STATISTICAL CONSULTING WITHIN THE INTERNAL REVENUE SERVICE

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I. Who Are We?

The Statistical Support Section of the Statistics of Income (SOI) Division, of the Internal Revenue Service (IRS), is comprised of seven mathematical statisticians and one management analyst, all working for one section supervisor. We provide general statistical consulting services on request for various areas of the IRS, as well as for other branches of the Federal Government. Specifically, our Section supports its customers with:

Design of:

- samples
- surveys and questionnaires
- quality/performance control measures and processes
- IRS systems and products
- cognitive research studies

Analysis of:

- data from surveys, focus groups, and usability studies
- data from existing administrative databases
- data from MIS and telecommunication reports

Training of:

- customers and their field components in basic statistical methodology

Our products include written memoranda of sample designs or statistical solutions with extensive technical data attachments, on-the-spot and on-location solutions to implementation difficulties, and formal presentations to project leaders.

II. Our Mission

All of our short-term and long-term goals center around the notion of delivering the highest quality statistical consulting services possible, given our available resources. Quality, as we define it, mandates certain basic, but essential, key criteria. Therefore, we require that the products we produce:

- meet the customer's needs,
- are technically accurate, based on up-to-date statistical practice,
- are well-documented,
- are attractively presented, and
- are easy to use.

III. Keys to Quality

We have found that the two biggest keys to realizing our mission goals are our dynamic team chemistry and our focus on customer relationships.

Team Chemistry:

We have found team chemistry to be an intrinsic ingredient in being able to consistently provide a quality product to our customers. The makeup of our team, our mentoring program, and our open and informal work atmosphere are essential ingredients to our unique chemistry and to successfully meeting our goals.

The members of our team have been selected so that their education, skills, and preferences mesh tightly with the needs of the Section's mission. Although virtually all members perform statistical consulting in one form or another, duties can vary widely depending on the projects assigned. For example, one project may require that an individual or team formulate sample designs, sample sizes, and quality rates, while another necessitates the development of instruction manuals followed by travel to service centers to educate the customer on proper implementation. The diverse backgrounds of our team's members help enable us to effectively deal with the comprehensive nature of our work.

We have developed an informal mentoring program within our Section to benefit new and inexperienced team members. Responsibility on specific project teams can vary considerably, depending on the experience level of the team member. The younger, less experienced section members generally serve as project team members or shadows for larger

projects, allowing them to assume an observatory role and be guided by more senior members. However, once they have acquired some experience, they are given the opportunity to take on leadership responsibilities for smaller projects, furthering the learning and development process. Experienced members, on the other hand, often have leadership responsibility for multiple projects with widely varied timeframes. Nevertheless, we do not use the term "Team Leader" to describe that project team role, preferring to think of everyone as "Team Members" with equal status, despite experience and rank differences. Regardless of experience level, our roles and responsibilities on project teams are flexible, not usually formally defined, and change often, depending on customer needs.

The environment within the Section is friendly, comfortable, cooperative, and professional with excellent and unstructured communication at all levels. There is an unforced emphasis on camaraderie and teamwork. This work environment promotes an informal atmosphere conducive to the open exchange of information. There is also a conscious effort to push decision-making to the lowest levels. We are given the freedom to take the initiative when necessary and encouraged to take as much decision-making control as we can adequately handle. By establishing this kind of work setting and granting more than sufficient authority and decision-making power to do our jobs, we have found a way to balance the accomplishment of short-term goals while building cohesion and motivation critical to enduring excellence.

Customer Relationships:

While the Statistical Support Section is part of the Statistics of Income Division, our primary customers are the wide variety of organizations throughout the IRS. Our primary customers include, but are not limited to, the:

- Customer Service,
- Information Systems,
- Submission Processing,
- Communications Division, and
- Electronic Tax Administration

In addition, our Section is asked to support other, smaller, ad hoc projects for groups outside of our primary clientele. These differ from the larger projects in that they require less support from our staff, often needing only one staff member working part-time instead of several working full-time, and they are generally shorter in length, varying from a few days to a couple of months. IRS areas that have contacted us for this type of assistance include:

- Treasury Inspector General for Tax Administration,
- Taxpayer Advocate Office,
- Multimedia Productions Division
- Office of Performance Evaluation and Risk Analysis, and
- National Partnership Council

The single most important aspect of our service is that it is customer-driven. We actively seek to form long-term relationships with our customers, allowing us to better learn about their operations and to effectively develop more strategies to meet their needs. These established relationships have produced a comfortable and productive rapport and have greatly enhanced the quality of the statistical services we are able to deliver.

