom built a more reliable product and a vibrant company culture. Step by step, they grew the company to six million in revenue. Then tragedy struck. Dean died of a sudden heart attack. Balkcom went to the investors and told them "I'm not much, but I'm all you've got." He was hired as the new CEO.

Balkcom's goal was to dominate the segment, which he estimated to be about $50 million. His marketing team worked hard to develop a thorough understanding of the current market. They watched people fish, held focus groups, consulted with customers and with prize-winning anglers, as well as distributors, and retailers to figure out exactly what they wanted and needed. He then worked with his engineers and launched a new and improved version of the fish finder based on the latest market feedback.

To no avail. Sales didn't budge.

So Balkcom went through the time and expense of talking to even more customers and listening to their ideas for new features and launched a second new version.

No change in sales.

The team tried again. And again. Humminbird brought out no less than nine new versions of the product, each one with better features for finding fish and/or more convenience. He tried a squelch knob to help see the fish more distinctly, technology that worked in shallower water, technology that worked while the boat was moving, a more portable version, a more waterproof version, a version that recorded on a spooled tape.

Nothing. Sales were flat. It felt for all the world like roughly six million in revenue was all they could get from the market no matter what they tried. But after all the expense of nine new product launches the company was in precarious shape. Now it was do or die.

The tenth time, though, was different. The new product broke all sales records. It actually had fewer functions than the nine previous iterations, but suddenly new customers came out of the woodwork, buying two or three for every boat. The company didn't just increase their share of the estimated $50 million market. They blew right past it. The new fishfinder generated $75 million in

sales during the first year, and revenue continued growing until at its peak the company had $120 million in annual sales.

That tenth version didn't succeed because they'd finally gotten the feature mix right. It succeeded thanks to a paradigm shift, a whole new understanding of the customers, which, in turn, forced a complete redesign of the company. Jim had been stuck, but thanks to a painfully-won, late-dawning realization, he became unstuck. With that realization he transformed from one kind of innovator to another, from one kind of leader to another.

The first kind of innovator and leader, by far the most common, is the kind with ideas, struggling to impose them on an indifferent world. This person (or more accurately a person in this situation) can't force their ideas into the lives of the people who make up their imagined market. No matter how much energy, how much ingenuity, how many resources they devote to the task, they can't get traction. Sporadic sales and occasional positive signals from distributors or other stakeholders keep them going, but the positive signals never add up to increases in revenue.

The second situation, much rarer, is the one Jim Balkcom found himself in. In this situation customer demand is like a whirlpool, a market of people demanding the product; pulling it toward themselves in such a way that the demand itself clarifies what's needed to satisfy it - what product features, what energy, and what ingenuity and resources. Jim hadn't hit on a combination of features that got traction: he'd hit on traction. From there, he was able to know what to do.

Jim describes the paradigm shift this way: "We thought we were in the business of catching fish. We were in the business of catching fishermen." That sounds simple, but it was a well-hidden insight. The mission of Humminbird Fish Finder was to sell devices that found fish underwater. It sold products labeled fish finders to customers who went fishing on boats and used the devices to see if there were fish. Every signpost pointed to building a more effective fish finder. But all that was just camouflage. Once Jim saw through it, everything changed.

All the work Jim had done to understand his customers came into focus. One thing he'd learned is that his typical customer owned a $30,000 boat and was up to date on payments, but lived in a trailer and was often behind on the rent. That seemed lopsided, but his research showed that they weren't fishing to eat; they were truly recreational fishermen. Taking their families out on the boat on weekends was their dearly bought escape, the part of their week that helped them get through the rest of it. Jim's attention shifted from the question of how to help these people catch fish to how to help them be recreational fishermen.

This is how it happened: Jim's VP of Marketing, Tom Dyer hired a marketing expert named Sue Symon. One day Sue approached a harried-looking woman at the fish finder shelf at a Bass Pro Shop and asked what she was buying.

"I don't care," said the woman. "My husband takes me and the kids out on the boat on weekends and it's as boring as hell. The kids go crazy. I thought maybe one of these would at least keep them entertained."

If it had been Tom, or Jim, or his engineers, with all their expertise in the technology of finding fish, they may have thought that was a useless conversation. But it clicked in Sue Symon's head. The customers weren't only the fishermen. A lot of those customers were spouses. And the users weren't only fishermen, they were spouses and children who were stuck for long hours on a small boat every weekend, bored to tears while the guy fished. Sue recognized that there's more to a successful weekend fishing excursion than catching fish. She went back to Jim and told him that he was in the entertainment business.

