

Comment

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I would like to thank Don Dillman for a stimulating, important, and well-written contribution to the “theory and practice of change in (government) statistical organizations.” Wherever one comes out on this topic is perhaps less important in the long-run than just having the topic discussed. Dillman presents three hypotheses — (1) the co-existence of research and operations cultures, (2) major differences in the value systems of these cultures, and (3) the difficulty of resolving the different values in a hierarchical organization — and why change is often so difficult in these organizations. Appropriately so, he also recommends four steps towards reducing these barriers to change. I will comment along the following lines: first, general remarks about the barriers and solutions; second, an additional hypothesis; and third, a suggestion that statistical organizations borrow a model from the U.S. semiconductor industry and use it to implement change.

Note that I do not use the word “innovation” from Dillman’s title; rather, I use “change.” I do this to call attention to the fact that what Dillman describes applies to any change in a survey or census process. It need not be an innovation.

Barrier to Change 1: The Necessary Co-Existence of the Research and Operations Cultures

It is difficult to argue with Dillman’s first barrier. However, the co-existence is often uncomfortable and sometimes very difficult. Much research can go on without much implementation. In fact one often hears from the research culture that their work is not important, is not used, or used with modification that negates much of its intended effect. And one often hears from the operations culture that the research is not pertinent to operational needs or is too complicated to work in practice. Tradition is also important to the operations culture. For the research culture tradition can be a large pill to swallow. When these two cultures interact, the co-existence becomes even more difficult but offers the greatest potential for improving the statistics an organization delivers to customers. Both cultures are necessary and the stronger, in the sense of technical competence, each culture, the stronger the organization. Having talented staff in both cultures is a strength in any organization.

Barrier to Change 2: Major Differences in the Value Systems of Both Cultures

Dillman is on target again when he identifies value system differences as a barrier to

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change. As noted in many courses in interpersonal skills, management and supervision, etc., it is nearly impossible to change the position of a person (or culture) on an issue if the position is associated with their value system. The research culture values experimentation (often for the sake of experimentation some from the operations culture may claim) to understand process change, develop ways to improve a process, or to test a theory. The operations culture often values change without testing. "So what if we test it, even if we find a difference we are still going to implement it." Therefore, from an operational perspective experimentation is not adding value, but rather adding complications and draining scarce resources. When the research culture fails to fully specify the hypotheses to be tested or does not properly develop the research design, the operations culture has a valid argument. Unfortunately these failures on the part of the research culture may have led to the suboptimization approach often taken by the operations culture. Let us do A the same for all surveys; it will reduce the cost of A by k dollars. However, the total survey effect is not considered and overall costs can rise. The operations culture often values the "sample of size one" approach. "When I open my mail at home . . . , I'd read a postcard . . . wouldn't . . . open a letter." I have seen such reasoning determine the fate of interesting proposals. For example a research proposal aimed at reducing measurement error was promptly killed by the operations culture because "I would never let anyone ask me to do B ." This same incident also highlights another value of the operations culture, tradition. Tradition was another argument the operations culture used to quell the project. "We never do that and always do it this way". Thus the value of tradition meets head on with the value of experimentation. This is not to say that tradition is bad in and of itself. Tradition is important, especially in government surveys that quantify a particular aspect of the economy, say, over time.

I must admit that I missed the point of Dillman's example of the company that both designs airplanes and operates an airline. While this is surely a large organization with vastly different cultures it is not out of the realm of possibility. I can imagine the benefits of such an organization. A continual flow of data from the operations arm, both operators (maintenance and flight crews) and customers on how the airplane behaves and how customers like its features. In addition, in designing the new 777 airliner the Boeing Corporation relied heavily on aircarrier input. In fact, that input caused Boeing to build-in a procedure to allow limited pilot control of the airplane (as opposed to the Airbus design) in case of computer failure.

Barrier to Change 3: The Difficulty of Resolving These Differences in Hierarchically-Oriented Organizations

In my experience, a quotation from a wise and now retired Census Bureau employee applies: "It is easy to make a decision, getting it to stick is another matter altogether." This statement owes its veracity to the hierarchy. A lower level group makes a decision and as the decision goes up the chain of command it is often extensively modified or even reversed. Does this suggest a problem with the lower level group? I believe not. Rather, the upper echelons are unclear about the actual definition of the problems, do not delineate the parameters for a solution, or do not ensure that

the problem and parameters are communicated to the problem solving group. Dillman has correctly identified three important barriers to change. I add a fourth.

Barrier to Change 4: The Absence of a Policy on How to Implement Change

It is my experience that very few organizations have a clear policy on how (controlled) change should occur. There may be some oral policy that changes from survey to survey and from situation to situation. The lack of a clearly defined organizational policy affects how change to the “essential survey conditions” should occur. In many ways this is how the tradition of the operations arm should change. These conditions are an important part of any government statistical organization that quantifies economic, social, and demographic change, usually through a series of repeated surveys conducted on a regular basis such as monthly, yearly, or even every decade (the U.S. Decennial Census of Housing and Population). Even minor changes, conducted without adequate testing and experimentation, can produce major changes to the estimates. I recall a “minor” change to the U.S. Current Population Survey (CPS) questionnaire that occurred several years ago where the order of a yes/no answer category was reversed with unexpected results. This change, of course, was introduced with little or no testing. When a change occurs to the essential survey conditions, without experimentation, and the resulting estimates show an unexpected difference when compared to history, one wonders whether the estimate truly reflects a change in the population parameter it attempts to measure. A well thought-out policy about instituting change will help both cultures understand their proper roles in the organization.

