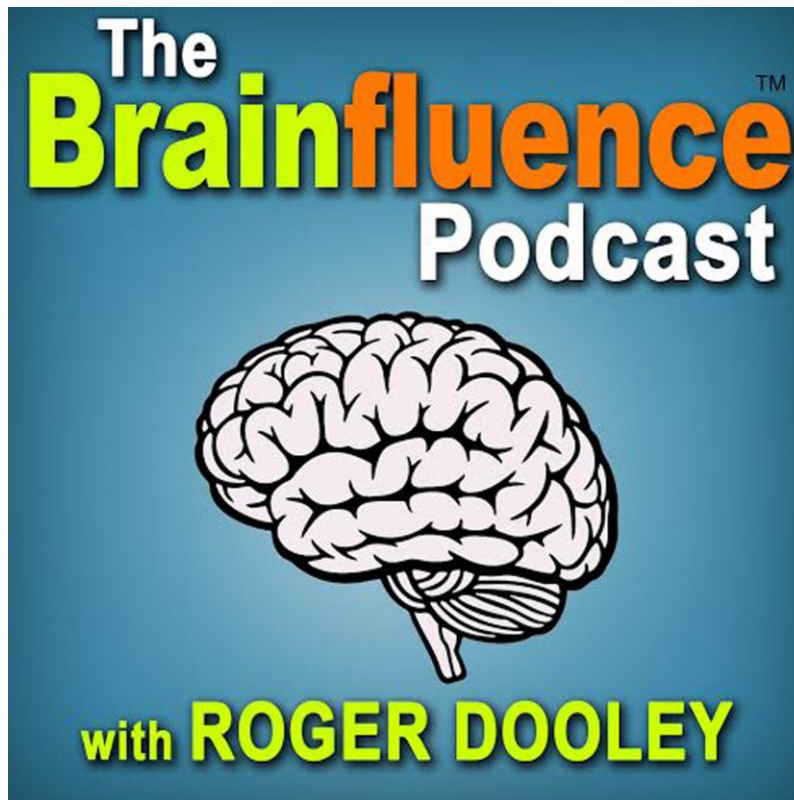


Ep #79: Solving Business Problems with Science



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Roger Dooley

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Welcome to the *Brainfluence Podcast* with Roger Dooley, author, speaker and educator on neuromarketing and the psychology of persuasion. Every week, we talk with thought leaders that will help you improve your influence with factual evidence and concrete research. Introducing your host, Roger Dooley.

Roger Dooley: Welcome to the *Brainfluence Podcast*. I am Roger Dooley. My guest this week, you might say, is a business scientist. He is a Texas Aggie engineer and has a Masters from MIT. His company, Business Laboratory, uses the very latest scientific techniques and methods to improve the performance of mid-size and large corporations using problem solving, optimization, and advanced forecasting.

He has thirty years of experience in corporate strategy across a wide variety of industries: manufacturing, energy, telecommunications, transportation. In the past, he founded Industrial Science, LLC and has held executive positions at nGenera Corporation and Arthur Andersen.

His clients include BP, Sun Microsystems, Schlumberger, Manpower, Target, AstraZeneca, and many others. His new book has a title that will really appeal to neuromarketing listeners, *Profit from Science: Solving Business Problems Using Data, Math, and the Scientific Process*. Welcome to the show, George Danner.

George Danner: Thank you, Roger. It's nice to be with you.

Roger Dooley: So, George, I love the idea that you're applying science to business but doesn't everybody do that sort of?

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George Danner: I think everybody solves problems day in, day out. If you take a look at what people do every day is they're confronted with some kind of challenge. Now some people solve that with a bit of discipline. Some people just jump in there and use spreadsheets and just get it done.

What I'm trying to do with the book is put a bit of a crispness around that so that when people go to solve problems they're doing so with data and with models in a way that makes the solution sustainable. Not just a one-off.

Roger Dooley: Okay. Well explain what you mean by sustainable.

George Danner: Well a lot of people for example when confronted, say, with a marketing question about their market size or how big the different segments are and so forth, we'll pull out a spreadsheet and they will enter in the data that will get the answer that they want. They'll report that up to the leadership team.