Sue began using focus groups to confirm and explore the implications of this pivotal insight, bringing in women for the first time. Immediately, she started learning things that hadn't become apparent in her previous conversations with customers. The fishfinder screens weren't usable in sunlight. The buttons and knobs were too complicated. The fish finders just weren't sold where they shopped.

The revised understanding of the market that came out of these sessions gave Jim and his company traction; a place to put all his energy and ingenuity and resources.

It allowed them to navigate the question of what features to offer. An entertainment device has to be attractive to play with, not intimidating like a scientific instrument. Jim removed every button, knob and gauge he could do without. He got a lot of pushback from his engineering department, who valued the technology they'd created and were resistant to the idea of change. But with a clearer vision of the customers Jim was able to confidently overrule them. The finished product was the simplest fish finder on the market; even children stuck on a small boat could use it.

One feature he decided was important to the entertainment market was a good screen. The fish finder screen was a spinning disk, like on a radar in a World War Two movie. It was barely readable in sunlight. Jim brought his engineer Al Nunley and said: "Go around the world and don't come home until you find a display that works." Al went home and packed his bags. In Tokyo, at Hitachi, he found what they were looking for. LCD screens were brand new. The only ones on the market at that time were tiny screens on wristwatches. Jim and Al convinced the giant conglomerate to beta test this new technology with their tiny fish finding company in Alabama. Humminbird became the first company in the world to commercialize modern LCD screens.

The insight into who the customers actually were also proved crucial for navigating sales and distribution. Fish finders were typically sold to distributors that serviced boat dealerships and sporting goods stores. But the customers didn't frequent those places; they went to Walmart or shopped from the Bass Pro Shop catalog, neither of which depended on distributors. Choosing to sell directly was a big risk for Humminbird. The distributors saw Walmart as a threat and issued an ultimatum: If you sell through Walmart, you can't sell through us. Choosing the big box store meant burning bridges. It would be nearly impossible to go back. Jim did it anyway.

Knowing the market helped him build a new company culture. With his revelation, Jim had another big challenge. To sell electronic entertainment devices Humminbird had to become an electronics manufacturing company. This was no small challenge for a company tucked into a small rural town in south central Alabama. It meant attracting, hiring and retaining consumer electronics designers and engineers to the kind of town that that sort of person rarely heard about, let alone went to settle down. The attention Jim had already paid to building a strong company culture paid dividends, here, and he doubled down on building a company environment that could attract and retain the people he needed. Just to mention a few highlights: he convinced his partners to go along with putting 20% of the company's stock into an Employee Stock Ownership Plan (ESOP). He provided generous health insurance and worked to keep costs down by running company-wide "stop smoking" challenges and other fitness challenges. He stalked the factory floor offering $20 bills for correct answers to trivia questions. Twice, when they hit sales milestones, his marketing director Tom Dyer filled a garbage bag with $100 bills and handed one out to every employee as they walked out the door, saying "have a nice weekend, see you Monday morning."

One simple but profound revelation gave Jim and Humminbird's other managers clear direction about what they needed to do moving forward to shape the product, the distribution channels, and key aspects of the company culture - virtually everything about the business. In short, by enabling Jim to understand what business he was in, the insight allowed him to get unstuck.

In the end, understanding the market correctly made the company a huge success. It led to a $7 million payout on the company's employee stock ownership plan. By then he had hundreds of employees, about half of whom were black and the other half white, including many people who had lived in deep rural poverty without even running water in their homes. When the ESOP paid out, Balkcom stood on the shop floor handing out checks. People bought houses and cars with those checks, put children through college, funded comfortable retirements. Jim found a true market, and the result was life changing, not only for him but for a whole community.

Not-Not: An Invaluable First Principle

Jim's breakthrough happened by accident. But by analyzing it properly we can start to see how to work toward such breakthroughs purposefully and methodically. We can start by unpacking Jim's story.

Suppose you were that weekend angler heading out to fish with your family. What's that excursion about? What could happen that would ruin your day?

Here are three (out of many) possibilities:

1. Your boat springs a leak
2. Your kids spend the whole time yelling, complaining, and carrying on.
3. You don't catch the maximum possible number of fish.

