Distr.
GENERAL

WP.11
25 April 2012

ENGLISH ONLY

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)
CONFERENCE OF EUROPEAN STATISTICIANS

EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN UNION (EUROSTAT)

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)
STATISTICS DIRECTORATE

Meeting on the Management of Statistical Information Systems (MSIS 2012)
(Washington, DC, 21-23 May 2012)

Topic (ii): Streamlining statistical production

Transforming Census Bureau Operations

Supporting Paper

Prepared by James T. Christy, Nancy N. Kobilarcik and Deborah M. Stempowski,
Census Bureau, United States

Introduction

1. The United States Census Bureau (the Bureau), which traces its beginnings to 1790 under the direction of Thomas Jefferson, has stayed abreast with socio-economic changes in the United States, configuring itself and its processes to meet the ever-increasing demand for data and information. This paper presents two recent initiatives that position the Bureau to work within a society that is experiencing rapid change as evidenced by five observable trends:

i) Increasing challenges in measuring the American population and economy
ii) Increasing demands for data and information on American businesses, local governments and communities by leaders from all segments of society
iii) Increasing pace of technological innovation that enhances the participation of respondents in surveys and censuses
iv) Increasing pace of new digital data resources from Federal-state-local government programs, private sector transactions, and internet-related activities
v) Decreasing survey/census budgets for all: the Bureau and its customers.

2. Coupled with these trends is a vision for survey/census statistical processes:

- Pro-actively analysing consolidated frame data and paradata during data collection.
- Pro-actively assigning the optimal data collection mode in real-time.
- Pro-actively estimating statistical parameters in real-time during data collection.

3. Led by the determination and unwavering vision of its current Director, Dr. Robert Groves, the Bureau is working ahead of the curve to leverage these trends in realizing its vision. It has streamlined the

field management throughout the country while reducing the number of regional offices. It has restructured its demographic survey organization to focus on customer service and timeliness and innovation of operations.

I. The Field

A. Developing alternatives for the future

4. The Bureau has operated under essentially the same field structure since 1950. In the face of internal and external concern about escalating costs, the Director authorised a small study to assess the efficiency of data collection activities. A key conclusion of this early work was the need to streamline the oversight activities of the management infrastructure. As a result, the Director initiated an ambitious restructuring effort, led by senior managers from both the Headquarters and Field operations.

B. Deliberations and discussions

5. The team of managers began their work in September 2010 with a broad discussion of ideas – ranging from a massive expansion of the field infrastructure to the total elimination of a distributed presence. This became the starting point for a highly confidential, structured process that lasted 10 months. During this period, the group incorporated a series of indicators and methods to assess the risks and costs of each idea. Using these indicators, concepts were assigned values of merit against the overall goals of the initiative and following an iterative process, four options were considered from the dozens originally provided. The group also incorporated the potential efficiencies of new technologies and improved statistical methods.

6. Once the four highest ranking options were chosen, the group did an exhaustive assessment of each, including a much more substantial analysis of costs and risk. The group also developed implementation strategies for each option, addressing things such as the logistics of closing offices, releasing and relocating staff, restructuring work assignments and communications with the public. Much like the earlier process to winnow the dozens of ideas to four, the group used an algorithmic approach to identify the top option.

7. Present in nearly all of the discussions were both the Director and Deputy Director. Their presence was critical to ensure the process was objective and data-driven. The selected option involved the closure of a number of regional offices. Because the team included all of the Regional Directors from the Bureau's twelve regional offices, the Director and Deputy Director used their own confidential process to select the regional cities that would remain and the ones that would close. This process was similarly data-driven and highly objective.

C. Final decision

8. The option that showed the greatest merit was to reduce the number of regional offices from twelve to six. Further, the option introduced a shift in the management of field workers to a substantially more decentralized focus. Finally, the Bureau strengthened its capacity to evaluate and analyse the data collection process in each of the remaining six offices. This option, which has become known as the Field Realignment Project, optimizes the balance of cost savings in concert with cultivating an environment that is innovative and rich in data for operational analysis; building up for a future of nimble mode assignment capability based on data and local knowledge; minimizing the Bureau's vulnerability and maintaining its time-honoured tradition of quality.

9. Since June 2011 a multi-faceted implementation team has been hard at work restructuring work units from the traditional 12-region structure to the new 6-region one. The transition process included changes to the geography of each region as well as the implementation of the new management processes and structure. Although a considerable amount of effort was made to assess the risks of the Field Realignment plan, the Bureau chose to implement changes over an 11-month period. This was done to mute

the effects of any unforeseen phenomena introduced by the change on the data estimates. Further, Statistical Process Control techniques were used to provide real-time monitoring of the effect of the restructuring on the data collection processes and the data being collected.