A year from now, when that same question comes up, they'll repeat that whole process. That's really something that should be codified, that expertise about crafting the markets and data, metadata, about those markets, should be codified in a model that is revisited year-on-year and not recreated every time. And there's dozens, hundreds, of examples of those that people do every day, week in, week out. So I'm arguing for good, sound modeling principles in practice in everything you do, particularly when it comes to solving complex problems.

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Roger Dooley: So I guess one question to ask yourself would be, “Am I ever going to have to do this again? Is somebody going to ask the same question six months or twelve months from now?” Or, “Are conditions going to change and we’re going to have to find out a similar answer?” If that’s the case, then what you should really try and do is implement some sort of methodology so that it can just be reapplied again, right?

George Danner: Well that’s exactly right. I’ll add to that, that often these questions take on a new life. So this month you might be asked about statistics around your customers and your customer segments and so forth and then you might be asked, “Hey, you did a great job on that. Can we use that in a pricing problem that we’re trying to solve over here? Or should we use that to carve up our sales territories?”

These things tend to have a life of their own and poor practice would be to just keep on extending the same spreadsheet. Best in practice would be to take that on in a serious way and apply a dose of science and analytics to it to create an institutional object that would be a model that would define those things for the corporation.

Roger Dooley: Yeah, George, I don’t want to start a war here, but in your book you say that scientists are the best problem solvers. I’m an engineering grad myself and I was always taught that engineers were the best problem solvers because what they do has to work in the real world unlike those sort of theoretical scientists over there. So I’m going to make you justify that statement.

George Danner: [Laughs] Well, that’s a good question.

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Roger Dooley: You're an engineer too, right?

George Danner: I certainly am.

Roger Dooley: Yeah, so ...

George Danner: What I was really trying to say in the book is that I was contrasting two different disciplines. I was contrasting science that's been around arguably for twenty-four centuries using the scientific method. And then you have modern capitalism that has been around, oh let's say, three centuries. Well I think the fact is that scientists over time have honed the scientific method and they have been solving problems for two millennia. There's something to be said for the durability of that concept.

When we go to solve problems in the capitalist domain, when we're confronted with standard day in, day out business problems, we can reach over to science to get science to teach us how to treat those business problems. We've all learned the scientific method when we were eight, nine, ten years of age but we tend to sort of check it at the door when we walk in to our corporate locations and we go to solve those problems. And I think that's wrong.

I think we still need that good, disciplined approach of the scientific method guiding the way for us. By the way, when I say science, I mean science really gave rise to engineering as the industrial age came to the fore. So I treat engineers and scientists pretty much with the same broad brush.

Roger Dooley: Okay. That's fair enough then, George. I think that most of our U.S. listeners, and I'm guessing many of our overseas listeners, dread a trip to the DMV, the

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Department of Motor Vehicles. It may have different acronyms in different places but that's the office where you get your driver's licenses and auto registrations.

It seems that in many states in the U.S. at least, these are characterized by indifferent staff, long waits. I have seen some improvements. Mitch Daniels in Indiana, when I lived in Indiana for quite a while, he took over and actually made them fairly efficient and customer friendly. But you've worked on at least one DMV project, haven't you?

George Danner: I certainly have. It was, let's say, a target-rich environment for making some improvements. Now this particular state had 200 DMV offices scattered across the state. About half of them were in what's called "spec space," which is in a shopping mall, let's say. And about half of them were in more expensive, stand-alone space.

So the idea was, "Well, gee, how can we" ... and this is a common business imperative ... "How can we do more with the same footprint of space?" given the severe budget limits for this particular state. They had a larger proportion of non-English speakers coming into the offices being served. In the U.S., we passed the Patriot Act which adds a little bit of time to every driver's license transaction.

So all of these sort of shifts were underneath them and they were trying to effect good policy, good strategy. What's the right thing for us to do with our DMV offices going forward? How do we serve more customers better over time? So what we did was we committed that to a scientific process. We modeled a DMV office and we literally took a day in the life of one of these offices and

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then we started to run some experiments with it. We tried kiosks for certain transactions. We restricted some transactions to certain times of the day. First in, first out is a terrible way to manage a queue of customers, so we experimented with that as well.

It turns out that it wasn't any one sort of magic bullet that dramatically raised our throughput. It was this strange combination of various things that people suggested that we try that ultimately won the day. Since then, this particular state, and this was done well over ten years ago, this state has not added a single DMV office and yet they're serving all of those new customers given that their state population has grown a good bit in recent years.