Among those possibilities, the first two really matter to you. If either of them happens it will ruin your day – maybe your whole week. But the third possibility. . . really, who cares? If you need more fish you can always pick them up at the supermarket.

Given these circumstances, are you likely to check that the boat won't leak? Do something to keep the kids entertained? How about buy something that helps you catch the maximum number of fish?

It's a complicated world, and people are never 100% predictable. No innovator or business leader could ever be in a position to confidently say: My customer will definitely check that the boat doesn't leak or will definitely buy something to prevent their kids from complaining on the boat. But given these circumstances. It would be unlike a recreational angler to not check the boat. It would be unlike a recreational angler with kids on the boat to ignore them. Allowing the boat to sink or allowing the kids to scream would not be normal behavior; it'd be a violation of normal behavior. These people, in this situation, can be counted on to act, for the most part, in a certain way. In contrast, it's perfectly common and normal for a recreational angler to finish the day without having caught the maximum possible number of fish. So there's no reason to believe that they'll buy some device to make that happen.

Put simply, the person in this circumstance will "not not" take care of the boat and not not see to the kids. It won't happen every time, but it'll happen.

The world is full of situations that can be better understood by seeing the not nots. People will not not pinch their fingers in closing doors. Certainly fingers end up getting pinched, but you can rely on people to move their hands to avoid it happening. People will not not go to bed without having eaten. They will not not greet a friend they pass on the street. Parents will not not see that their children get home after school. Not nots are not necessarily desperate situations. You can't place them somewhere on an intensity spectrum between whims and necessities. Also, they can't be categorized as conscious or unconscious. People don't walk around with a strong desire to avoid getting their fingers pinched in a door. They avoid it happening without intensity or conscious attention for the most part, but sometimes they're mindful and alert about it. To use the not not rule of thumb it isn't necessary to categorize something as important or not, or to worry about whether people are acting consciously or unconsciously.

Eliminating negatives doesn't offer a path to certainty, but it offers considerably more certainty than relying on positives. Too often, potential customers respond to surveys or speak up in focus groups to say they would buy something. The reasons why they won't buy it remain unexplored until it's too late.

Not nots are often hard to notice, because people typically just take care of them in the normal course of their days. Sometimes, though, they're noticeable in the adaptations people make to new circumstances. To take the example of parents seeing that their kids get home from school; it's possible to watch them adapting to situations that challenge the not not behavior. If the school bus isn't running that day, a parent will leave work to pick the kid up. If they can't leave work

they'll call a friend to do it, or text the child that they have to walk home that day, or call the school and demand the child is safely taken care of until they can arrive. The world is always throwing new situations at us, and we generally cope, adapting to the situation so as to keep fulfilling our "not nots." Except when we can't.

Sometimes situations change in such a way that people can't find an adaptation that works. Sometimes the ways we cope with one situation come into conflict with how we cope with another one. In these circumstances, a product that offers people a new adaptation, so that they can keep fulfilling their not nots, will fly off the shelves.

The "not not" principle is useful not just for seeing new opportunities but for clarifying what to do once you've found them. Once Jim Balkcom identified his new not not, he could see that some features, like an easily visible screen, met the demands of a not not. A person in the circumstance of using a fish finder on a boat as entertainment; watching what's going on underwater, would normally, typically, watch the screen. If they didn't it would be weird. Therefore the device wouldn't play its role properly without a screen that was visible in bright sunlight. Other features that he'd tried in his earlier iterations of the device - making it more portable or capable of recording or improving the squelch circuitry - didn't have that sort of quality. They weren't meaningful to customers in respect to the not not. Figuring out the details of the features for the new device became a process of clarifying the details of a customer's circumstance and applying the not not rule.

The rule is useful not only in designing the product, but in designing the company. As a company selling electronic entertainment devices to people who shop largely at Walmart, Humminbird Fishfinder could not not sell through Walmart. That meant it could not not jump through the inventory management and other hoops that Walmart demands of its suppliers.

Jim Balkcom didn't hear of the not not rule until long after he'd sold Humminbird Fish Finder. He felt his way, step by painful step, after coming to the insight that he was selling entertainment devices. But years later, when he happened to visit Flashpoint, it hit him with a powerful shock of recognition. Understanding the customer's situation, and the business's situation, in terms of not nots, was exactly what he'd been up to. Jim has since become a friend, mentor, and board member, and has graciously allowed us to use his story.

