

THE STATISTICAL CONSULTANT

Section on Statistical Consulting
Murray K. Clayton, Editor
Winter 1997: Volume 14, No. 3

American Statistical Association

In this issue Murray Selwyn provides valuable information on starting your own consulting company. His article is followed by some personal thoughts of Christy Chuang-Stein on the experience of consulting. Finally, Richard Browne offers a perspective on the difficult task of keeping up to date on new methods.

Starting Your Own Statistical Consulting Company

Murray R. Selwyn, Ph.D.
Statistics Unlimited, Inc.
P. O. Box 13368
Savannah, GA 31416
suims@ix.netcom.com

Introduction

An alternative to working in a large organization such as a pharmaceutical company or in a cooperative clinical trials group at a university is to function as an independent statistical consultant by forming and running your own company. In this article, we compare the two environments as to their similarities and their differences. We provide guidance to anyone interested in independent consulting as to what additional duties may be involved and what factors are likely to be most important in a successful consulting company. Recommendations are based on the author's experience of more than a dozen years as an independent statistical consultant.

Our own company, Statistics Unlimited,

Inc., has five permanent employees (one Ph.D., three Masters, one Bachelors) and has been in business since 1986. We operate from two sites: leased office space in Westford, Massachusetts, and an in-home office in Savannah, Georgia.

Similarities

There are a great number of similarities between consulting within an organization such as a pharmaceutical company or a university and working in a statistical consulting company. Our clients come to us with problems for which our statistical expertise and experience can be brought to bear. We may be brought into a project at any stage ranging from the pre-protocol phase to data analysis or even to review someone else's data analysis. Our clients may be statistically naive or statistically savvy. Some projects may be very short such as a few hours or a day, while others may go on for an extended period of time such as several months to a few years.

Like statisticians in other organizations, we attempt to develop a good rapport with our clients. In addition, every time we are faced

with a new subject matter area, for example, a fundamentally different type of clinical trial because the disease or condition under study is different from others in our experience, we need to learn new terminology and to understand from our clients what issues are most medically or biologically important. As our experience in a particular area grows, we find we are better able to generate insightful suggestions for study design or analysis methods. In our company, because of our ability to interact closely and cooperatively with our clients, we find that we have a large segment of repeat business.

Differences

The major difference between consulting for a single organization and working in a statistical consulting company is the diversity of the clients and projects. Because our clients come from many companies and can have vastly different interests and backgrounds, we find that the projects we work on and the aspects of them that we are assigned provide us with great variety. We deal with a large number of people in many organizations. However, the fact that many of our clients are not just down the hall or on another floor of our building or even in the same city makes our communications with them different than for statisticians consulting only within a given organization. We therefore rely heavily on telephone, FAX, letters, and e-mail for a large portion of our communications. There have even been a few clients whom we have never met face to face.

The second major difference relates to the size of the statistical consulting company. With a small company such as ours, there is no bureaucracy or red-tape for many decisions. For example, if we want to buy a new computer (and we have sufficient funds on hand), we just buy it. If we want to make a job offer to a potential new hire, we write him/her a letter or make the offer by telephone. There are no levels of management to go through and no forms to fill out (in triplicate!). Even our

performance review system is simple and informal. All such decisions are made by one or a few senior people.

The size of the organization, however, also means that there are no real “support” functions: no corporate travel department, no accounts payable, no accounts receivable, no mail room. In some cases the President/CEO of a small company is also the mail boy.

Why Start Your Own Company?

There are many possible reasons for starting a statistical consulting company. If an individual has an entrepreneurial spirit and is ready for a change, it can be both challenging and rewarding to run one’s own company. Certainly one needs a great deal of experience and a reasonable reputation in any area that one is to specialize in. This is not an undertaking that someone can readily do fresh from graduate school.

A very common situation, however, relates to the changes in American industry that have been taking place over the last fifteen years or so. With frequent mergers, consolidation, downsizing, and restructuring, many of us find that we are no longer satisfied with the composition and opportunities within our current organization. Because of the limited number of high level positions available and the fierce competition for them, becoming an independent consultant remains an attractive alternative.

Marketing

Perhaps the most difficult aspect in starting or continuing with a statistical consulting company is the constant need for marketing. This should be an ongoing activity and at least some effort needs to be devoted to it on a regular basis. It is especially difficult when one is starting a new company and has no history of successfully completed projects. The best advice I could give someone starting a new statistical consulting company would be to have at least

one or two projects in hand (if possible, totaling six months worth of work) before making the change to a full time consultant.

Another difficult aspect of marketing is that, as we tend to get very busy with some of our projects, there is the tendency to forget about this critical part of the business. Unfortunately, this often leads to a cyclical trend of being very busy for a while and then not busy because the marketing activity has been neglected. Because it usually takes at least a few months and sometimes even a few years for these efforts to pay off, one cannot neglect this important function in a consulting business.