Before turning to solutions I would like to point out that interaction effects are important. In the extreme, someone from the research culture, with poor communication skills, who believes in experimentation, running an operations unit may produce results that qualify as a *Harvard Business Review* case study.

Solutions or Trying to Jump the Barriers

Dillman’s four steps to leap the barriers will, over time, make change easier and better. Although with the general downsizing of government it will take dedication and commitment to train or retrain staff. But the effort would be worthwhile. At a minimum, short courses should be developed or given to all research and operations staff. This in itself will overcome some barriers, especially barriers 1 and 2. The 1995/1996 calendar of short courses offered by the Joint Program in Survey Methodology at the University of Maryland shows that the materials and even much of the coursework (Introduction to Survey Sampling, Compensating for Missing Data, Self-Administered/Mail Surveys, Cognitive and Communicative Aspects of Survey Measurement and Answering Autobiographical Questions to name a few) is already available. And the regular coursework leading to a Masters in Survey Methodology contains the necessary ingredients to produce even more complete knowledge on a wide variety of subjects. Based on the “sample of size one” approach, it is my prediction that this program will bring the operations culture closer to the research culture. Note that this training is also beneficial for the researchers. Nevertheless, I am not sure

that this type of training will bring those from the research culture to appreciate, understand, and esteem the values of the operations culture. While some coursework will help, I believe the solution lies in “rotational and training” assignments in the operations areas. Short-term time away from one’s area of expertise and some loss of productivity are well-worth the overall gain to the organization in the long run.

As Dillman points out, hiring more staff trained to reduce nonresponse and measurement error should be emphasized. Such staff are, however, a relatively rare species and in times of downsizing, hiring is severely limited.

Hierarchy can and should change, but again, the agenda should be long term. The current situation requires change and the hierarchically-designed organization, where turf and functions have been defined over many years, is not readily suited to change. Teams by themselves are not the answer. Here again it seems as if experimentation can lead to useful results. Tearing down at least a part of the hierarchy and instituting a team approach based on much of the theory and practice of matrix management would be worth the effort. Perhaps a short term solution that would help surmount all three of Dillman’s barriers is instituting a policy on how to change the essential survey conditions.

This policy has two aspects: (1) deciding what types of changes should be made and (2) how these changes should be made. The policy can go in several directions. It may simply be change when you “think” you have a good idea or change when you have accumulated a fixed number of changes, or accumulate and change on a fixed cycle (once a year, once every five years, etc.) or my preferred choice, when testing shows that change is warranted and a plan is developed to institute change in a statistically sound way.

The process used by a large portion of the U.S. semiconductor community can serve as a model for this approach to change. SEMATECH (1993), a consortium of the U.S. federal government and several semiconductor companies, was created to overcome a decline in market share of the international semiconductor market (Spencer and Tobias, 1994). The main approach is based on the SEMATECH policy on how new semiconductors are designed, developed, and tested using sound statistical methods, before being turned over to industry to build and sell. (Other components of the policy include the training required for statisticians and engineers when they come to SEMATECH. This includes coursework and common terminology used by both cultures. Some more on breaking down the barriers, especially 1 and 2.) A main component of that policy is based on using sound statistical methods in the design, development, and testing of a semiconductor. Briefly, it lays out a series of experiments that must be conducted to identify the important variables that affect semiconductor design, experiments that need to be conducted to understand the process of fabricating the semiconductor along with the data that need to be collected, and concludes with a marathon test of the actual fabrication process. A similar approach (Tortora et al., 1992) could be instituted in statistical organizations for evaluating and incorporating change.

Why have statistical organizations, where the basic foundations of all outputs are based on statistical and survey methods, not adopted this statistical approach? While the answer to this question is complex (a future JOS paper?) some interrelated

possibilities include (1) a long tradition of leadership, particularly the organizational head, from professions outside of the statistical and survey methods community, (2) the failure of the statistical and survey methods community to develop potential top agency leadership and then get those individuals into these organizational head positions, (3) a general lack of recognition that methodology, the process, is just as important as producing numbers (output), (4) the inability to secure adequate funding to support a strong research program, and (5) an often misdirected research program that is not focused on the problems of the organization.

In the end, however, the important point is the lack of a policy. While I believe the approach based on the SEMATECH model is the correct choice, a clearly enunciated and enforced policy on how to institute change, even if it is "change whenever you have a good idea," would go a long way towards overcoming the barriers identified by Dillman. At least all cultures in the organization would know what is expected.

Concluding Remarks

One should not conclude from Dillman's article or these comments that innovation has not taken place in government statistical organizations and that some of that change has not been based on sound methods. The recent changes to the CPS that included revising and automating the instrument was based on an overlap survey run simultaneously with the old CPS over many months. Much of the experimentation that Dillman led at the Census Bureau on improving response to the census mailing will find its way into the 2000 census. The National Agricultural Statistics Service and the Census Bureau have made large strides in automating their data collection processes. Nevertheless, the main issue is not that change or innovation does not occur. Rather, it is the process of how it should occur, the resource loss that occurs in that decision process as the cultures come together, and afterwards, whether the method of implementing change is flawed.

Again I thank Dillman (and JOS) for laying out some important thoughts on why change is often so difficult. I agree with most of what Dillman says and add a fourth barrier and a solution for helping all of us to leap the barriers — a policy on how change should occur.

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