10. The transition was divided into 7 "waves" distributed both by geography and time. For example, the first wave, which began in January 2012, moved one-quarter of a closing region's work to a region that was remaining open. At the same time of the geographic transfer, the move to the new field management structure was also implemented for that area. Conversely, the second wave, which began in April 2012, included primarily geographic locations already assigned to regions that were remaining opened – meaning the only change was to incorporate the new management structure for these areas.

11. At the crux of the new design is the increased capability to work-from-home in a virtual environment. Positions which had traditionally been anchored in the regional office for technical reasons are now possible at home through the introduction of a secure virtual environment. It is important to note that no changes were made to the principal data collection activity –the Field Representative (FR) continues to contact respondents and record the results via a laptop. However, the management and reporting chain for the FR is streamlined. In the past, an FR would report to multiple survey supervisors in a regional office based on his/her survey assignments. Now the FR reports to one of 600 Field Supervisors (FSs) working out of their homes across the Nation. This FS in turn reports to one of 48 Survey Statistician – Field positions (SSF), who also work from home. Each of the 6 regions is assigned 8 SSFs and they work together to optimize the operations for a particular survey. Each SSF has oversight over the work of about 150 FRs and FSs. The SSF, who manages the work of as many as 16 different projects, collaborates with a group of technical project experts, called Survey Statisticians - Office (SSOs), who are located in one of the six regional offices. The SSOs monitor the data collection activities for their assigned survey projects across the 8 SSFs in the region. They work closely with project managers at Headquarters to ensure the region's data collection activities are in keeping with the goals and objectives for the survey project.

12. To ensure the feasibility of the Work At Home environment, the Information Technology staff at the Bureau made substantial changes to the infrastructure and software tools used in supporting field data collection activities. Taking advantage of recent advances in "cloud computing", the Bureau was able to quickly field a Virtual Desktop Interface for remote workers that allowed full flexibility without compromising security. This innovative approach has spurred further use of this technology in other areas of the Census Bureau. At the same time, many of the custom software developed to manage field data collection activities required substantial modification. Using a state-of-the-art change management process, the Bureau moved these modifications into the production environment following a streamlined testing process The Bureau used similar approaches in developing the monitoring and measurement systems to ensure data quality during the production phase of data collection.

13. There are a number of key benefits from this approach. The projected savings in reduced infrastructure cost are around $20,000,000 per year. The Bureau also anticipates additional efficiencies gained from an improved flow of information and better decisions from moving the management of field staff closer to the work that is taking place. Further, the technological advances incorporated in this design position the Bureau to adapt to future changes in the data collection process – including real-time mode switching, logical work management and significantly more flexible survey designs.

14. Throughout the implementation process, the Bureau has maintained a pro-active Risk Management Plan. The greatest risk to implementing the Realignment Plan is acceptance by staff and management of the changes it introduces. The primary mitigation strategy for minimizing the impact of this risk is communication. At all levels and in all locations, in-person or virtually, communication activities reign. There are monthly conferences of senior leaders involved in the field data collection activities, including in-person Regional Director meetings with the Director, Deputy Director and designated HQ managers and personnel. There are weekly teleconferences with managers in the regions and at Headquarters. There are weekly Field Executive Management Status Briefings with the Director, weekly internal management implementation meetings on specific implementation topics and on-going meetings with internal and

external stakeholders. Additional communication tools include a monthly Realignment Newsletter, Director's Blog, Intranet site and periodic Video Teleconferences.

15. Within Headquarters, a one-time special Project Management Office was established to monitor the overall realignment effort. This office is staffed by experienced data collection managers and makes use of state-of-the-art project management practices including a Master Project Schedule, a Knowledge Transfer Checklist, Regional Checklists, Transition Training Materials, a Realignment Risk Register, Data Collection Quality Tools, Survey Paradata Tools and Survey Data Result Modeling. These are used to provide insight on each dimension of the implementation to monitor the Field Realignment Plan and to quickly intervene when warranted.

II. Headquarters

16. Before the Field Realignment decision was announced in early summer of 2011, the Director formed a complementary team at Headquarters to address the need for realizing similar efficiencies. This project was titled "Transforming Reimbursables" and it occurred in two phases: AS IS (documenting how operations currently exist) and TO BE (developing options to operate better in the future).

