A Total Survey Error Approach to Business Surveys

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Basic TSE approach: Quality = 1 – \( \sum (\text{Bias}^2 + \text{Variance}) \)

**REPRESENTATION**

- Population
  - Sample frame
    - Sample
      - Respondents
        - Adjusted
          - Data delivery

**MEASUREMENT**

- Construct
  - Measurement instrument
    - Response
      - Edited

**Errors**

- Coverage errors
- Sampling errors
- Nonresponse errors
- Adjustment errors
- Validity
- Measurement errors
- Processing errors
Business Survey TSE approach

REPRESENTATION
- Population
- Observational units
- Sample frame
- Sample
- Respondents
- Adjusted

MEASUREMENT
Theory
- Construct
- Indicators
- Measurement instrument
- Response
- Edited

Practice
Development & testing
Survey communication
Coding, cleaning & data integration
Data delivery
The Relationship Between Statistical and Observational Units

- Enterprise group
- Enterprise
- Establishment
- Kind of Activity Unit
- Homogenous Unit of Production
- Local Unit
- Local Kind of Activity Unit
- Local Kind of Homogenous Production

Definitions affect coverage
The Relationship Between Observational and Reporting Units

Enterprise group
Enterprise
Establishment
Kind of Activity Unit
Homogenous Unit of Production
Local Unit
Local Kind of Activity Unit
Local Kind of Homogenous Production

Statistical unit
Observational unit
Reporting unit
Reporter

Design affect nonresponse
The Relationship Between Reporting unit and Reporter

Enterprise group

Enterprise

Establishment

Kind of Activity Unit

Homogenous Unit of Production

Local Unit

Local Kind of Activity Unit

Local Kind of Homogenous Production

Statistical unit

Observational unit

Reporting unit

Reporter

2-step Survey Communication affect motivation, competence & authority
Representation → Measurement

Survey Communication

Questionnaire Communication

Management

Respondent(s)

Encode
Select
Prioritize

Motivate
Comprehend
Retrieve
Judge
Report

Information distributed…
– Between people
– Between sources
– Over time
Survey Communication  Questionnaire Communication

Management  Respondent(s)

Encode Select Prioritize

Motivate Comprehend Retrieve Judge Report

Information distributed...
- Between people
- Between sources
- Over time

• More steps increase the error risk
• More complicated structure increases the error risk
• Mismatch between organizational structure and question flow increases error risk
Feasibility study: Financial Data Survey

Study the complexity of collecting financial data:
“Is the requested information available and easy to retrieve?”

• 5 large enterprise groups visited on site:
• Cross section of very large enterprise groups in NL
  o Different activities, foreign direct investment
  o Different internal structures
    • Company 1: A Private equity company
    • Company 2: Centralised accounting
    • Company 3: Accounting offshore
    • Company 4: Complex project organisation
    • Company 5: A foreign owned multinational, limited accounting in NL
Feasibility study

“Is the requested information available and easy to retrieve?”

Five research issues:

1. **What?** What data do we get? Concepts/constructs:
   - From Statistical definitions to Accounting definitions: conceptualisation (indicators)?

2. **Who?** Entities:
   - Which entities’ data need to be included in the consolidation?

3. **Where?** Sources and people:
   - Where can the information be found?
   - Which business units and people are involved in the data collection?

4. **When?** Availability:
   - When is the requested information available?

5. **How?** Data collection instrument:
   Desired design and functionalities of a new data collection instrument that supports the response process to get low levels of total survey error?
Feasibility study – enterprise structures

Enterprise group level
- Manager
- Enterprise accountants
Feasibility study – enterprise structures

Simple case: centralized accounting

Enterprise group level
- Manager
- Enterprise accountants
  - Group accounts
  - General ledger
  - Sub-accounts
- Treasury
  - time

Diagram: Centralized accounting structure with roles and time indicators.
Feasibility study – enterprise structures

Complex case: Diverse structure

Enterprise group level
- Manager
- General accountants
  - Group accounts
    - General ledger
  - Group-2 accountants
    - Group accounts
      - General ledger
      - Sub-accounts
    - Group-2 ledger
    - Sub-accounts
- Group-1 accountants
  - Group-1 accounts
    - Ledger
    - Sub-accounts
  - Group-1 ledger
  - Sub-accounts
- Group-n accountants
  - Group-n accounts
    - Ledger
    - Sub-accounts
Feasibility study – enterprise structures

Complex case: Diverse structure

Enterprise group level
- Manager
- General accountants
  - Group accounts
    - General ledger
  - Group accounts
    - General ledger

Group-1 accountants
- Group-1 accounts
  - Ledger
  - Sub-accounts

Group-2 accountants
- Group-2 accounts
  - Ledger
  - Sub-accounts

Group-n accountants
- Group-n accounts
  - Ledger
  - Sub-accounts

Treasury

Not to be included in consolidation
1. **What?** Concepts:  
   • Differences/mismatches in definitions can be expected

2. **Who?** Entities:  
   • Consolidated reporting: *integration problems* over groups within an enterprise  
   • Deconsolidated reporting: *integration problems* during data editing

3. **Where?** Sources and people:  
   • Availability of required data in sources (units, formats, missings), data transformation and *integration problems* within groups  
   • Availability, knowledgeability of people

4. **When?** Time-related issues:  
   • Availability of data and people over time, communication issues

- Unit errors, non-response errors, measurement errors  
- Depending on the design
Prominent Errors Sources in Business Surveys

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- **Sample**
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**MEASUREMENT**

- **Construct**
- **Indicators**
- **Measurement instrument**
- **Response**
- **Edited**

**Theory**

- Practice

- Development & testing

- Effects of 2-step Survey Communication

- Coding, cleaning & data integration

**Definitions affect coverage**

- Design affect nonresponse

- Mismatches Transformations Integration Information system complexity

**Data delivery**
References

Thank you for your attention