COMMENT ON "THE FEDERAL STATISTICAL SYSTEM'S RESPONSE TO EMERGING DATA NEEDS" BY JACK E. TRIPLETT*

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Jack Triplett, with his paper on the U.S. Federal statistical system, has said insightfully what should have been obvious long ago: we need do-able solutions to our difficulties, rather than continuing to focus on factors mainly outside our control.

The structural problems of the statistical system have been center-stage for over a decade (Bonnen, 1981). Lack of adequate budgeting has also been appropriately targeted (e.g., Juster, 1988). What has not been said often enough is that we in the statistical system need to blame ourselves for some of our dilemmas. Better internal management and a greater spirit of cooperation will go a long way towards increasing the system's responsiveness.

The Triplett paper makes four specific prescriptive suggestions that should help us; my discussion will take up each of them, in turn, from the viewpoint of a data producer. As he says in his paper, Triplett does not "address the substantial needs in statistical agencies for research" on better methods. However, in my concluding comments, I will speak to these briefly, since it is my belief that the energy for the changes he advocates could come – at least in part – from the *many* revolutions now going on in statistical practice.

1. Prescriptive Suggestions

1.1. Analysis Orientation

Without a doubt, we need to create in statistical data-producing agencies a culture in which analytic thinking is more highly valued. In this context, the Triplett paper rightly fixes on the need for increasing the *role* of research units; to my way of thinking, though, Triplett's structural suggestions would be the means, not the ends.

As Triplett mentions, getting the numbers out and getting them "right" is still the most important activity of statistical agencies – at least it still is for us at the IRS. I also agree that this goal, however worthy, is insufficient; indeed, it could be argued that just having this narrow a primary objective is, itself, a part of our problem (e.g., Rubin, 1990).

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Historically, the mainline government statistical agencies have had a much stronger "enumerative" or descriptive focus than an "analytic" or cause-seeking one (Deming, 1954). The continued definition of ourselves in this fashion could be a major barrier to the integrated structure of national data gathering and information usage that Triplett advocates. In my opinion, whether or not the mission of government statisticians is to establish causal relationships themselves (Norwood, 1989), the data collection they do *must* have this as one of its goals.

There are many forces that are working or could be enlisted to help us make the needed reforms in government statistical agencies. The *sine qua non*, of course, is that we must want to change. Specifically, the statistical agencies need to re-examine their missions or, deeper still, their visions of themselves.

In particular, government data-producing agencies have simply not kept up with the explosive growth of statistical theory and methods. This is doubly ironic because, in some cases, the main developments were made within government (e.g., Bailar, 1990). In any event, data-providing agencies have not *fully* participated in the shift from descriptive to inferential uses of statistics (Scheuren, 1989a). This may be due, in part, to the innate conservatism of large organizations not subject to strong market pressures. Whatever the cause, I can attest to how hard it is to change the culture of a production organization into one "driven by curiosity".

Harder to talk about and more difficult to change is the tradition or "corporate culture" that develops around an agency's vision of itself (e.g., Deal and Kennedy, 1982). By and large, these traditions are at the very core of the many strengths of the Federal statistical system (Martin, 1981). We have every right to be proud of values like integrity and thoroughness and to resist attempts which might alter them. Redefinitions, though, at least of some of our traditions, seem needed. Take the commitment to quality, for example. Let me illustrate by talking about the Statistics of Income program at IRS, which I currently head. We are over 75 years old and (of course) have always prided ourselves on the quality of our statistical products – with the emphasis on products (Department of the Treasury, 1988).

