Survey Management Challenges

- **Panel 1:**

Top three challenges organizations are encountering in technology and survey computing

- Panel 2:

Challenges and approaches related to Data Governance

Top three challenges organizations are encountering in technology and survey computing

Panelists will identify the top challenges facing their organizations today given the changing survey technology, data systems, and programming environments. Projects today often include innovative survey technologies, the use of specialized programming customizations, incorporate administrative and extant data sources, and the integration of different devices and technologies to support data collection. The panelists will discuss the ways that their organizations are dealing with the environmental changes that they have identified, and offer examples and lessons learned in addressing these challenges.

Top three challenges organizations are encountering in technology and survey computing

Moderator: Karen Davis – RTI

Panelists:

- Bryan Beverly, BLS
- Gregg (Skip) Bailey, Census
- R. Suresh, RTI
- David Trevarthan, NORC

The Top Three Challenges in Technology and Survey Computing

FedCASIC 2022
April 5th, 2022

Bryan Beverly
Data Collection Branch
Current Employment Statistics
US Bureau of Labor Statistics

Current Employment Statistics (CES)

- The Current Employment Statistics (CES) program of the U.S. Bureau of Labor Statistics is a monthly payroll survey of approximately 144,000 businesses and government agencies, representing approximately 697,000 individual worksites.
- Provides detailed industry data on employment, hours, and earnings of workers on nonfarm payrolls.

Challenge #1

- SITUATION: Respondents do not accept unsolicited telephone communication from government agencies. Calls are being blocked or going directly to voice mail.
- SIGNIFICANCE: Survey enrollment is declining.
- SOLUTION: Find ways of making the initial contact by letter, email and a web page.

Challenge #2

- SITUATION: Interviewers need to prove legitimacy and value to respondents. The identity of the interviewer may not be believed or deemed as worth the time for a conversation.
- SIGNIFICANCE: Collection rates are declining.
- SOLUTION: Increase the modes of data collection that prove legitimacy but do not require conversations.

Challenge #3

- SITUATION: Respondents need the freedom to supply data records in unstructured file formats. It is a burden to respondents to gather and export data that cannot be captured in a digital form and entered on just a couple of screens.
- SIGNIFICANCE: Large volumes of data from a single source are less likely to be collected.
- SOLUTION: Shift the burden of formatting large data sets to the agency.

SUMMARY

- The top three challenges in technology and survey computing are engaging, sustaining and facilitating agency/respondent relationships.
- The solution to these challenges is for agencies to make the data collection process as transparent, easy and innocuous as possible.

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Top three challenges organizations are encountering in technology and survey computing

Gregg (Skip) Bailey PhD
Deputy Chief Information Officer
Office of the Chief Information Officer (OCIO)
US Census Bureau

“Context is worth 80 IQ points”