In our company, we have an ongoing marketing program with five major components: publishing statistical and/or scientific papers; making presentations at statistical or scientific meetings; exhibiting at scientific meetings; regularly contacting current, former, or potential clients; and generating and distributing a quarterly newsletter to clients and potential clients. We have rarely used advertising as this tends to be quite expensive and in our limited experience, it has not paid off. One of the people in our company handles the office administration and marketing duties as her only responsibility. Others in the company spend a limited amount of time on marketing (less than 10%).

Other Administrative Functions

Running one's own company is an interesting experience and one for which we are ill-prepared by our formal training in graduate statistics programs. In addition to the marketing function described above, there are a number of other administrative functions that a successful entrepreneur needs to deal with. Among these are standard personnel functions such as hiring, performance evaluation, and the like; office administration; payroll; taxes; accounts payable; accounts receivable; and bookkeeping. In a small company such as ours, one cannot really afford to have full time administrative staff and so most of these func-

tions are performed by the owner.

While the range of functions may seem quite daunting to the uninitiated, one learns to accept these responsibilities as a routine part of the business. Initially, the advice of a good accountant is very helpful in putting procedures and systems into place. Moreover, there are now many PC-based programs to help the entrepreneur. After performing these functions for 11 years now, I find that they take only a few hours of my time each month.

In our company, we also provide almost all of our own computer support. We run SAS on our DEC MicroVAX 3100-85 in our Westford office with high speed telecommunications from our Savannah office (a wide area network). One of our staff members serves as the VAX system administrator.

Rate Setting and Project Costs

Our commercial consulting (billing) rates were established at the start of the company by comparison with other similar companies. They have risen modestly, yet steadily throughout our history. For almost all projects, we find that we have one of two possible fee structures: (1) the fee is simply figured by the number of hours expended at each level times the standard rate, plus incidentals (Federal Express, computer costs, travel); or (2) a fixed fee set in advance based on an initial estimate of hours.

Recommendations

Becoming an independent consultant and running one's own statistical consulting company can be a challenging and rewarding experience. Although there are many similarities with internal consulting in a large organization, there are also a number of differences.

To start one's own company, the new entrepreneur should have at least several years of practical consulting experience in the area of specialization. Because of the uncertainty

of future work, I would advise anyone starting out to have at least a half year's worth of projects lined up, if possible. Market, market, market. And don't stop when you're busy.

As the business permits, hire reliable, well experienced statistical professionals who enjoy and are challenged by the consulting busi-

ness environment. Be conservative in spending. Above all, strive to perform high quality work and meet all reasonable deadlines. If you do so, you will be assured of a considerable amount of repeat business from satisfied clients.

Thoughts on the Road of Consulting

Christy Chuang-Stein, Ph.D.
Director, Clinical Development Biostatistics I
Pharmacia & Upjohn Company
Kalamazoo, MI 49001

My Pathway

It has been 17 summers since I left graduate school and started my first real job at The University of Rochester. I remember vividly the trepidation I felt the first day as the primary consulting statistician at the University's Cancer Center. Despite the friendly smiles greeting me, I could not but wonder if I was adequately prepared for the job. Over the years, I have come to the realization that no one could be fully prepared for a challenging new environment no matter how much experience one has already accumulated. Certainly, I lacked confidence and maturity then as a brand new graduate. It is true that I participated in the walk-in consulting clinic as part of my graduate training at the University of Minnesota, but I did my share at the clinic half-heartedly and always felt relieved when my turn was over. As a result, I started my first job at the University of Rochester with a solid theoretical training but little real consulting experience to my credit.

It is fun now to reflect on the decision I made 17 years ago. Despite the uncertainty I felt about my ability as a consulting statistician, I did decide to become one. This decision also meant that I needed to overcome my defi-

ciency with the English language; I spoke Chinese exclusively for the first 22 years of my life. Becoming a consultant in the United States meant that I needed to improve my command of English so that I could communicate fluently and efficiently with others no matter what the subject matter might be. Aware of all the challenges waiting for me on the road of consulting, I still decided to go down that road. Deep down in my heart, I must have known then that consulting would open my eyes and mind to a rich and diverse world, leading me closer to a multitude of disciplines that look into the very secrets of our own existence.

The years at the University of Rochester Cancer Center laid the foundation of my consulting career. The projects I worked on ranged from biochemistry to physiology, from retrospective studies to prospective trials. There were frustrating moments as I realized how little biology and biochemistry I knew. However, the sense of accomplishment as my colleagues and I finished one project after another greatly exceeded the frustration. My theoretical training paid great dividends as I succeeded in applying statistical techniques to different fields. While I sensed the appreciation of my collaborators, I also sensed my own growth as a statistical consultant. Each completed project gave me another dose of confidence. With one small step after another, I increased my consulting experience both in breadth and depth. The learning experience was tremendous and I am forever grateful to the University of Rochester for giving me the chance to test myself out during those crucial career-forming years.