Our orientation towards quality is now changing, albeit slowly, under the strong influences of Deming and Juran, among others (e.g., Deming, 1986; Juran, 1988). The focus on *process* quality that Deming and Juran urge, while not really new, is having a revolutionary impact on us, especially in its emphasis on continuous improvement or "Kaizen", as the Japanese call it (Imai, 1986). Among other things, it has forced us to shift our emphasis to better program planning. (Juran would have called it quality planning.) Examples range from sample design improvements (Hinkins and Scheuren, 1986) and employing cognitive research techniques (van Melis-Wright et al., 1990) to more flexible and dynamic approaches to data capture, cleaning and completion (e.g., Holik et al., 1989); these quality initiatives, in turn, are strengthening the research component's role, as Triplett has advocated.

1.2. Data Integration and Information Usage

Triplett suggests that greater integration of disparate data sets produced by different agencies is essential and that there should be more interaction between the users and producers. I agree wholeheartedly on both counts.

Without a doubt, strong government analysis customers – like our users, the Treasury Department's Office of Tax Analysis (OTA), the Congressional Joint Committee on Taxation (JCT) and the Commerce Department's Bureau of Economic Analysis (BEA) – aid in focusing producer resources on what is important and needed. They also – especially if the quality jargon means anything – can help the producer agencies look more outward (and not primarily inward or even backward). Good (analysis) customers make it much more likely to have good (data) suppliers. In my opinion, Tom Peters is right when he says that one of the keys to quality is being "customer driven" (e.g., Peters and Waterman, 1982). Of course, realistically it may not be feasible to gear our data production to all (no doubt conflicting) user needs; at least in the short run, the focus must be on our major customers. However, such improvements as better documentation, more built-in flexibility, and greater information on limitations and error measures will certainly benefit a broader clientele, as well. (Some references include Department of the Treasury, 1990b, 1989, and Alvey and Kilss, 1981-1987.)

System-wide, the Office of Management and Budget's (OMB) Federal Committee on Statistical Methodology deserves credit for working on numerous aspects of research – on statistical methodology and survey techniques – over many years (COPAFS, 1990). While Triplett does not explicitly discuss the work of this Federal committee, I feel that it has been quite useful in keeping open lines of communication among agencies. On the other hand, clearly far more must be done to integrate data sets produced under the auspices of different agencies (e.g., Council of Economic Advisors, 1990). Long overdue advances in such fields as microsimulation modeling will be unattainable without more integration (e.g., Lewis and Michel, 1990). Turf barriers, of course, exist among statistical agencies which have their predictable negative consequences. Legitimate concerns about privacy and confidentiality are major issues, as well (Duncan and deWolf, 1990).

Redefinitions of customer-supplier relationships also demand greater cooperation in order to achieve better integration, especially between statistical and administrative components. Statistical agencies have to be willing to do more "out-sourcing" – e.g., greater use of administrative records in conjunction with the decennial census (Scheuren, 1990). To balance this, administrative agencies must accept an appropriate support role (Ohio Quality and Productivity Forum, 1988). Together both should raise their sights and begin working on the goal of transforming administrative systems into information systems. The old paradigm of simply "exploiting administrative data" must be broken.

1.3. Professional Advisory Groups

As Triplett observes, the Federal statistical system can be out of touch with what may be fundamental in the long run, because of its connections to the political arena. The use of professional advisory panels is certainly one way to augment the internal decision-making processes of data-producer agencies (e.g., Eldridge, 1990).

Like Triplett, I agree that statistical agency analytic units can surely benefit from close ties to such groups. At IRS, we have an SOI Consultants' Panel which meets regularly with us. Our principal users are always invited to play key roles in these sessions, so as to achieve a more balanced viewpoint. Even so, to make advisory groups really effective, all of the parties involved must be motivated to participate actively and must learn to listen "naively" (alas, another of Tom Peters' prescriptions). The latter is a lot easier said than done. What we know about our part of the job too often gets in the way of our ability to understand and empathize with what others know (and do).

In addition to formal advisory panels, Federal data-producing agencies should – and, in fact, often do – take advantage of other means to draw in outside researchers. In the case of the Census Bureau's Survey of Income and Program Participation, for example, the National Science Foundation was instrumental in setting up a research facility to meet user needs (David, 1990). Two groups which could play key roles in strengthening the Federal statistical system deserve to be emphasized: the Fellowship program of the American Statistical Association (ASA), which Triplett mentioned, and the activities of the Committee on National Statistics.