- Alan Kay

United States® Census Bureau

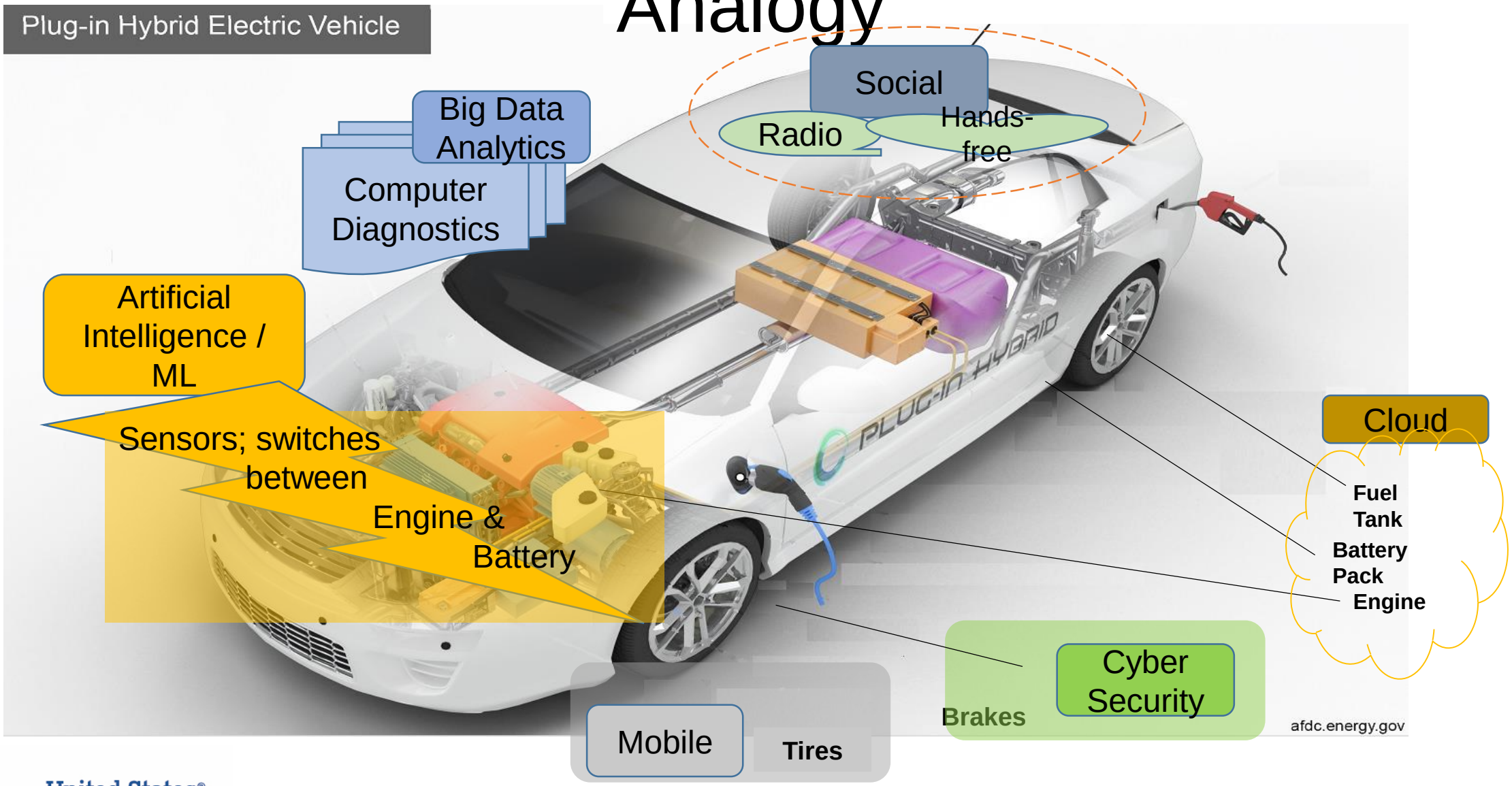
"90% of the data in the world today has been created in the last two years alone, at 2.5 quintillion bytes of data a day!"

"…with new devices, sensors, and technologies emerging, the data growth rate will likely accelerate even more."

- **IBM Marketing Cloud**, "10 Key Marketing Trends For 20

https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=WRL12345USEN

Technology at Census Analogy

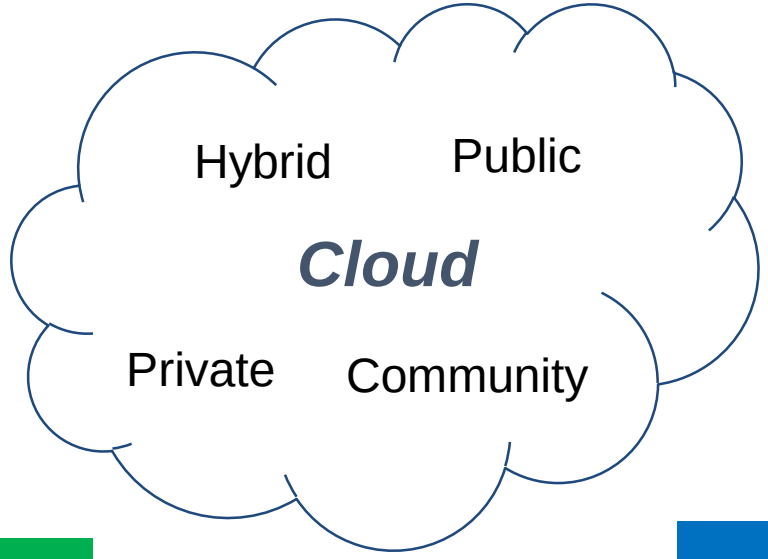


United States® Census Bureau

Basic Definitions of Cloud Computing

Cloud vs. Traditional Solutions

- Virtualization
- Outsourcing
- Utility computing



Qualities of Service NIST

- On-demand self service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

Service Layer

- Software-as-a-service (Saas)
- Platform-as-a-service (Paas)
- Infrastructure-as-a-service (Iaas)

Business Model

- Cloud service consumer
- Cloud service broker
- Cloud service provider
- Cloud service enabler

United States® Census Bureau

Secure Multi-Party Computation

Concerns:

- Lack of response to traditional survey instruments.
- The world is getting survey tired.