It wasn't long before I decided to get even further involved in consulting. After 5 years at the University of Rochester, I left the University for industry and totally gave up the regular classroom responsibilities. I joined the Pharmacia & Upjohn Company (then The Upjohn Company) in 1985 and have been there since.

My consulting experience at the Pharmacia & Upjohn Company took on a different dimension. As a large pharmaceutical sponsor, Pharmacia & Upjohn takes a team-based approach with a strong emphasis on the team's ability to attain corporate-set target timelines. In a highly competitive industry where the first drug in a new class to enter the marketplace enjoys great financial reward, there is every incentive for a pharmaceutical company to make decisions as early as possible — decisions to go forward with a development project or to terminate a research program. Frequently, statisticians are the bearers of unfavorable results in this environment. However, timely delivery of negative trial results can facilitate an early transfer of precious resources to other development programs, therefore contributing to the overall development efforts. Since publications are usually not required for promotion decisions in the pharmaceutical industry, the latter helps foster an atmosphere where methodological research is nice but not essential.

Corporations like Pharmacia & Upjohn engage in many research programs from discovery to manufacturing. Despite this diversity, statisticians typically work in focused areas without much crossing between areas. Compared to the academic consulting I was used to, the industrial environment gave me the opportunity to acquire more in-depth than broad consulting experience.

Learning how a corporation functions and seeing first-hand how the various components in the drug development process fit together is probably the most valuable experience I have gathered at Pharmacia & Upjohn. My ability to interact with a team regardless of the results I need to deliver has frequently been put

to test in such an environment. In addition, participating in the development of new drugs has exposed me to many interesting research projects which make statistical thinking and statistical applications so much more real and interesting for me.

In March of '95, I joined the management group at Pharmacia & Upjohn. The management position provided me the opportunity to look at other statisticians' pathways and their accomplishments on their respective roads of consulting. This opportunity has allowed me to learn from my staff members and in return to share my own experience with them. Even though I collaborated with many statisticians prior to March of '95, most of the collaboration tended to be on the technical side. Compared to the collaboration on technical subjects, the nurturing and coaching expected of a manager nowadays has injected a new dimension and, associated with it, new meaning to my pathway.

My Thoughts

What are the traits I have found essential for a consulting statistician to be effective? Traits I have been trying to develop for myself for years, and now instill in my staff members? What do I look in a potentially new employee? Even though in what follows I will speak from my experience in the health care and pharmaceutical environment, I suspect that what I am saying below is equally applicable to statisticians in other fields.

It is without question that an effective consulting statistician needs to have sound statistical knowledge and basic principles of statistical applications. In addition, an effective consulting statistician needs to have the following qualities:

- Organizational and leadership skills;
- Good verbal and written communication skills;
- Capable of innovation, able to adapt;

- Willing to listen and initiate discussion for solutions;
- Willing to learn the basics of a collaborating discipline;
- Having a high standard of excellence;
- Having the ability to appreciate the timeline of the customers;
- Open-minded about intercultural differences and willing to respect such differences.

In an increasingly dynamic environment, it is no longer enough for a statistician to just sit in the office and wait for clients to come. It is important that statisticians be excited about their discipline and enjoy being a consulting statistician. If a statistician can avoid an inward focus and, instead, enthusiastically embark on outreach efforts, the excitement and the value of statistics can be felt by our non-statistical colleagues far more effectively than any formal classroom preaching a lecturer in statistics might hope to accomplish. This is because our clients can see first-hand how statistical applications can help their own projects.

An individual needs to feel comfortable and secure about themselves before they can hope to win others' trust and confidence. A consulting statistician needs to learn how to take charge of a situation and run with it. With enough coaching and mentoring, I have found these abilities can generally be cultivated with time. However, an individual needs to have the necessary motivation and self discipline to put in their share of effort on this pathway where progress can be slow. This effort needs to be self-directing and will take time, but results are only possible where effort is made.

The above effort is related to the on-the-job training discussed in Chuang-Stein (1996). Because of the limitations of graduate programs, formal academic training is rarely adequate to prepare an individual to meet all the challenges faced by a modern-day consulting statistician. Therefore, it is important that one continue to grow professionally while on the job. Furthermore, it is important that a consulting statistician strive to gain maturity on the job since growth and maturity are responsible for an individual's ultimate independence at the work place.