Triplett rightly advocates that government outreach efforts, like the ASA Fellows program, be complemented by corresponding opportunities which invite government statisticians into academic or research organizations to teach and study. Incidentally, we have already begun such a program at IRS, where selected employees are sent to such universities as M.I.T. for up to two years to work on emerging technologies (Department of the Treasury, 1990a). While this can be quite a sacrifice in tight budgetary times, the long-range payoff should certainly make it worthwhile.

The Committee on National Statistics (CNSTAT) of the National Academy of Sciences could well have an expanded part in the renaissance of Federal statistics that Triplett is calling for. It already plays many important advisory roles; these could be enlarged so as to provide direct outside help on major cross-cutting issues. The vehicle, here, might be a stronger partnership between CNSTAT and the OMB Federal Committee on Statistical Methodology.

1.4. The People Factor

Triplett rightly sees the detrimental effects of the second class status almost automatically accorded government professionals by their academic "peers". Some in government may even be deserving of this uncomplimentary view-

point. In any event, the lack of teamwork that results *can* be serious – even occasionally disastrous.

Now, there are many aspects of this people issue that I am tempted to comment on. Triplett's concern about how recognition systems operate is basically well-taken. I will leave it, however, to be addressed by others; instead, let me elaborate on his observations about statistical agency problems in attracting and retaining a fair share of the best people.

Improving the image of public servants is a key to recruiting good staff. Clearly, the lack of competitive salaries is part of this problem. Admittedly, there are trade-offs in choosing to work for the Federal government as opposed to the private sector – and, personally speaking, I am not sure I want to hire anyone not willing to make some sacrifice to serve his or her country; on the other hand, people ought not be asked to give up too much – noncompetitiveness can go, indeed, and has already gone, too far.

Money is not the only issue, or maybe not even the major one. Hierarchical structures are the bane of government. They badly need to be "flattened" – permitting employees at all levels to participate in the decision-making processes – to achieve greater job satisfaction for staff members and to position agencies to make more rapid change. Managers who grew up in another era cannot lead very well in "high tech" environments, unless they constantly work at retooling themselves; the real key, however, is to create systems that empower people rather than control them (e.g., using self-managed teams, as advocated by Juran and Godfrey, 1990). Flatter, leaner organizations will be hard to attain, but they are going to be crucial to government, if it is to be truly responsive.

One of the other keys to the "people factor" is how much we invest in them. Two suggestions may be worth mentioning, which could possibly be carried out with OMB help:

Inventory of Training Options. The Statistical Policy Office at OMB could coordinate a system-wide evaluation of the training needs of the current Federal statistical workforce, particularly with an eye towards boosting the analytic capabilities of government statisticians. It goes without saying that much of the current inefficiency in the statistical system is tied to the lack of adequate human capital investments in our existing statistical, managerial and computing staffs. (An important beginning study of issues involving government scientific personnel can be found in Campbell and Dix., 1990.)

University Training Agreements. There is a necessity for developing system-wide university training agreements, so that the re-tooling which has begun can be accelerated. Such classes might be conducted in work settings, but with a mix of students from different agencies and orientations (production-oriented vs. analytical, say). Even without the inventory, specific areas of immediate common need are evident. One major issue of concern to me, personally, is the re-training of paraprofessional statistical assistants, whose jobs have been dis-

appearing through automation. They, too, would benefit from broader-based opportunities for re-education.

