United Nations Statistics Division Programme in Support of the 2020 Round of Population and Housing Censuses

Session 8

Main Drivers and Decision-Making on the Use of Electronic Data Collection Technologies

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Content

- Key drivers of technological innovation in census data collection
- Steps for decision making
- Management structure for making a decision

Key drivers

- Demand for timely data
- Demand for better coverage and data quality
- Demand for improving the quality of operations-min. human errors
- Demand for cost reduction and cost effectiveness
- Demand for minimizing response burden
- Less costs of technology and easy accessibility
- Management structure for making a decision
- User and stakeholder expectation
- National and global commitments to modernization of statistical systems

Decision making process

- Steps for making a decision
  1. **Developing strategic objectives**
  2. Identifying key factors affecting decision
  3. Information required for decision making
  4. Analysis of information
  5. Components of decision making
  6. Documentation and evaluation

1. Strategic objectives

- **Strategic objectives will differ depending on local circumstances**
  - **Among the most important would be:**
    - Improving census coverage and decreasing non-response
    - Improving data quality
    - Disseminating census results more timely
    - Conducting the census in a cost-effective approach
    - Modernization of statistical business processes
    - Meeting public expectations

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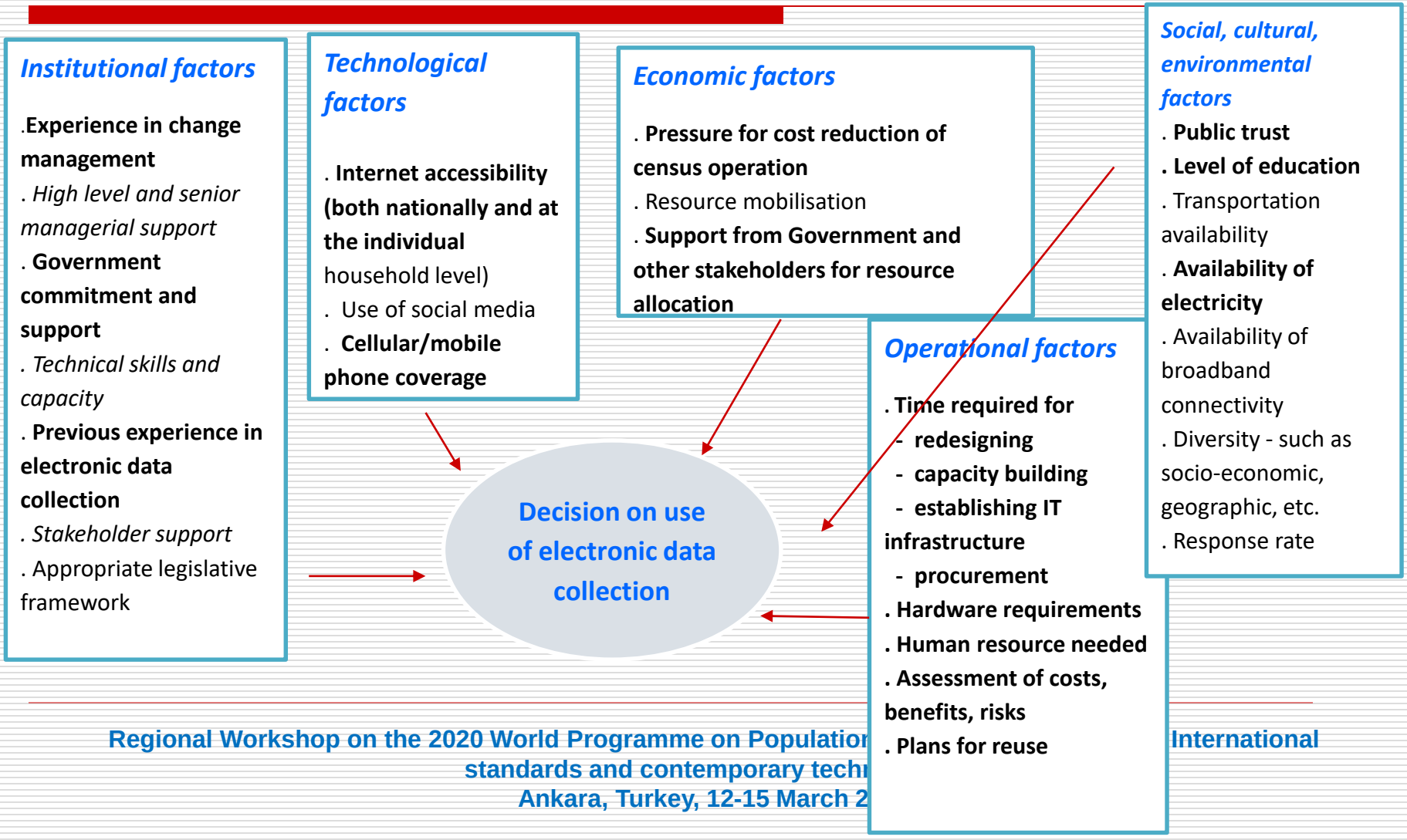
2. Identifying key factors