Developing a self-documenting system has proven to be very beneficial to our customers. All obligations, ours, the customer's, and the supplier's, as well as an understanding of the task are spelled out in writing so that everyone is clear about their responsibilities and the level of effort required. Meetings are documented, status reports are provided, and all work is delivered in writing. We also pull together all materials associated with a specific project and deliver it to our customer either at a project's completion or at key developmental stages of a continuing project.

Most Section members are involved with several projects at a time with varying degrees of responsibility. This work arrangement assures that someone who is knowledgeable about a particular project is always available should the customer need assistance. It also facilitates peer review, which is important for the growth of the individual and the Section as a whole and is essential in ensuring that we consistently provide a quality product to our customers.

The primary focus of our Section is working with customers outside of SOI, but within the IRS. These projects are funded through the annual transfer of staff years (resource arrangements), which has greatly influenced our style of work. It mimics a payment-for-services arrangement and has led to more collaborative relationships with our customers. While we have broad latitude to make decisions, the customers' ability to withdraw resources at any time and for any reason means that they, with us, are co-managers of product quality. Therefore, employing shared resources and goals has resulted in an enhanced determination from

both parties to complete the task on schedule and well within budget.

IV. Project Overview

The following is an incomprehensive list of the major projects we are currently involved with and a brief description of each:

Lockbox Quality Improvements:

An effort to improve and refine remittance processing at Lockbox bank sites by designing a proactive review system, which provides reliable accuracy rates and mitigates the potential for negative taxpayer impact.

Refund/Remittance Sort Initiative:

A nationwide effort at service centers to use mailing labels to help IRS mail sorting equipment identify a tax return as a remittance or refund in order to improve its sort accuracy. We provide assistance with the development, testing, and quality measurement of the program.

Management Communication Practices:

An effort to evaluate IRS communication practices service-wide. We are assisting the Communications Division with development of surveys, sample design, data analysis, and quality measurements.

941 TeleFile:

An alternate method of filing Form 941, the Employer's Quarterly Federal Tax Return, with a touch-tone telephone. We provide statistical support for its development, operation, and quality measurement.

TeleFile: IMF & Fed/State:

Two programs that offer an alternate method of filing income tax returns via touch-tone phone. IMF TeleFile allows 1040EZ filers to file their return quickly, easily, and paperless. We provide statistical support for the development, operation, and quality measurement of both systems.

Quality Review Database (QRDb):

An automated system that properly estimates and weights each of the Customer Service's product lines. It allows the user to access established reports or generate user-defined reports for various time periods and reporting levels.

Employee Satisfaction Task Force:

A joint effort with members of the Employee Satisfaction Team to manage the Employee Satisfaction Study. This includes the development of survey questions, organization of questions into indices, and the development of key scoring procedures. We also help prepare briefings for the National Partnership Council on progress with regard to survey implementation and analysis of results.

Generic Clearance for Cognitive Research:

A method which provides advanced approval by OMB of a well-defined plan for cognitive research. Specifically, SOI facilitates the approval process by reviewing and tracking the research proposal between the client and OMB.

Survey Feedback Action (SFA) Support:

An effort to analyze SFA returns. Special attention will be paid to notable trends & outstanding findings.

V. Centralized Quality Review System

We conclude this paper with an encompassing description of a project indicative of our work. We believe that the "Centralized Quality Review System" project is an example representative of many of the other studies that we are involved with. Therefore, the following analysis will be a helpful illustration of how we engage with customers and approach projects in general.

Overview:

The Centralized Quality Review System (CQRS) was developed to centralize the product review process within the Customer Service organization. Implementation of the CQRS was the culmination of much hard work by a wide-ranging group of IRS employees. The CQRS provides a single, consistent method of performing product review for all Customer Service product lines. The CQRS is the product review methodology developed to replace the nine separate review systems that were brought together when Customer Service (CS) was established in October 1996. Working in two phases, review of telephone calls and review of paper cases, CQRS consolidated CS product reviews onto one database and one location, Philadelphia, Pennsylvania.

The goal of the Quality Review process is to monitor, measure, and improve the quality of work throughout CS. A sample plan is used to select the data during this process and is designed to deliver a statistically valid sample for E-mail, Accounts, Tax Law, Automated Collection System (ACS) On-line (calls), and ACS Closed case product lines. The data collected during this process is used to identify trends,

problem areas, training or procedural needs, and opportunities for process improvement. Components of the Quality Review process include the CQRS and site reviews. Data collected from these reviews are input into the Quality Review Database (QRDb) system. Reports produced by the QRDb system contain the basis for CS performance measures.