2. Concluding Comments

One of the strongest forces that can be harnessed to make the changes Triplett advocates is the current ferment in statistics. The excitement that exists right now in many fields of practice is contagious and could, *if we let it*, redefine the environment in which many government statistical agencies operate (Scheuren, 1989a; Binder, 1990). The contribution that cognitive psychologists have been making to survey practice is well known (e.g., Fienberg and Tanur, 1989). Sample design problems continue to offer new challenges to survey statisticians, particularly where studies have multiple competing objectives (e.g., Mulrow and Jones, 1990). The pioneering efforts on handling missing data by Don Rubin and Rod Little (e.g., Little and Rubin, 1987) offer another example of methodological developments where big changes have begun, especially the growing use of multiple imputation (Rubin, 1987).

Lots of agencies in the government statistical community are also taking a leading role in important analytical work. Two specific examples from our work at the Internal Revenue Service are, perhaps, worth mentioning here. First, progress is occurring in the way we think about, and use, those "awful tables" to which Triplett has referred. In particular, we have been concerned about the reanalysis potential of published tables as we move from publication on paper to simultaneous publication on paper and floppy disk (and, maybe, eventually on CD-ROM). It is hard to get an agency like ours to make such a change, but we have been getting a lot of help recently from the Ruggles family (Ruggles et al., 1989). What they, and perhaps others, have done is to go several steps beyond LOTUS in easing the reanalysis of aggregate data. To complete the picture, a system like the Ruggles' needs to be connected up with software that carries out various conventional grouped data techniques (like contingency tabulation and curve-fitting approaches, such as those in Oh and Scheuren, 1987). Other good general references here are Beu et al. (1989) and Heitjan (1989).

Another specific example at IRS is our current effort to redesign all of our major statistical samples with a customer-oriented outlook. Working closely with our users to learn their data needs from the outset and restructuring our samples to address policy analysis concerns more specifically have resulted in a closer and more appreciative relationship with our customers. This, in turn, has become a key part of the continuous improvement process in all our statistical programs. Old requirements are being discarded and emerging needs are being emphasized, leading to a more efficient and effective use of resources (e.g., Hostetter et al., 1990).

Triplett's suggestion that data producer organizations work hand-in-hand with their analysis customers could be the key to advancing still other research.

Tying study design more closely to analytic, rather than enumerative, applications has already been mentioned (Skinner et al., 1989). A richer class of measurement error models is needed, too, including a lot more on user concerns, rather than primarily looking – as we have historically – at producer variables (e.g., Scheuren, 1989b). With growing input from our analytical counterparts, better solutions to these problems should be coming.

Finally, permit me to make a literary observation. From reading the Triplett paper, it would appear that he is clearly up on his Shakespeare –

> "Men at some time are masters of their fates;
> The fault, dear Brutus, is not in our stars,
> But in ourselves ... "
>
> *Julius Caesar*, Act I, Scene II

In the context of the Triplett paper, it could also be said that the fate of the statistical system may not be in the stars (OMB and all that) as much as it is in ourselves. Despite the obstacles to be overcome, I am optimistic about the future. With that in mind, all of us should take heed – if Jack Triplett is listened to, this can be a time when we become more nearly masters of our fates.

References

Alvey, W. and B. Kilss, eds. (1981–1987). *Statistics of Income and Related Administrative Record Research*, a series of methodology reports from the Statistics of Income Division, Internal Revenue Service. See also the latest report in the series, B. Kilss and B. Jamerson, eds. (1990). *Statistics of Income and Related Administrative Record Research: 1988–1989*. Internal Revenue Service.

Bailar, B.A. (1990). Contributions to Statistical Methodology from the Federal Government. *Survey Methodology*, 16(1), Statistics Canada.

Beu, D.H., D. Mingay and A.A. White (1989). Cognitive Experiments in Data Presentation. *Proceedings of the American Statistical Association, Section on Statistical Graphics*, pp. 30–35.

Binder, D.A. (1990). Statistical Research Problems at Statistics Canada, *Liaison*, February, 4(2), 38–41.

Bonnen, J.T. (1981). Issues and Options. *Statistical Reporter*, February, 81(5), 133–221.