A. Current operations

17. For the AS IS phase, the project lead from the Director's staff met with survey liaisons over the summer of 2011 for three key surveys that differed in several respects. One survey, National Health Interview Survey (NHIS), is characterized by a client that is heavily engaged in address collection and analysis and estimation of data. The second survey, National Crime Victimization Survey, NCVS, has differing needs that employ additional survey capabilities offered by the Census Bureau than what NHIS uses. The third survey, Survey of Program Participation (SIPP) is an internally sponsored survey that is longitudinal in design. The AS IS analysis described the commonalities along with the distinctive attributes of each survey, offering a diverse framework on which to build the TO BE vision.

B. Developing alternatives for the future

18. For the TO BE phase of this project, four division chiefs in the Demographic and Field Directorates, namely Demographic Surveys Division (DSD), Field Division (FLD), Demographic Statistical Methods Division (DSMD), and Technologies Management Office (TMO) joined the Los Angeles Regional Director, a Survey Methodologist and the Project Leader and as a team they worked to develop ideas for improved business processes.

C. Deliberations and discussions

19. This team met from September 2011 through January 2012 on at least a weekly basis, but often several times a week. Similar to the Field Realignment process this team brainstormed options against weighted goals defined by the Director; but this team had added factors to consider. The Director and Deputy Director crafted additional dimensions for the options in order to "stretch the thinking" when coming up with options. This table summarizes those dimensions.

Project Authority and Resource Control	Project Managed	Team Composition	Team Organizational Placement	Business Standards
Full Authority Coordinator	Hierarchically Horizontally	Functional Units Enterprise "Pool"	Flat Within Hierarchy	Fully Custom Fully Standard

20. Once a smaller list of high ranking options was chosen, the group did an assessment of each, including a much more substantial analysis of risk. The group also brought in a group of their senior managers to provide other input, as the options were refined during this phase. Much like the earlier process to narrow the list of ideas to a smaller number, the group ranked the options against the goals. The Director and Deputy Director selected the option that would be implemented based on the risk assessments for each option as well as trends with other survey organizations around the world.

D. Decision

21. Each large survey has a dedicated Survey Director. Projects may share Survey Directors in several situations: (1) smaller surveys (based on cost, sample size, or other factors as appropriate), (2) periodic surveys, (3) one time surveys, or (4) the project requirements dictate less than full time commitment. The Survey Director has full authority for decision making and is responsible for managing all aspects of survey work including scheduling project work, managing staff and client relations, monitoring the budget, overseeing questionnaire and materials design, plans and executes data collection and delivery of completed data sets, and reports ongoing cost and progress for the survey over its entire lifecycle. The Survey Director also serves as the single point of contact for the sponsor as well the lead of the survey team, working with the project manager, other survey team members and the service provider areas to meet the survey sponsor's goals.

22. The Survey Director is a highly skilled generalist in survey lifecycle. A good candidate will be knowledgeable about frames, sample design, questionnaire development, data collection modes, processing, and analysis (through experience or formal education). Good communication skills (oral and written) are critical as well as familiarity with survey analytics, cost analysis and modelling, and quantitative analysis. The Survey Director needs to be a strong leader and manager.

23. Each survey also has a Project Manager (PM). Smaller projects may share Project Managers in much the same way as they might share Survey Directors. The Project Manager has responsibility in managing the triple constraint for a survey: Scope, Schedule and Resources as bound by Quality. The Project Manager has many of the same skills as the Survey Director with one key difference: the PM's key focus is on the dimensions of managing the project, rather than working as the main point of contact for the sponsor. To this end in particular the PM is a highly skilled resource with experience in managing the nine dimensions of a project as defined by the Project Management Institute (PMI). A good PM candidate is also familiar with demographic surveys.

24. As noted previously, each survey has a Survey Team that is led by the Survey Director. The Survey Team's focus will be on data collection (including multi-mode), sponsor specific statistical operations, project management, and survey oversight. Membership on this team will rotate throughout the lifecycle of the survey, utilizing particular expertise only at the time where it is needed. The role of this team would be to make sure the project is meeting the sponsor's needs. Monitoring and solving problems along with negotiating ongoing work and changes, ensuring data products are delivered, and suggesting innovations and improvements would be part of this team's role.

25. Two specific roles are critical to the success of the Survey Team. The Survey Design Lead identifies requirements and coordinates implementation of requirements for quality management, questionnaire design/development/edits, and sample design/estimation/data analysis. The Survey Operations Lead identifies requirements and coordinates implementation of requirements for data collection, procedures, training, and data processing.

26. Each survey team benefits from the work by three centralized Service Providers that will provide staff and assistance as part of the Survey Team. They are Interagency Agreements Processing and Approval, Cost Estimation, Modeling and Analysis, and Survey Analytics. While the focus of these groups will initially be to improve operations for our reimbursable work, they will eventually serve all Census Bureau

managed programs. The expertise their areas will develop addresses critical challenges in meeting our external sponsor's goals and expectations.