Roger Dooley: Well that's great. I think that you probably highlighted one of the experiences of many consultants, where often the answers and the ideas lie within the organization, but it takes a structure or a process to bring them out and actually make them work.

George Danner: That's exactly right. I go into this in the book, that there's a tremendous amount of human knowledge and experience in our companies. They don't lack for ideas on how to improve their internal systems. What they lack is just an analytical forum in which to test their ideas.

That's where simulation modeling really comes into its own. It allows these people to express thoughts that they had, experiments that they had hypotheses that they have in their minds, and how to put those together in creative ways to ultimately improve all of our businesses.

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Roger Dooley: Yeah, I think it's good that governments are actually trying to use a little bit more science. I can't say it's totally pervasive. But on the behavior science side, we're seeing a little bit of that too where our U.S. President Obama has his nudge group that uses behavioral science to try and implement better outcomes for things like retirement planning.

In a previous segment of this podcast, I had Robert Cialdini on and in his latest book he describes how in the U.K. they increased tax compliance by using some of his principles of persuasion. Notably in that case, social proof, by crafting letters that employed this particular approach. They were able to get much higher compliance and collect hundreds of millions of pounds more in taxes than they would have otherwise. But it seems like still applying science in this manner is the exception rather than the rule.

George Danner: [Laughs] Well, unfortunately, it is but it's growing. I will say I'm very encouraged by recent government moves all around the world in increasing the volume of data. The U.K. government has stepped forward and made a lot of their data, put a lot of their data, in the public domain. I don't know if you're aware of this but the U.K. government makes the position of every train on the London Underground available in real time, every thirty seconds.

So that's the kind of thing that governments have been doing lately, really improving their posture with data so that not only other government agencies can use that for the betterment of the performance of their agency but also so that other public-minded people, citizens, can take that data and learn patterns with it, try to

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understand it, and suggest ways for our governments to work better for the population.

Roger Dooley: Are the tools to do this kind of thing becoming more accessible?

George Danner: They really are. That's another great piece of news. I recently read Walter Isaacson's book, *The Innovators*, and one of the themes that came through very clear in his book was we make these technological leaps every time there are two or three technological innovations that live in the same period of time. I think this confluence of better tools that are easier to get to, increased access to data, and the computing power that we have these days, have now given rise to sort of analytics on a mass scale inside of organizations.

My message with the book is that people who five years ago, ten years ago, may not consider using analytics, considering that a domain that was inaccessible, I would give that another look. Because we now have lots and lots of tools. We've got lots more data. And we've got the computing horsepower capable of running sophisticated models.

Roger Dooley: In general, does the amount of web and mobile data give you a lot more to work with?

George Danner: It does. I'm very encouraged by the recent moves by various organizations to essentially make the web computable. There's an entire body of work going on in the semantic web. What that's going to do is essentially turn the web into a gigantic database that programmable systems can now access.

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So for example, I believe it's Best Buy has their catalog as a computable object. So you don't have to go through APIs and all of that sort of rigmarole to get to elements on their catalog. You can actually get to them through a computable device and a program that you can run.

Roger Dooley: Very interesting. George, what kind of projects have you done in the marketing space?

George Danner: Well, one we did a few years back was really exciting. We had a chance to work for a major retailer and that retailer was challenged with the idea of where do we put our stores? I mean, it's an age-old problem. It's not a new problem. But they wanted to go at it in a new way. They really wanted to take that issue and make a science out of it.

Up to now, there had been five or six human experts that essentially decided where they're going to put a new store. And they did pretty well, really well, in fact. But there was a feeling that we could augment the knowledge that these experts had. So imagine the challenge. I live in Houston and in Houston at that time there were about twenty-seven stores in the metro area. It's since grown to over fifty.

So if you have a collection of stores in an area, where do you put them? Do you go downtown where it's a little underserved? Do you interweave them in with the footprint of existing stores? Do you go way out in the suburbs? Or do you do some combination of all three of those? It's a very complex question. Not to mention the fact that this particular retail chain did business in all of the sixty major U.S. metro markets and they told me that

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shoppers in Chicago are very different from the shopper behavior in Denver and Baltimore and the like.

So you had to account for all of those local differences as well as geographic differences. Take Seattle. Seattle's got a strange shape to it, if you will, because of a body of water sort of sitting right in the middle of it. So they decided to commit this effort to a model. They essentially wanted to create a laboratory where they could open a store in virtual space and run a simulation of lots of agent buyers and then take that store and say move it five miles to the east and rerun it. Or close a store and rerun it. And every possible combination of adding and closing stores they could experiment with.