Campbell, A.K. and L.S. Dix, eds. (1990). *Recruitment, Retention, and Utilization of Federal Scientists and Engineers*, a report to the Carnegie Commission on Science, Technology and Government. National Academy Press: Washington, DC.

Council of Economic Advisors (1990). *Economic Report of the President*. Appendix B.

Council of Professional Associations on Federal Statistics (COPAFS) (1990). Seminar on Quality of Federal Data, Washington, DC, May 23–24, 1990.

David, M. (1990). Data-Driven Social Policy, Data-Driven Social Research: A Reality in the 1990's? A paper presented to the Association for Public Policy Analysis and Management, October 18.

Deal, T.E. and A.A. Kennedy (1982). *Corporate Cultures*. Addison-Wesley: Reading, MA.

Deming, W.E. (1986). *Out of the Crisis*. Massachusetts Institute of Technology, Center for Advanced Engineering Study: Cambridge, MA.

Deming, W.E. (1954). *Some Theory of Sampling*. Dover Press: New York, NY.

Department of the Treasury (1990a). Artificial Intelligence in the IRS. Unpublished Research Division paper, Internal Revenue Service.

Department of the Treasury (1990b). *Statistics of Income, 1987, Corporation Income Tax Returns, Documentation Guide.* Internal Revenue Service.

Department of the Treasury (1989). *Processing Procedures and Findings: Working Notes on Quality*, Statistics of Income Individual Income Tax Returns Studies, Internal Revenue Service. See also Department of the Treasury (1986). *Processing Procedures and Findings: Working Notes on Quality*, Statistics of Income Foreign and Domestic Special Studies, Internal Revenue Service.

Department of the Treasury (1988). *Statistics of Income Bulletin*, 8(2), Internal Revenue Service.

Duncan, G.T. and V.A. deWolf (1990). The Federal Statistical System Amidst the Rising Tension Between Privacy and Data Access. *Chance*, 3(3), 45–48.

Eldridge, M.S. (1990). The Status of Advisory Committees to the Federal Statistical Agencies. *The American Statistician*, 44(2), 154–162.

Fienberg, S. and J.M. Tanur (1989). Combining Cognitive and Statistical Approaches to Survey Design. *Science*, 243, 1017–1022. See also C. Dippo and D. Herrmann (1990). The Bureau of Labor Statistics' Collection Procedures Research Laboratory: Accomplishments and Future Directions. Paper presented at the Seminar on Quality of Federal Data, Council of Professional Associations on Federal Statistics, Washington, DC, May 21; Jabine, T.B., M. Straf, J.M. Tanur and R. Tourangeau, eds. (1984). *Cognitive Aspects of Survey Methodology: Building A Bridge Between Disciplines.* National Academy Press: Washington, DC; and Sirken, M. (1990). Discussion of the session on Recent Developments in the Application of Cognitive Psychology to Survey Design. *Proceedings of the American Statistical Association, Section on Survey Research Methods.*

Heitjan, D. (1989). Inference from Grouped Continuous Data: A Review. *Statistical Science*, 4, 164–183.

Hinkins, S. and F. Scheuren (1986). Hot Deck Imputation Procedure Applied to a Double Sampling Design. *Survey Methodology*, 12(2), Statistics Canada, 181–196.

Holik, D., S. Hostetter and J. Labate (1989). The 1985 Sales of Capital Assets Study. *Proceedings of the American Statistical Association, Section on Survey Research Methods.*

Hostetter, S., J.L. Czajka, A.L. Schirm and K. O'Connor (1990). Choosing the Appropriate Income Classifier for Economic Tax Modeling. *Proceedings of the American Statistical Association, Section on Survey Research Methods.*

Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success.* ASQC Quality Press: Milwaukee, WI.

Juran, J.M. (1988). *Juran on Planning Quality.* The Free Press: New York, NY.