27. Each survey will also have to access additional Service Providers within the Bureau which constitute the resource pool from which rotating Survey Team members will emanate. Within the service provider units, there will be senior and junior staff with the same functional area skills. The senior staff will oversee and mentor the junior staff. Over the years, staff would work on different surveys. Staff in all functional units would be candidates for eventual appointment as a survey director. These Service Providers are defined by the survey lifecycle and include: (1) Statistical Methods, (2) Data Collection, (3) Data Collection Automation, (4) Subject Matter, (5) Data Processing and Editing, and (6) Project Management.

28. There are a number of key benefits from this approach. Our sponsors wanted a single point of contact at the Bureau and they will have the Survey Director to fill that need. Our sponsors demanded lower costs and improved efficiency. Through the establishment of the centralized service providers, we can meet that demand by managing our resources more effectively, charging only what is required on a survey by survey basis. Our Survey Analytics group working with the Survey Team will provide our sponsors with a more proactive approach in identifying issues, problems and solutions. Lastly, our Survey Analytics group will better enable us to use real-time information to manage our surveys, specifically focusing on data collection operations.

29. As we prepare for implementation, the Director provided several principles that would provide the foundation for our new organization. In grouping staff together, we will combine areas that require similar expertise in order to promote sharing of expertise. Organizations will be designed to reduce the number of hand-offs or transfers between areas throughout the survey lifecycle. Our new organization of service providers should also promote common methods across surveys and so do while leveraging existing Bureau resources.

III. Lessons learned

30. As with any large change initiative, senior managers have to be flexible in order to be successful. Although we are not finished implementing the changes described previously, we have already taken away some key lessons learned and made adjustments as we moved forward in our change effort. Most important in these efforts is that in order to set the tone for the organization, the vision and involvement of senior leadership is critical. Both the Director and Deputy Director provided continuous support and focus in achieving the end results they determined were necessary for success. Having senior management set an ambitious schedule also forces a sense of urgency within the staff, ensuring that progress is made in a timely manner.

31. Regular, frequent, repeated communication at all levels is a good thing and it reinforces that things are going to change from how business is done currently. The Director and Deputy Director both continuously reinforced the message of change and why it was needed for the Bureau to survive. The employees knew these were key executive initiatives that would be successful.

32. In developing options for operating in the future, involvement of staff at all levels will make gaining support moving forward much easier. While it may seem easier to have a small group working initially, including a broader group during the development stages will also bring additional issues, risks and ideas for improvement to the discussion. Teams also need to be sure that they focus not on the symptoms, but on the real problems. Managers need to make sure to correct the root problem and its cause as solutions are developed.

33. It is critical to ensure that operational staff are an intricate part of the process to identify and vet requirements for IT systems and structures. This cannot simply be a "hand-off", particularly if there is a strong need to do things quickly. The opportunity for operational managers to provide immediate input to

developers on design features is important, as systems must be designed in concert with operational priorities. Misaligned systems can create disruptions – leading to a lack of confidence in the process and costly delays or errors.

34. During implementation, close real-time monitoring of the effect of changes is critical. In the field realignment, this brought to management's attention unanticipated costs – but also unanticipated savings. It also enabled the Bureau to assure its sponsors that the data quality of their surveys was not being jeopardized during the change in field operations.

IV. Next steps

A. Field operations

35. There are several activities remaining in the process: 1) The transition to the new management structure will be completed in November 2012. We are incorporating efficiencies and adjustments as the process continues. 2) We are refining the relationship between the managers with oversight over the data collection (the SSFs) and the project managers in the regional offices (the SSOs). While the concept is clear, the practical implementation requires substantial analysis of job assignments and decision trees. 3) We are planning to introduce new tools and analytic platforms that are compatible with the new structure and roles. We are embarking on an intense development effort – involving experts familiar with technical, statistical and field issues. 4) While there is a clear direction on what happens with the existing data collection activities at the Census Bureau, much work remains in developing a strategy to handle substantial changes in workload. Key to this thinking is how we maintain the core components of the new structure while incorporating a flexible architecture to accommodate fluctuations in work. 5) We are working to join the restructuring of Field Operations with the Headquarters effort with a goal towards creating a complementary relationship between the two.

B. Headquarters

36. We will move to this model gradually, survey by survey, with clients interested in moving quickly the first to do so. Implementation teams for the first two surveys will begin their work in April 2012. The remaining surveys will move on a flow basis, the specific order of those moves has not yet been determined. As the implementation teams move ahead, we will continue to incorporate process improvement suggestions and other adjustments as needed. Full implementation is projected to take approximately 18 – 24 months.