Solutions:

- Solution is to use more publicly available and “administrative” data.
- Use Secure Multi-Party Computation

United States® Census Bureau

Challenges in Technology and Survey Computing

R. Suresh

RTI International

RTI INTERNATIONAL

Challenges in Technology and Survey Computing

Top 3 Challenges:

- Data Security
- Hiring and Staff Retention
- Multi-Mode / Multi-Device

Challenge 1: Data Security

- Federal data security standards, and agency-by-agency interpretation of those, are constantly evolving and changing
  - Work closely with client's security staff
- Data collection in FIPS-Moderate Environment
  - RTI set up such a network back in 2007
- Designing systems to be flexible and adaptable to different security environments.
  - Ensured all survey related systems function in FIPS Mod

Challenge 1: Data Security (Continued)

- Securing devices used by (field) interviewers
  - Full disk and 2-factor
- Securing websites for conducting self-interview
  - Restrict PII display
  - Require passcode for resumption
- Using 3rd party tools and websites for better user experience
  - Limited use

Challenge 1: Data Security (Continued)

- Sanitizing data for analysis and delivery
  - Use MASSC for statistical disclosure analysis
- Controlling access to the data
  - Review and remove access promptly
- Ensuring all staff are trained regarding data security
  - Impress upon staff at every opportunity

Challenge 2: Hiring and Staff Retention

Hiring technical staff with required skills and expertise

- Blaise or Voxco survey programmers
  - Skill Not taught in schools
  - Train your existing staff
- Survey computing is somewhat unique
  - Target hiring pool is more limited.
  - Survey navigation is unique
  - Handling production data
  - Constant changes in production

Challenge 2: Hiring and Staff Retention (Continued)

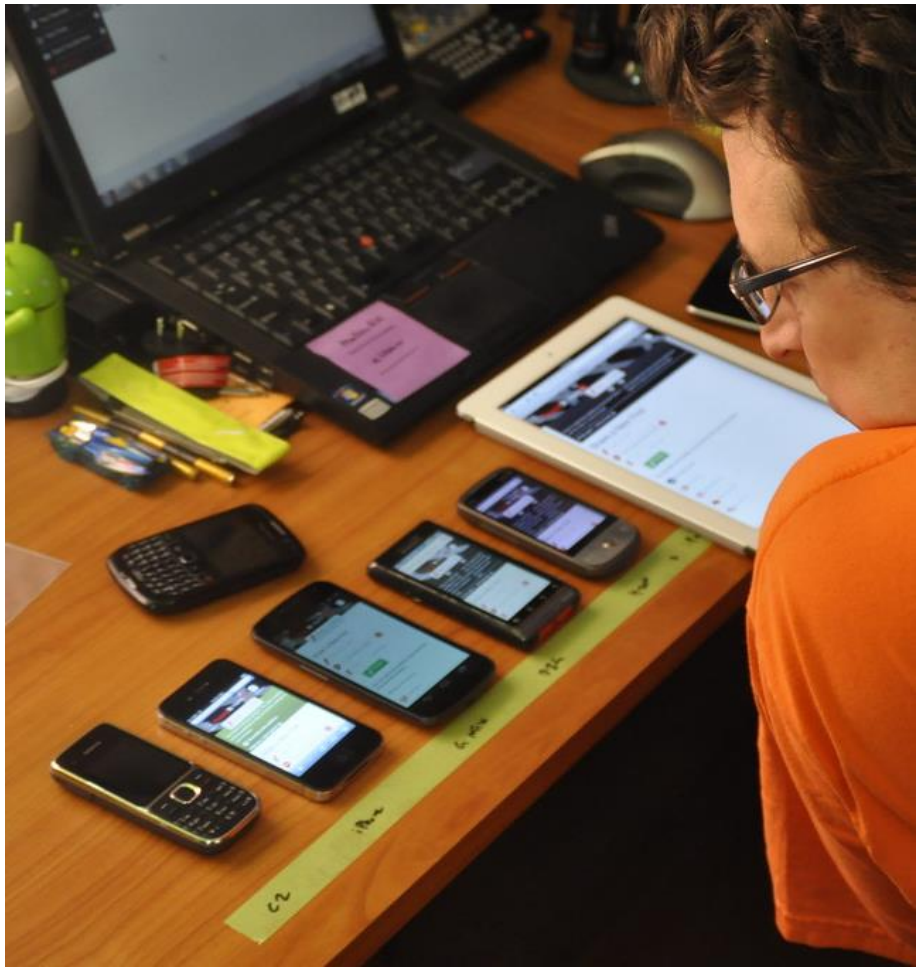
Retaining programming staff

- Competing with organizations
  - "Improve the Human Condition"
  - Let social media work for you
- Competitive compensation and benefits package
- Increasing visibility and expanding skillsets
  - Opportunities for self-development
- Workplace benefits including, but not limited to:
  - Flexible location/schedule
  - Support services
- Emphasis on Diversity and Equity in the Workplace