The data they used was from their affinity cards. Now their affinity cards were held by roughly ten to twelve percent of their shoppers but it was a big enough sample size where you could make fairly accurate projections across the entire space of their customers. So they did this and they narrowed the window of forecasting of first-year store sales from a band of plus or minus twelve percent to a band of plus or minus four percent.

Roger Dooley: Very interesting. I know my friends at Bryan and Jeffrey Eisenberg are working on a site location project too that sounds like a little different emphasis focused on evaluating the potential of a site or particular sites for say a new outlet. But again, basically crunching a whole bunch of data to get that as opposed to the usual sort of expert analysis process of hiring a consultant who goes out and looks around and provides an opinion that may or may not be valuable.

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George Danner: Right. You know, it used to be, Roger, that we had this sort of false argument I would say between human experts and models. I think best practice today is really thinking about models as leverage points for the experts because when you think about it, who are the best people to provide the content and the logic for these models? They're people who are the human experts. Maybe collections, maybe committees, of human experts come together to build a model of their knowledge along with parameter data that you necessarily need to put, say, one site to another site to another site.

So it's really... the right kind of modeling today is pulling the human into the decision loop. Not pushing the human out of the decision loop because one of the things that we have yet to build is a computer that's as fast as the human brain in one particular thing, and that's pattern recognition. The human brain is far more efficient than any computer ever devised in that one area. Therefore, a lot of the models that you see these days that draw the human into the decision-making loop make advanced use of visualization.

So I don't care what kind of model you have, whether it's a factory or a bank or of a market of consumers, if you add visualization into the mix, you're appealing to those people who have a decided stake in the outcome of this model and can actually participate in the critique and debugging interpretation of that model. As long as there is a strong dose of visualization.

Let me give you a brief story. I was working with a model of an airline and we literally showed a day in the life of that airline, the planes running around across the

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country as the route schedule unfolded. As we were reviewing this model with the team there at the airline, somebody from the back of the room raised their hand and said, “I see you still have that flight from Amarillo to Omaha.” I’m making up locations. “You know, we’re planning to cancel that next week.”

Well that was very valid information that I needed to revise the model. It’s unlikely that that person would have deduced that simply from a large table of rows and columns of numbers but they were able to critique it because the model was very visual in nature.

Again, back to what you were saying about the tools these days. That’s probably the one area that’s grown the fastest and the most, which is our ability to visualize these models. The visual tools, the ability to use shape and color and scale to express complex mathematical outcomes is really ... there’s a feast of offerings in that space today.

Roger Dooley: Yeah, I think the level of automation is getting better too. I was surprised this morning, I have a little dashboard program that I manually update, just with a few metrics that I keep track of for my business, and I was surprised that Google Sheets suddenly suggested about six or eight different ways to visualize the data.

I saw it was totally useless because they were taking two variables that didn’t necessarily relate to each other, but nevertheless, it was really interesting how suddenly they said, “Okay, here’s a bunch of ways you can look at your data.” And it found ways to plot them and a few of the charts were actually pretty significant and interesting. They were somewhat similar to the ones that

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I had created but I think that's great and I'm sure that's just scratching the surface of some of the more powerful visualization tools out there.

George Danner: Well your illustration there is a perfect description of this symbiosis between human and computer. So you as a human, you know exactly what you need for your business and you know what you're looking for in your mind's eye.

The computer can suggest ways for you to look at that and you'll say, "Ah, these are interesting. These are not. I'm going to go a little bit deeper with these choices that the computer has made." So did you arrive at that strictly from the computer? Did you arrive at that strictly from human knowledge? No. It was a little dose of both that came together in sort of a magic way and you ultimately and very quickly arrived at the right visualization you needed in that particular case.

Roger Dooley: Yeah. George, one of the things that I try and do is turn research and data that other people have done or collected and turn that into actionable advice for businesses that don't have the resources to go out and run their own studies or do those same experiments. In some cases it's social science research, in other cases it's business data.

I'm wondering if as you work on some of these projects you end up coming up with rules or practices that simply make sense and you could apply, or other companies could apply, across the board without actually having to do their own modeling and their own rather extensive project work?