Sampling Plan for 2000 Filing Season:

The CQRS conducted quality review, Monday through Saturday, 7AM through 11PM. Based on historical call volume data, it was determined that this schedule would allow more than 95% of the calls going into the IRS Toll-Free Telephone System the potential to be monitored for quality. There were 23 reviewers employed at CQRS. Three reviewers had expertise in Account work only. Five reviewers had expertise in both Accounts and ACS. Six reviewers worked on ACS only. The remaining nine reviewers had expertise in Tax Law, Accounts, and E-mail.

Ideal sample sizes were calculated using a goal of 90 percent confidence with a 5% precision margin. The formula for calculating the sample size, **n**, for a simple random sample is as follows:

$$n = z^2\left(\frac{p(1-p)}{d^2}\right)$$

where **p** is the historical accuracy rate expressed as a decimal, **d** is the desired precision margin expressed as a decimal (in our case it is .05), and z is a constant that equals 1.645 when our confidence level is 90 percent (z = 1.96 for 95% confidence).

E-mail had an historical accuracy rate of 75%. By using the above formula, we calculated that in order to achieve an estimate of accuracy with 90% confidence with a 5% precision margin, we would need a sample size of:

$$n = (1.645)^2\left(\frac{(.75)(.25)}{(.05)^2}\right) = 203$$

Therefore, since we wanted monthly estimates for E-mail at a national level, our monthly sample size for the nation was 203.

Account calls had an historical accuracy rate of 70%. Again, via the sample size formula, we found that an estimate of accuracy with 90% confidence and 5% precision margin required a sample size of 227. However, during filing season we wanted quarterly estimates for Account work, instead of monthly. Spreading our sample size of 227 across three months resulted in a monthly sample size of 76. Because we wanted site estimates for Account calls, we needed to sample 76 Account calls in each of the 25 sites every month. This resulted in a total monthly sample size of 1,900 Account calls to be monitored.

Tax Law calls also had an historical accuracy rate of 70%, resulting in a sample size of 227. Since we wanted monthly estimates at the site level, CQRS had to monitor 227 calls monthly at each of the 16 Tax Law sites, resulting in a monthly sample size of 3,632 Tax Law calls to be monitored.

The entire ACS program (paper cases and on-line calls) had a very low historical accuracy rate. Since assuming a 50% accuracy rate requires the largest sample size, this "worst-case-scenario" was used to determine the ACS sample sizes. We found that the necessary sample size for the ACS product lines was 270 each. Since this was a quarterly estimate, that equated to 90 at each of 18 ACS sites each month. This resulted in a monthly sample size of 1,620 ACS telephone calls to be monitored and 1,620 paper ACS cases to be reviewed. However, due to technological difficulties, CQRS was unable to monitor ACS calls. Thus, all employees with ACS expertise reviewed closed paper cases only.

Due to the limited number of reviewers at CQRS, the wide range of staff expertise, and the various tours of duty (Monday-Friday or Tuesday-Saturday) of the available staff, it was apparent that meeting the above ideal sample sizes was not possible. Therefore, given the number of reviewers and the staff hours available for reviewing Tax Law, E-mail, and Accounts cases for each day of the week, we adjusted the sample sizes accordingly.

These sample sizes assumed that all employees were available to review 8 hours a day, 5 days a week, and 52 weeks a year. This assumption was necessary to develop a sampling plan that would remain in place for the filing season. At the time, it was impossible to account for training time, annual leave, sick leave, lunch hours, or any type of administrative overhead.

Once these sample sizes were established, each reviewer was assigned a product line, site, and specific application to monitor, and were assumed to be reviewing cases 8 hours a day over a two-week period. To increase randomness, sites were assigned at varying times of the day throughout the week according to their individual hours of operation. In addition, individual days within the two-week period with identical staffing patterns (i.e., the first and second Monday, Tuesday through Friday of both weeks, and the first and second Saturday) were shuffled. This option allowed for over 160,000 different permutations of the two-week plan.

Ultimately, this system allows the IRS to document the accuracy of information supplied to taxpayers on a monthly basis.

SOURCE: Paper presented at the 2000 Joint Statistical Meetings of the American Statistical Association, Indianapolis, IN, August 2000.