A statistician needs to love his/her job. Without it, it would be hard for a consulting statistician to convey the message that he or she, as a consultant, can bring added value to a team. As I reflected on my own journey and observed those of others, I realized how much a keen sense of team spirit can increase one's effectiveness as a consultant in a group situation. From my experience, the desire to nurture oneself plus the ability to invoke team spirit often form the force that drives an individual to be better than the best.

As I stated at the beginning, no one is expected to be able to do it all without some mistakes along the way. What counts is to understand the elements for success and to address these elements through perseverance and determination. This process of continuous improvement is full of challenges. However, as long as one heeds the time-tested saying "where there is a will, there is a way," the road of consulting will be an exciting journey full of professional rewards.

Reference

Chuang-Stein, C. (1996), "On-the-job training of pharmaceutical statistician," *Drug Information Journal*, 30, 351-357.

Some Thoughts on Keeping Up With The Latest in Statistical Methods

Richard H. Browne

Senior Biostatistician

Texas Scottish Rite Hospital for Children

2222 Welborn St.

Dallas, TX 75219

rhbrowne@airmail.net

The question was posed on the back page of the Summer 1997 issue of *The Statistical Consultant*: How do you go about keeping up?

The “correct” answer is to say that I diligently read the latest issues of *JASA*, *Biometrics*, *Technometrics*, and the other mainline statistical journals. But in my own experience as a consulting statistician, I all-too-rarely pick up anything of immediate value by reading those articles. After 20+ years since grad school, I am becoming more inclined to let time sort the wheat from the chaff, rather than devote many hours to reading about a method that may eventually be found to be flawed.

Practically speaking, much of my “keeping up” is driven by the fact that my clients expect me to be conversant about the methods they see in their literature. One of my regular activities is reading the Methods sections of the major application journals in my field, such as *The New England Journal of Medicine*. If I spot a method that is new to me or is used in a way I have not seen before, I make a copy of the article and look up the methodology references. In one sense, that method now has the “Good Housekeeping Seal of Approval” and

should be part of any good biostatistician’s armamentarium. I use a program called Reference Manager to keep track of these articles so that I can find articles on a topic when the need arises.

If I want to learn more about a topic, my best tool today is the CD with the Current Index to Statistics on it. The results of the search usually suggest a couple of articles that are helpful. If I still have difficulty understanding a method, I keep an eye out for survey articles or for inexpensive one-hour and two-hour short courses at national meetings. When an expert gives an introductory overview of a subject, it is amazing how understandable a method can suddenly become!

Another thing I do is read the short course announcements in the mail. Most of those course topics have become accepted methods in the statistical community. If there are topics with which I am not familiar, I try to track down some basic information on them. Often, a textbook is listed that could be a good introduction or reference.

Another thing I do (though not a thrilling one) is to read through the user manuals of the statistical packages I have. Once a method makes it into a mainline statistical package, I consider it something I should at least know about. In addition, little gems may have popped up in the latest release of a package that you might not be aware of if you haven’t checked the manual in a long time.

I would be interested to hear what other people are doing to keep up, especially those who are solitary, non-academic statisticians (like me).

Notes from the Editor

- Some of you have been writing to ask about obtaining copies of Boen and Zahn’s book, *The Human Side of Statistical Consulting*. For a long time it

had been out of print. I’m happy to report that you can now obtain a copy from the Pharmaceutical Education and Research Institute. Individuals inter-

ested in obtaining the text can phone (703/276-0178), fax (703/276-0069) or e-mail (paulperi@aol.com). The price is \$25 which includes postage (in the US).

- I've had a request for more book reviews. If you've read a book that you found particularly helpful in your consulting activities and you are willing to write a review for us, please let me know.
- To me, consulting involves learning at several levels: first we want to learn as best we can what the client's problem and goals are, what the scientific concerns and constraints might be, and what the client's statistical needs are. We might also have to learn some new statistics to help them with their problem. On top of that, I think consulting is a continuing process of learning how best to work with clients. In that spirit, have you had any particular successes in the

consulting arena that you would like to share with us? I'm thinking especially of situations where, not only did things go well, but you learned something about the process of consulting at the same time. Or, maybe, a particularly dismal consulting experience taught you a useful, if perhaps painful lesson. If this strikes a chord, please give me a shout.

- As I mentioned in our last issue, let me know if there an article or topic that you would like to see covered in *The Statistical Consultant*. I'm eager to hear your suggestions and ideas.

As always, you can reach me via e-mail at: clayton@stat.wisc.edu
and by US mail at:

Department of Statistics
University of Wisconsin—Madison
1210 W. Dayton St.
Madison, Wisconsin 53706-1685

THE STATISTICAL CONSULTANT
Murray K. Clayton, Editor
c/o American Statistical Association
1429 Duke St.
Alexandria, VA 22314-3402