Authentic Demand

Identifying the not nots of the customer's situation is like drawing a map, which represents something like the lines of force in the parts of the customer's life that are of interest to an innovator. The purpose of drawing that map is to locate a treasure we're calling authentic demand.

Everyone who's ever sold a product that met an authentic demand knows the feeling. The customers don't need to be convinced to buy. Selling doesn't feel like pressuring the customer. To the contrary customers act like salespeople themselves, promoting themselves as buyers.

People who are standing in line trying to get into a popular club, or saving money for their dream car, or entering contests to buy concert tickets, are customers acting as their own salespeople.

If you are someone who has managed a large sales force you probably have a feeling for authentic demand. All sales forces include some who are better at selling than others. An expert salesperson in a direct sales environment can often manufacture a version of authentic demand for an individual customer, even when the product alone doesn't meet a not not. But when the product does answer a genuine not not that's otherwise unmet, the experts will sell more easily, the non-experts will also perform well, and the results will be apparent in rising conversion rates and revenue.

What is an authentic demand? It's the draw to close a gap that separates the way things are now from the way things might be that would allow us to fulfill our not nots. In the Humminbird example, recreational anglers on boats are drawn to a situation where the children and spouses on the boat are content to be there. They are not drawn to a situation where they've caught the maximum number of fish. In the language favored by Clay Christensen, people have jobs to be done, and they "hire" products for those jobs. Theodore Levitt was making a similar point in his famous manifesto Marketing Myopia, when he wrote that customers weren't looking for a quarter inch drill but for a quarter inch hole. The most useful discussion of this phenomenon, though, doesn't come from Christensen or Levitt but from the philosopher Martin Heidegger. Heidegger called the things people use in order to go about coping with their daily lives "equipment," but he used the word in a very broad sense.

Equipment can be nearly anything; a hammer to drive nails, a credit card to pay today's bills with tomorrow's money, software for making presentations, the phone number of a good attorney, clothes to keep warm or look good, and on and on. Equipment is purely situational. A hammer works as equipment in a situation that involves hammering, but isn't equipment at all in a situation that doesn't. Equipment in its proper situation is something people simply take up and use. If you saw someone trying to drive a nail into the wall using the back of a smartphone, and you handed them a hammer, they'd put down the phone, take up the hammer, and drive the nail with it. The phone is likely to be a noticeably problematic piece of equipment in this situation; *not picking up the hammer would not be ok.*

Finding the Treasure

Why bother with philosophy and theory though? Why not just ask customers what they want? That's exactly what Jim Balkcom did, again and again, with no good results. Our hopes, illusions, confirmation biases, and a myriad other ways we make judgement errors lead us to imagine we know where to look for demand, expect to see it, and dismiss the possibility of indifference. Like Humminbird's market researchers before Sue Symon, we ask the wrong people the wrong questions. We misconstrue answers and mischaracterize the situations customers find themselves in. The purpose of the theory and philosophy is to see through the fog, cut through the clutter, and uncover and get a grip on authentic demands.

In our experience, the phrase “authentic demand” is very easy to adopt, but the concept is not. Almost any innovator can explain why their product or invention “meet’s authentic demand.” Why then, are customers so often indifferent to their products? The not not principle, and the authentic demands it can be used to uncover, work reliably only when they’re used systematically, following a science-based process of testing and disproving hypotheses.

What innovators often miss is that most of the time, in most situations, the “equipment” is already there, as part of the situation itself, and the authentic demand that exists is already satisfied. Established products and businesses run on this basis. People will not not eat food, so equipment like grocery stores become part of the situation they find themselves in. To use Clay Christensen’s terms, why will the customer fire whatever they’re using to do the job now, and hire your solution? Christensen’s metaphor is useful, but it doesn’t shed light on whether there’s authentic demand for any particular job to be done. It doesn’t provide a basis for understanding why Jim Balkcom’s original customers wouldn’t just fire their current fish finder and hire a more effective one.

Unmet authentic demand exists when situations change or when not nots come into conflict. Prior to the Covid-19 pandemic grocery delivery was, for most people in most situations, a matter of indifference. Then, as now, not having groceries was not ok, but a supermarket that could be visited was an acceptable piece of equipment, so choosing between in-person shopping and online ordering and delivery was normally a matter of indifference. In a new situation, at the height of the Covid-19 pandemic, a supermarket that offers in-person shopping only can cease to be usable equipment for many people. Online purchase and delivery becomes the only option, and companies that offer it experience authentic demand.