Juran, J.M. and A.B. Godfrey (1990). Worker Participation – Developments in the U.S.A. A paper presented at ICQCC'90 – Tokyo, Juran Institute, Inc.

Juster, F.T. (1988). The State of U.S. Economic Statistics: Current and Prospective Quality, Policy Needs and Resources. Presented at the 50th Anniversary Meeting of the Conference on Research in Income and Wealth, Washington, DC.

Lewis, G.H. and R.C. Michel, eds. (1990). *Microsimulation Techniques for Tax and Transfer Analyses.* The Urban Institute Press: Washington, DC.

Little, R.J.A. and D.B. Rubin (1987). *Statistical Analysis with Missing Data.* Wiley: New York, NY.

Martin, M. (1981). Statistical Practice in Bureaucracies. *Journal of the American Statistical Association*, 76(373), 1–8.

Mulrow, J. and H.W. Jones Jr. (1990). Sampling Administrative Records: Detection and Correction of Stratification Error. *Statistics of Income and Related Administrative Record Research: 1988–1989.* Internal Revenue Service.

Norwood, J.L. (1989). The Influence of Statistics on Public Policy. *Proceedings of the Symposium on Statistics in Science, Industry and Public Policy.* National Academy Press: Washington, DC, pp. 30–42.

Oh, H.L. and F. Scheuren (1987). Osculatory Interpolation Revisited. *Proceedings of the American Statistical Association, Section on Survey Research Methods.*

Ohio Quality and Productivity Forum (1988). Deming's Point Four: A Study. *Quality Progress*, xxi, 12, American Society for Quality Control, Inc.: Milwaukee, WI, pp. 31–35.

Peters, T.J. and R.H. Waterman Jr. (1982). *In Search of Excellence.* Warner Books, Inc.: New York, NY. See also M. David and A. Robbin (1990). Computation Using Information Systems for Complex Data. *Proceedings of the Conference on Advanced Computing for the Social Sciences*, April 10–12.

Rubin, D.B. (1990). Discussion of the papers presented in Concurrent Session VIII-A: Imputation. *1990 Annual Research Conference Proceedings*, U.S. Bureau of the Census, pp. 676–679.

Rubin, D.B. (1987). *Multiple Imputation for Nonresponse in Surveys.* Wiley: New York, NY.

Ruggles, R. et al. (1989). The PRTAB System: User's Manual and Reference Guide. 13363 Saticoy, North Hollywood, CA 91606.

Scheuren, F. (1990). Paradigm Shifts: Administrative Records and Census-Taking. Paper presented at the Seminar on Quality of Federal Data sponsored by COPAFS (Council of Professional Associations on Federal Statistics), May 23–24, Washington, DC. See also F. Scheuren (1990). Discussion of "Rolling Samples and Censuses" by Leslie Kish. *Survey Methodology Journal*, 16(2), Statistics Canada.

Scheuren, F. (1989a). Statistical Research Problems in Government. Paper presented at the Annual Meeting of the Statistical Society of Canada, Ottawa, Ontario, May 31. See also K.V. O'Conor, F. Scheuren, B.K. Atrostic and R. Gillette (1990). Moving from Descriptive Statistics to Inference. Paper presented at Symposium 90: Measurement and Improvement of Data Quality, Statistics Canada, Ottawa, October 29–31; and M. Straf (1990). Some Challenges Facing the Federal Statistical System. Paper presented at APDU90 (Association of Public Data Users), October 22.

Scheuren, F. (1989b). Nonresponse Adjustments: Discussion. *Panel Surveys.* Wiley: New York, NY, pp. 426–431.

Skinner, C.J., D. Holt and T.M.F. Smith, eds. (1989). *Analysis of Complex Surveys.* Wiley: Chichester, England.

van Melis-Wright, M., M. Batcher and F. Scheuren (1990). Cognitive Psychology Approaches in Evaluating Information Exchange Processes. *Proceedings of the American Statistical Association, Section on Survey Research Methods.*