

## Comment

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There is ample evidence in the literature that innovation is essential for the survival of any organization – be it business or government. The consequences of failing to innovate are substantively quite similar even if they take superficially different forms in different economic sectors: businesses go bankrupt, while government organizations are drastically reorganized, or lose their mandates. The need to evolve, at least partly based on research and development, is particularly true for statistical agencies whose task is to illuminate the fast evolving issues facing their respective countries. Don Dillman chose to highlight the difficulties; I will highlight the need. But this is more than a question of emphasis: I think Dillman's analysis is incomplete and, as a consequence, he might ultimately be wrong in his identification of the key factors that make for an effective program of research and innovation in statistical agencies.

I agree with Dillman that “innovation in large survey organizations is as essential as breathing – there is no alternative.” Statistical agencies are under considerable pressure to maintain their major outputs, reduce their budgets, illuminate new social, economic and environmental phenomena and issues, maintain the credibility of their outputs, and respect public sensitivities. As I have argued elsewhere, maintaining a strong research *and* analysis capability is one of a number of key long term priorities that must be respected – even at the price of cutbacks to current outputs.

If having a strong research and development program is indeed a survival issue, then one could deduce from this observation a conclusion about the U.S. Bureau of the Census that is at variance with Dillman's: the bureau has demonstrably continued to exist for many decades, so it must have engaged in a level of innovation that was at least adequate for its “breathing” and survival. Actually, as we all know, it has done much more than that. It pioneered, developed, and introduced a whole series of methodological innovations of ground-breaking importance: sampling with probability proportional to size, sampling in the census, self-enumeration to reduce response variance, sample rotation designed to balance the reliability of level versus change estimates, research on recall errors and the notion of bounded versus unbounded reference periods, etc. Yet, throughout its great period of path-breaking work it has been living with Dillman's “three-part problem” as discussed in Section 5 of his article. Indeed, it had a strong presence of both of the “two cultural orientations . . . the research and operational cultures”; it had a “research culture . . . dominated by statistics” (but nevertheless achieved fame as a centre of work on innovation on non-sampling errors);

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and it had a “hierarchical” organization. Of course, this argument does not say anything about the current state of innovation at the Census Bureau – but that is not the ostensible subject of the article. Rather the article makes a general point about innovation in government statistical organizations and provides reasons for its thesis.

My main criticisms of Dillman’s argument relate to the following:

- He is generalizing from a narrow experience base: his own four years with the Census Bureau (and, within the bureau, mostly with the decennial census). The “assistance of many people from several government agencies” is no substitute for either a broader personal experience, or a thorough study of the topic.
- The title of the article is quite general: “innovation” in government statistical organizations. In spite of this title, the article is restricted to methodological innovation – even though there are many other types of needed innovations, such as the exploration of new subjects of emerging relevance, development of new analytic approaches (e.g., those involving large longitudinal databases), information technology and data management, etc. Even within the context of survey methodology, the discussion is largely restricted to measurement errors.
- The author focuses on the conflicting “core value systems” of the “research and operations cultures.” By contrast, I believe that it is essential that research and operations staffs have different outlooks and priorities, even different “value systems.” After all, they do have very different mandates and functions. The question is how to keep both cultures healthy and productive, yet complementary. Effective management, broadly interpreted, does have a role beyond the one described by Dillman of circulating unsigned research memoranda and otherwise standing in the way of progress.
- In addition to the conflict among “cultures,” Dillman’s diagnosis of the problem involves two more factors. The first is that the research staff is “dominated by the discipline of statistics,” the second that government management is hierarchical. Clearly, I can neither contest nor agree with these diagnoses *as they relate to the Bureau of the Census*. But I cannot accept them as part of a general diagnosis of research dysfunctionality – even as an adequate explanation of why measurement errors receive less than needed attention. Indeed, many if not most of the pioneers of research on measurement error in surveys were statisticians, many of them from the Bureau of the Census. And the extent to which management is hierarchical is, I believe, not the key question: There are numerous successful enterprises with an outstanding record of innovation, some having “hierarchical” management, others less so.

This is not the time or place for a full treatment of the intrinsic elements of effective statistical systems, (see Fellegi, 1996 for more detail) not even of the full role of the broadly interpreted function of research, development, and analysis. I would, however, like to outline what I see as the main issues that need to be addressed if an effective approach to innovation in statistical systems is to be nurtured.

- What type of interaction is productive between researchers and practitioners?
- How to ensure the eventual adoption of research results into the operating environment?

- How to ensure the relevance of research? Specifically, what combination of measures is needed to encourage research staff to focus on issues of significant importance to the statistical agency, while at the same time recognizing that the individual interests of research personnel are critical for the ultimate success of research and development projects.
- How to select, maintain, and stimulate research staff?
- How to fund research?

All of these questions need to be addressed – and many others – for a statistical organization to have an effective research strategy. Exploring the variety of possible strategies would take me beyond the confines of this brief discussion. So, instead, I shall outline how Statistics Canada is attempting to resolve these issues.