Sometimes, though less often than innovators hope, introducing a new product can itself create a new situation that generates authentic demand for that product. Telegraphs, radios, web browsers, cell phones, and smartphones are all examples of product types that changed the situations markets full of people experienced, such that they could not not reach for these products.

Is the customer’s situation adequately understood? Has a gap, an authentic demand, really been identified? Is the product properly designed and situated to close the gap and meet the demand? These aren’t questions that can be answered in a vacuum. Reliable answers only appear when innovative creativity is married to a systematic process of testing ideas while managing biases and cognitive illusions.

Humminbird was a small company with a straightforward consumer product. But the same rules hold true for global enterprises facing complex shifts in the technology environment – companies like IBM when it was challenged by the growth of the internet. The expansion of the internet during the late 1980s and early 90s was a genuine authentic demand phenomenon. People and companies at all levels could not not engage with it in some way. Looking at the opportunities

and threats facing IBM through the lens of not nots goes far to clarify that situation and how IBM responded to it.[4]

IBM WebSphere

Before the web, the only people who interacted with a companies' IT systems were employees. Today, literally billions of people routinely interact with these systems to shop, do their banking, and for other purposes, all without the intervention of anyone from the company. This is the story of IBM's role in that transition. IBM's first foray into the web was comparable, in terms of revenue size, to the first years of Humminbird Fish Finder. But over a decade they built an $8 billion annual business, largely by solving problems in a way that looks very similar to the not not approach. The challenges the WebSphere team faced along the way were considerably more complex than the ones faced by Humminbird, making the not not, authentic demand way of thinking even more important.

In the late 1980s, IBM was hemmed into a difficult situation by a web of not nots, and looking towards a bleaker future. The company still made the core databases and tools that most large enterprises used to store and manage their data. But the ground had shifted, leading to a tangle of new opportunities and challenges:

- For makers of enterprise solutions, the new priorities weren't just about information update and storage. They involved distributing information and providing access and interactivity.
- Customers were being offered more choices of software and solutions spurred on by the emergence of personal computing.
- Personal computing and emerging corporate networks meant enterprises large and small were competing to leverage an increasing number of automation solutions.
- The community of developers leveraging personal computing standards like Microsoft Windows was emerging as a crucial stakeholder.

In this environment, IBM was no longer the sole 'hub' for enterprise-level software/hardware solutions, and it was starting to lose market share. Microsoft emerged as a counter force in the world of enterprise computing, spearheading so-called client/server architectures, which ended up being a transitional phase between traditional mainframe systems and the web.

So by the end of the 1990s, IBM's dominance had taken a blow. It was then that the web emerged an even more disruptive technology. Consumer-usable internet access is one of the rare technologies that generates its own authentic demand. Once it existed, people and companies throughout the economy could not not have it. The internet and its emerging open standards, like universal browsers, were making computing solutions even more accessible to everyone,

[4] One of the authors of this paper, Danny Sabbah, was part of a small team leading IBM's efforts at the time, and this next section is from his perspective.

anytime. Then-current Client/Server solutions were effective within single organizations but could not hope to deliver broad access in the emerging internet centric world. The enterprises that were IBM's key clients needed to respond to their own customers who came to demand self-service marketplaces they could manage their bank accounts, buy consumer goods, airline tickets, insurance, and so on, without the intermediary of an employee sitting at a terminal, allowing them freedom to do their business at their own convenience, day or night.

As consumers got used to using browsers to conduct transactions, IBM's enterprise customers had no choice but to create web-based solutions; they could not not have the tools needed to develop web-based functionality. They could see the future well enough to know that without these functions they'd be shunted into the slow lane. IBM faced the same threat. At the same time, it was an opportunity to regain market share and relevance that had been lost, largely to Microsoft, during the client/server era.

While IBM had the world's experts in mainframe tools dealing with high volume transactions and databases, it did not have the ability to create and sell products that customers needed to grab onto the web. The only good news was that the leaders in client/server technology didn't either. The question became: what exactly was the "equipment" that customers needed, and how could IBM provide it?