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George Danner: Well yeah. I think you touched on it earlier. The level of automation in analytics is improving day by day. I think there are ways for companies to get at this without building huge teams and building a lot of infrastructure.

One illustration of this that I think is terrific is this new app on the market called IFTTT, I-F-T-T-T, it stands for “If This, Then That.” It’s a way to take a bunch of apps and build recipes for notification. So for example, I have a Fitbit, my wife got me one for my birthday. I could use IFTTT to tell it, “Look, whenever my Fitbit shows that I've got a heartrate that goes above 95 beats per minute, send my wife an email.” Or you can put a little device on your car that connects to an app on your phone and you could say, “All right, whenever my tires reach 10,000 miles, send me a little message and give me notification that I need to rotate those tires.”

So that’s all great as a consumer application but I think that also speaks to a possible business application where you could write your own recipes to get notifications on certain triggers in the business. It’s a brilliant metaphor for doing what they are currently doing in the consumer space but doing that on an industrial kind of scale in any business, large or small. Almost like self-service, or do-it-yourself kind of analytics.

Roger Dooley: Yeah and for our listeners who may not be familiar with the IFTTT product, it’s definitely worth checking out. I use it for a few things. You can, for instance, if you post a photo to Instagram you may want to also post that to Facebook rather than doing it yourself or to Twitter, for example. That program can do it for you.

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In fact, after Twitter severed its relationship with Instagram so that the photos no longer automatically appeared, a link would appear but no photo, I was able to sort of restore that functionality by using a simple little recipe, as they call them, and that's just scratching the surface. You can do some really complex things with that and now with the internet of things coming along, it's really going to be amazing.

George Danner: You bet, you bet. So I see an analogous form of IFTTT coming to the marketplace at some point so that companies can use this and essentially develop some of their own analytics. It won't be a complete model but it will be a great tool for those who are looking to build a more analytical organization.

Roger Dooley: I know a lot of our listeners are in entrepreneurial businesses or smaller businesses, how can they employ some of the scientific techniques that you advocate, George?

George Danner: Well certainly, the kinds of things that I write about in the book do not require a large-scale organization. It really is a good bit of health and hygiene, if you will, around tackling complex problems. So the book speaks to the scientific method. It speaks to good care and handling of data.

Data is almost free these days. The cost of measurement is near zero so I advocate capturing more data rather than less, businesses large and small. It really talks about going beyond the Excel spreadsheets for doing some calculations and it talks about people. You may not want to hire somebody fulltime to do data science. I mean, large corporations do that. But if you're

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a small business, an entrepreneurial business, you don't have to forego good, first-class data analytics because you can tap people that you may not have expected would be a good talent for doing this kind of work.

One of the things I write about in the book is what kind of people it takes to be good problem solvers. People ask me this question, I get it all the time. "Well, George, what makes for a good data science team? What people should I be hiring? I assume it should be lots of Ph.D. mathematicians." And the answer is, no, not necessarily. Some of the people who are the very best problem solvers and model builders are programmers. It turns out that programming, by its very nature, requires you to think in terms of systems. To have a certain attitude toward data. To very clearly and methodically line out the functionality of a particular program, which also could be a model.

So if you presented me with two people, one a very good mathematician and one a very good programmer, I would choose the programmer over the mathematician. No insult to mathematicians, I think they're great. But programmers are a very fertile ground for tapping to do this kind of thing. So lots of entrepreneurial businesses have people who write code either as part of their work or on the side, or maybe they're even gamers. Those are excellent candidates for doing problem solving in the way we're describing here. Doing it with data and mathematics.

Roger Dooley: Well, let me remind our listeners, we're speaking with George Danner, author of the new book *Profit from Science: Solving Business Problems using Data, Math,*

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and the Scientific Process. George, how can our listeners find you and your content online?

George Danner: Well sure. I have a website, it's www.Business-Laboratory.com. They will also see my blog there and will also see a link to the book.

Roger Dooley: Great. We'll have links to those resources and your new book and anything else that we mentioned during the course of the show. And those will all be on the show notes page at RogerDooley.com/Podcast. And we'll have a text version of our conversation there as well. George, thanks for being on the show.

George Danner: Thank you for having me, Roger.

Thank you for joining me for this episode of the *Brainfluence Podcast*. To continue the discussion and to find your own path to brainy success, please visit us at RogerDooley.com.