Challenge 3: Multi-Mode / Multi-Device

- Layout related issues
  - Focus on smaller devices
  - Software selection
  - *Informed consent text*
- Instrument testing
  - Teach multi-mode testing
  - Test plans for multi-mode/multi-device
  - Plan for additional staff and time for testing

Challenge 3: Multi-Mode / Multi-Device (Continued)



- Instrument revisions in mid production
  - Change control boards help
  - Regression testing
- Support staff
  - Train help desk staff on atypical devices
  - Be aware that OS versions and patches can affect applications

Summary

- Data security will continue to be a challenge and ensuring that staff are trained to deal with it is the best solution
- Providing staff with the flexibility and challenge that they yearn for and ensuring that compensation is competitive is the best way to hire and retain them
- Design the questionnaire for small devices first and make sure that test plans take schedule and budget into consideration

Thank you

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Top Three Challenges NORC Data Services Faces in Technology and Survey Computing

FedCASIC 2022

04.05.22 : Version 1.1

David Trevarthen, IT Director, Data Services

NORC at the University of Chicago

Agenda

01 Introduction

02 Challenge 1: Decentralized Programming Skills

03 Challenge 2: Incentive Theft Prevention

04 Challenge 3: Overcoming Limitations in Professional Survey Platforms

05 Wrap-up

Introduction

NORC at the University of Chicago

About Me

Brief Recap of Bio

- IT Director of Data Services at NORC @ the University of Chicago
- 13-year NORC tenure at the end of March
- Previous experience was in software engineering, project management, and IT management at various commercial enterprises in a variety of industries, mainly with consulting firms

My Team

- Three related data-centric development teams
    1. **Survey Programming: Supervisor plus 10 onshore and 10 offshore developers**
    2. **Data Delivery Solutions: Supervisor plus 6 (primarily) SAS programmers and 2 PT SAS admins**
    3. **Data Science: Sr. Data Scientist plus one Sr. Software Engineer**

*

Disclaimer Statement

Opinions and Thoughts Herein are Mine Alone

- Nothing in this presentation is intended to be taken as NORC policy or overall practice.
- Nor do I represent the perspective of other NORC managers or fellow thought leaders.
- The content in these slides are unique to my experience at and understanding of NORC and the survey research industry.

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Challenge 1: Decentralized Programming Skills

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Define the Problem

Decentralized Programming Skills

NORC at the University of Chicago

Coding is Not Just an IT Function

Social Scientists are Increasingly Skillful

- Coding skills ubiquitous now, not just those with a CS degree
- At NORC, Statisticians, Research Divisions, and Field & Phone Ops all have proficient programmers
- Python, R, SAS, and JavaScript popular among non-IT folks
- Opens the door to loss of or competing standards and best practices, as well as may introduce some really bad habits (as an IT person might see it)

NORC Data Services' Solution

Decentralized Programming Skills

NORC at the University of Chicago

Resolved: Everyone Codes Today

However, This is an IT Opportunity, Not a Threat

- Accept that reality and adapt accordingly
- Continue to take on the toughest assignments or those requiring a true Survey Programmer (SP), SE, data programmer, or DBA
- Provide self-service tools for those simple use cases where a research project may not need or be able to afford IT specialists
- Pivot to a role as an SME, tutor, and mentor
- Formalize collaborative support centers (SAS, R, Python)

Resolved: Everyone Codes Today

However, This is an IT Opportunity, Not a Threat

- Organize peer-driven users groups
- Offer internal coding classes taught by IT personnel
- Promote version control; we use Git

Value Added

Examples of Some IT Wins for Research Coders

- Reengineered and professionalized two Twitter feed analysis applications that a Public Health Data Scientist had prototyped.
- Performance improvement: On a COVID-19 study, reduced RT written SAS job stream runtime from 6 hours to 5 minutes
- Optimization: On a large Federal project, simplified a 100+ program job stream, moved onto a scheduler, added a config file for global input parameters, inserted restart points
  - **RESULT: Reduced new round setup from 2 to 4 weeks to just a few hours**
- Expanded Self-Service Offerings: IT offers a Qualtrics account to anyone who asks (within agreed upon response limitations)

More Opportunity

What the Future Holds

- Harness this diversity of skillsets on enterprise investment projects, such as new applications, processes, templates, and standards
- Through our collaborative approach, Data Services has earned a place at the table with Research, Stats, and Field & Phone Ops
- They tap our talent without our having to ask, which is a reversal in behavior
- Engage in continuous adaptation as technology changes and more non-IT folks become comfortable with writing their own code when prudent and advisable