Inside IBM, some parts of the organization naturally looked at this problem incrementally. They believed they could adopt necessary technology and skills (principally a new computer language called Java from Sun Microsystems) and develop extensions to the mainframe tools they were already selling. Those people found allies in their customers' own development shops - people IBM had worked with for years who were comfortable with IBM tools. In their minds, there was clear, compelling evidence for this incremental approach based on surveys and direct interaction with counterparts at client companies. Just like Humminbird's market research prior to Sue Symons, they were asking the wrong people the wrong questions, and misconstruing the situation.

Where Humminbird had a few discreet challenges to overcome, having to do with distribution and with convincing engineers to remove what seemed to them like cool features, IBM faced a whole world of problems. Many different teams were working on competing solutions, some cautious and some radical, but none that, looking back, addressed an authentic demand. More than anything else they were designed not to rock the boat with existing customers. The competition and parallel activities led to more than a few tempers flaring, personal conflicts, and organizational gridlock. All together, our co-author Danny Sabbah, was able to name at least six different factions fighting for resources and attention.

From an executive point of view, bringing order to this chaos would have been more straightforward if they had the tools of not nots from the beginning. Without those tools, Danny and his colleagues struggled and fought internal battles, ultimately converging on solutions to the issues in an incremental, directed random walk. They were lucky given the core demand was authentic and the broader customer situation had not changed dramatically.

The three key members of the executive team, Danny, John Swainson, and Steve Mills, intuitively realized that the approach of simply extending old line mainframe tools to incorporate Java would not work. There was an emerging value chain, stretching from consumers, to companies that sold to them, to web centric developers (in-house and 3rd party), to the tools those developers needed to build their systems, and finally to IBM. The shift to the internet, and recognition of what could be done on the web, was happening at every level of that value chain. It couldn't be addressed incrementally. But at the same time it had to be addressed realistically, in ways that took into account the not nots of every significant stakeholder.

The Websphere team dealt with this tangle of issues piece by piece over a period of at least four years. In retrospect, They could have simplified and clarified the issues by using the not not approach, parsing the overall situation this way:

- Not having consumers using your web solutions was not OK
- Not having web centric solutions to attract those consumers was not OK
- Not having a platform for developers to generate those solutions was not OK
- Not having an ecosystem of developers and partners for that platform wasn't OK either.

Every one of the elements in the value chain was in flux. There was IBM, with its legacy systems built around mainframes, still prevalent in large enterprise solutions. There were Microsoft's developer tools, which were pre-eminent in client/server solutions, tools the web was quickly making obsolete. There was Sun Microsystem's Java, which had traction among developers as the cool, easy way to build web apps. There was also the emergence of open source tools like the Apache web server, which were rapidly proliferating in those "cool" developer circles but loosely managed and not acceptable to large enterprises.

What the Websphere team did, in effect, was to look at these loosely coupled situations in terms of the not nots that were hemming in each institution. For each one of them, those not nots added up to a predicament, an unacceptable situation where the participants were stuck. The job, for IBM and it's key partners, was to engineer ways for each party to escape from those predicaments. The Websphere team implemented an approach to connect the dots and position IBM for the web-based future. The reality was that there was no master plan and no explicit not not reasoning, but in hindsight the disparate pieces all fit together:

- Sun had what IBM didn't; a growing ecosystem of eager developers who went to Java parties and wore Java t-shirts and eagerly jumped into building Java apps. IBM didn't have and couldn't generate that kind of cool. However, Sun knew that the real money was with the large enterprise system builders - IBM's customers - and they couldn't sell in that world without IBM. The answer here was partnership.
- Apache was the premier web server architecture on the market, and it was free. Large enterprises couldn't use it; it didn't offer the kind of licensing or support that they required. IBM knew how to fix that. IBM funded the Apache non-profit organization, helped them create the kind of licenses enterprise customers needed, and made it all

available, still free. IBM wasn't accustomed to giving stuff away for free, but the Websphere team became convinced that as Apache turned into a standard among its customers, there would be plenty to sell. This decision was particularly noteworthy because there was an IBM team working hard to build a proprietary web server to compete with Apache. After a tough internal battle, IBM abandoned the in-house effort and went with the emerging, free standard.