Starting with the first two questions above, interdisciplinary teams are basic to the modality of operations in Statistics Canada. All major new surveys are designed by a team including staff who understand the subject matter involved, survey methodologists, operations staff, experts in computing, and others as needed. The people involved belong to different line organizations. For example, the survey methodologists belong to one of three methodology divisions which, in turn, belong to a part of the bureau that is organized along functional lines. All project teams have a project manager who has been given a set of project objectives (these might be gradually “sharpened” at subsequent review points) and a project budget. The project budget, over which the project manager has full control, comprises the full cost of the project, including the time and cost of the functional staff. Both the objectives and the budget of the project would have been established as part of a full and open annual planning process. This involves several iterations on the objectives, the project budget, as well as on the major components of the budget. It involves a negotiated agreement by the management of all participating areas. Through this process the objectives and costs should be clarified before the start of the project. This is a critical phase during which the strategic questions are fully explored, including the extent to which the project is to be in a developmental mode. The process should fully involve the management of functional areas.

Once a project is approved and a team for its implementation is brought together, the members of the team answer for their project work to the project manager – a person typically from the subject matter area. Teams are expected to discuss all aspects of projects. In case of disagreements, the project manager decides. However, there are safety valves. The project manager reports on strategic issues to a steering group involving the line managers of the participating team members who are typically senior and experienced experts in a given functional area. These reporting occasions provide opportunities for probing. Also, team members may, on issues of critical importance, “appeal” the decisions of their project manager through their line manager. While providing opportunities for conflict resolution is important, it is much more important to have an environment in which issues are decided on their merit and exploration of issues is applauded, yet one which is not paralysed by non-convergent discussion.

The combination of measures outlined above seems to provide a workable balance between the discipline that is essential for large projects, and full participation by

methodology staff (and others, including the variety of disciplines which comprise the operations staff) in determining project objectives, budgets, and implementation – thereby having substantial influence over the process of innovation adoption. It leads to the development of an open environment in which issues are resolved on their merits. And, over time, it leads to an awareness in operation staff of the importance of statistical/methodological issues and, conversely, an appreciation in the minds of methodologists of current operational constraints.

This is a brief outline of how Statistics Canada attempts to achieve a productive interaction between research and operations staff, and how it facilitates the adoption of the results of innovation into operational activities. But how to ensure the relevance of methodological research? This is closely related to the method of funding. Very briefly, we do not have separate methodology staffs working on research and applied survey design: both occur within the same three methodology divisions (the divisional boundaries are drawn on the basis of fields of application). The bulk of the methodology activity is funded through the planning process described above, and is based on the estimated volume of methodology input required for approved project work. However, in addition, we also allocate resources for research in the form of a “block fund,” meaning that its magnitude is not based on approved projects but rather on a management assessment of the amount we should spend on methodology research. This block fund is managed by a small committee of experienced research staff which approves proposed research projects for funding, based on internal peer review. Methodology staff interested in research can either volunteer to participate in the approved research projects, or they can make their own research proposals. Most methodology staff working on research projects do so either part time, or alternating with assignments as members of interdisciplinary teams working on applied survey design work. In this manner most methodology research grows out of problems stimulated by applications. And conversely, methodologists working on applied survey design tend to have an awareness of mature research results which eases the way for their subsequent utilization.

Finally, just a few words about the stimulation of methodology research staff. There are many tools needed and used. These range from regular participation at conferences, encouragement to publish (we have our own refereed publication *Survey Methodology*), and the stimulation derived from seeing the results of one’s research successfully applied. Perhaps the most important stimulant is an environment in which questioning is not just tolerated but encouraged – preferably during the broad design and exploration stage, but even during implementation if necessary. A particularly important role is played by our Statistical Methods Advisory Committee consisting of prominent North American researchers external to Statistics Canada. This group meets twice a year for one and a half days and discusses in depth the methodological issues involved in all significant new surveys or redesigns, as well as the research program of this agency. Senior staff are invited to attend from all disciplines involved in projects that are discussed. Given the prestige of the committee, its open but searching approach, and the regular attendance at their meetings of senior agency management, these discussions contribute to the weight the methodology function carries within the agency.

To recapitulate, Dillman focuses on two key groups in his analysis of the innovation vs operations confrontation. In addition he attributes an entirely negative influence to management as a third group. A more complete analysis requires the recognition of several other principal participants, not the least of whom are subject matter experts who, among their other contributions represent the interests of ultimate clients. But even restricting consideration to research staff, operations, and management, the article presents a far too simplified picture of their respective roles and conflicts.

*Individual researchers* must be able to pursue their research interests, search for defects in existing approaches, identify relevant research hypotheses, and try to develop the necessary theoretical and empirical evidence. The task for *managers of the research staff* includes the provision of a stimulating environment, guidance regarding issues of importance to the organization, recognition, encouragement of and support for scientific exploration, hiring and development of staff, including guidance concerning the research-application interaction, maintenance of bridges to the rest of the organization including appropriate publicity for successful innovations. In order to secure long term support, research managers must try to ensure that, over time, there are sufficient instances of research success to “carry,” in a non-monetary sense, the entire research and development enterprise. *Operations staffs* must insist on having clear and implementable tasks, strive to operate within established budgets and deadlines, have a clear perspective on potential public concerns, and acquire a broad understanding of the cost and error structure of statistical surveys. Finally, *senior management* must concentrate on the long term survival and effectiveness of the statistical agency. An important component of survival involves having an effective research program – maintained even in the face of pressing overall budget cuts. In addition to adequate funding, a healthy environment for research implies timely and transparent decisions about contentious issues, welcoming exploration, encouraging relevance, ensuring that a variety of perspectives are considered objectively, stimulating rigour, and recognizing success.

## Reference

Fellegi, I.P. (1996). Characteristics of an Effective Statistical System. *International Statistical Review*, Vol. 64, No. 2, 165–197.

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