Challenge 2: Incentive Theft Prevention

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Define the Problem

Incentive Theft Prevention

NORC at the University of Chicago

Nefarious Actors Abound

Word of “Free” Money Spreads Quickly

- Primarily an external Web threat
- It could be an inside job, though
- Bad actors harness social media to promote incentive theft
- The head of security at Qualtrics told us that trolls set up special Facebook pages or DM channels to promote opportunities to dishonestly harvest incentives and disseminate techniques to facilitate such activity

NORC Data Services' Solution

Incentive Theft Prevention

NORC at the University of Chicago

Remove the Threat

Promote & Enforce Best Practices Among the Survey Groups

- No open links when incentives are on the table. Unique authentication a must.
- No sequential PINs or other predictable patterns
- Use numbers *and* letters in PINs:
  - **36 character available instead of 10.**
  - **Thus, the game of guessing a PIN becomes nearly impossible.**
  - **That is, $36^4 = 1.7MM$ unique PINs vs. $10^4 = 10K$.**

Remove the Threat

Buy / Build Incentive Protection Tools

- Imperium RelevantID is part of our standard Web survey template
  - **Assigns a unique identity to each respondent using dozens of data points including geo-location, time, language and IP address**
  - **Returns a fraud profile score**
  - **Compares new respondents' digital profiles to existing in order to detect duplication**
- NORC's Central Incentive Warehouse
  - **Homegrown NORC tool accessible only through an on-premises survey engine *after* respondent validation**
  - **Uses encrypted handshakes between systems**
  - **System vendors provide NORC with unique tokens to validate authenticity**
- Randomized PIN Generator Application
  - **Homegrown**
  - **Let's survey teams choose own conditions such as length, character set, etc.**

Challenge 3: Overcoming Limitations in Professional Survey Platforms

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Define the Problem

Overcoming Limitations in Professional Survey Platforms

NORC at the University of Chicago

An Abundance of Solutions

No one platform meets all NORC client needs in all situations

- NORC IT has 6 survey engines:
  1. **Commercial CATI/Web solution (on-premises)**
  2. **Commercial CAPI/Web solution (on-premises)**
  3. **Commercial tablet/Web solution (on-premises hybrid)**
  4. **Home grown multi-purpose data collection tool in C#.Net (on-premises & cloud)**
  5. **Commercial legacy CAPI survey platform that hosts just one survey at NORC – client dictated (on-premises)**
  6. **Commercial self-service Web survey tool for small, low to moderate complexity surveys (cloud)**
- Despite APIs, interoperability is not always smooth or easy
- Often, a project may require custom API calls, JavaScript, portal integration (Python), one-off incentive experience, stored procedures, new tables with triggers and constraints, etc.

NORC Data Services' Solution

Overcoming Limitations in Professional Survey Platforms

NORC at the University of Chicago

Preparation, Flexibility and Nimbleness are Key

Each Custom Build Adds to Overall Capabilities for Future Work

- We have a wide set of custom templates, middleware, and backend applications built over the past decade to improve functionality
- For all practical purposes, these are one with the survey engine(s)
- Some examples include:
  - **Case spawning**
  - **Question types not natively supported (triangular slide, draw a picture)**
  - **Non-linkable segregation and decoupling of PII from question responses (two separate database environments required)**
- We have beefed up SP skills in SQL, JavaScript, HTML, and CSS. Some .Net as well for utilities (e.g., test sample, random PIN generator, etc.)
- NORC SPs work closely with database programmers and software engineers as required

Preparation, Flexibility and Nimbleness are Key

Each Custom Build Adds to Overall Capabilities for Future Work

- Our 10 onshore and 10 offshore SPs are highly collaborative:
  - **Open DM channel to bounce ideas off one another**
  - **SPs are empowered to pull in another resource to help problem solve without supervisor approval**
  - **Peer review of complex solutions**
  - **Ample unit testing, QA testing, and UAT**
- Many project specific solutions become part of the core solution set
- We've assigned expert Tech Leads to three problem domains:
  1. **Advanced Programming / Survey Systems Design**
  2. **Panel Surveys and Panel Operations**
  3. **Survey Methodology**

Summary: Top Three Challenges NORC Data Services Faces in Technology and Survey Computing

NORC at the University of Chicago

My Team's Top Challenges

RECAP

Challenge 1: Decentralized Programming Skills

Challenge 2: Incentive Theft Prevention

Challenge 3: Overcoming Limitations in Professional Survey Platforms

Thank you.

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Discussion