- Programmers needed development platforms like Microsoft's award-winning and popular tool, Visual Studio (VS). But VS had two strikes against it: it belonged to a competitor, and it was oriented toward older client/server architectures. That gave IBM an opening, and it created Eclipse as an open source competitor, a developer alternative. Eclipse wasn't initially as good as VS, but with the connection to "cool" technology like Apache and Java it was the equipment that served the authentic demand. The developer community around the open source project flourished and continuously made it better. Given the cool factor that came with Java and the availability of free open source tools like Apache and Eclipse, students in universities quickly flocked to them, graduating a new crop of young programmers who were already familiar with them and dealing a solid blow to the competition for web solutions and tools.

Looked at it in aggregate, IBM's entry into the web space required the company to transform its typical way of doing business. It was a difficult but ultimately successful example of responding to new parameters in new ways. IBM was used to being the biggest kid on the block, selling everything it made (not giving it away), and making everything it sold. This was the first time in the company's then 80-plus year history that IBM leveraged open source offerings and recognized their potential relevance to the enterprise market. In fact, it predated the large-scale emergence of open source movements and licenses later driven by Linux in the enterprise space. It was the first time that IBM devised relationships like the ones with Sun and the Apache organization. Steve Mills provided executive leadership and corporate cover. John and Danny used their business and technical teams to drive the evolution of WebSphere and the core of Eclipse into the market. All in all, it was a successful, multi-faceted innovation, responding to an interconnected web of not nots and providing IBM and its partners access to new opportunities.

Ultimately, though, the company's way of doing business hadn't fundamentally changed. IBM still sold customers software tools for managing and storing data in transactional environments; in this case, tools for self-service solutions around the web. Hence the core of the demand had not really changed. It had, instead, transformed. Modern large business enterprises always have, and still do, need ways to keep track of transactions and other events. They need to allow or disallow transactions, set expectations, record whether they've been met, and update rules and expectations based on ongoing activities. A bank must approve a loan, transfer the credit, notice that payments have or haven't been paid, and note when the loan has been paid off. A factory must note that an order has been placed, that it has been fulfilled, and so on. Much of this information has to be available and updated continuously and often simultaneously to avoid conflict and confusion or even double billing or double ordering. To say that modern large enterprises need these functions is also to say that these modern enterprises can scale to millions, even billions. None of that had changed with the emergence of the web. Indeed, the

need had actually grown as a result. The main difference was an altered situation and an altered set of not nots for IBM, its partners, customers, and competitors leading to altered technology solutions.

Conclusion

The not not principle is particularly useful for clarifying situations and discerning ways forward in business because it reflects the actual structure of how consumers and other stakeholders typically behave. Not nots, once discovered, are usually simple and straightforward to understand and validate. But the urge to take them for granted and skip the validation process has to be resisted. Crucially, “not nots” are difficult to uncover because embedded assumptions, confirmation bias, and motivated reasoning lead us to look for them in the wrong places, and see them where they aren’t.

Jim Balkcom looked in the direction of a more effective fish finder because everything from the name of his company, to the choice of people to speak with, to the phrasing of his questions led in that direction. It was difficult not to assume what seemed obvious: a better fish finder would sell better. Better at what? At fish finding of course. Only a clean break from those assumptions and biases led Fish Finder to more clarity and ultimately to success. IBM, similarly, had to overcome the momentum of many years building false confidence with a poor set of assumptions driving confirmation bias. Had Danny and his colleagues had the benefit of “not not” reasoning, decisions would have been quicker and more definitive. They would have more rapidly realized the appeal of new developer skills to new developers not tied to existing product directions (e.g. the emergence of open source). Even with the benefit of hindsight, teasing out the actual ‘not not’s’ required extensive and deep discussion. If they had done that in real time they would have avoided much of the resistance and constant infighting. They would have made an earlier, cleaner break with the past toward the new direction ultimately manifested as the WebSphere brand. They would have done a better job of seeing through biases to a more authentic view of actual market demand. Innovation could have emerged more deliberately.

How do we get innovators to see the not nots? As discussed above, the Center for Deliberate Innovation and its commercial counterpart, Flashpoint, have offered participants a systematic approach to understanding authentic demand and what it means to be a customer using the “not not” framing. The principles and systems are designed to account for and manage the innovators’ biases and cognitive illusions, and offer a range of new tools to address innovative challenges. Innovation does not have to fail. Certainly not at the rate it does now. Attention to the methods of innovating *deliberately* to uncover authentic demand can substantially improve the situation.