- **Institutional factors**-refer the capacity and capability of NSO to adopt the new technology
- **Technological factors-** factors that have a direct effect on the establishing the infrastructure needed for the use of new technology more widely, particularly for data transfer and the use of Internet
- **Economic factors-** refer to that have to be considered for securing the financial resources for establishing a system for the use of the new technology
- **Operational factors-** refer to the parameters that specific the necessary conditions for adoption of electronic data collection technologies in terms of time required and the workforce needed
- **Social, cultural and environmental factors-** refer to those that are related both to public`s general exposure to, and acceptance of new technology

Key factors affecting decision-General framework



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3. Information required for decision making

a. Quantitative information

- Population size and density
- Literacy rate
- Proportion of population having basic computer skills
- Number and proportion of population who can access to the Internet
- Number and percentage of households with Internet connection
- Proportion of households with electricity
- Cellular/mobile phone coverage
- Pattern of non-response rates for previous censuses and surveys
    - By geographical area and rural/urban

b. Qualitative information

- How ready is the statistical agency to adopt new technology for enumeration?
- How will Government and main stakeholders (particularly data users) react to the use of new technology?
- Does existing legislation allows for a change in the method of enumeration, and, if not, is a requisite change practicable?
- What is the public's reaction to adoption of Internet as the medium for self-response?
- What are main expected challenges? What would be strategies to achieve these challenges?
- What are the risks in procuring hardware and outsourced services?

3. Information required for decision-making

c. Information needed for operational aspects

- The extent of the geographic area to be covered
- Number of days/weeks estimated to complete the enumeration
- Total population (in terms of person and households) to be counted
- Number of Enumeration Areas (EAs)
- Size of field force (enumerators and all supervisory staff) depending on method of data collection including multi-mode approach
- Availability and the quality of address frame or address registers
- Technology constraints (online/offline, power access)
- Outsourcing opportunity
- Non-response follow-up (anticipated level of non-response)

3. Information required for decision making

d. Estimate of Total Cost of Ownership

- Fixed costs and variable costs
- Three components of TCO:
  - Hardware/ software
  - Operational costs
  - Personal costs
- Total costs of the multi-mode can be assessed by adding the cost estimate of each possible method
- Comparison with the costs of previous census

Items	Method of Data Collection 2010			Method of Data Collection 2020				
	PAPI	PASI		PAPI	PASI	CAPI	CASI	CATI
Number of EAs								
Number of questions								
Number of households								
Fixed costs:								
Hardware								
Software								
Technical support/services								
Other Electronic equipment								
Maintenance Fees								
Variable costs:								
Recruitment of temporary staff								
Training/workshops, etc.								
Enumerator salaries								
Supervisor salaries								
Data entry (PAPI/PASI only)								
Data cleaning								
Printing paper questionnaire (PAPI/PASI only)								
Data transfer fees (CAPI/CASI only - cost of data plan from carrier)								
Logistics costs								
Other (describe)								
Total cost per household:								

A template for calculating total cost of ownership including all methods considered for data collection

3. Information required for decision making

e. Benefits- improving data quality, coverage, timeliness of delivery of outputs and future uses of same technology for statistical operations

f. Risks and challenges- such as building a capacity, data transfer, resource mobilization, hiring a qualified field staff, data security

g. Timetable- sufficient time such as for building a capacity, procurement, system development, end-to-end testing (usually extensions to the timetable required for decision making and planning)

h. Reuse of technology- other censuses, household surveys, business registers, the use of hardware by other organizations

i. Best practices-practices of countries which have similar conditions

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4. Analysis of Information

- Analysis of existing census/demographic and contextual data is a critical step in the decision-making process
  - Several types of approaches should be used for analysis
  - Information collected should be analyzed with the involvement of relevant stakeholders
  - Comparative analysis is necessary for selection of appropriate data collection method in a country context

4. Analysis of Information

A. SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis: a better understanding of the balance between the benefits, risks and challenges in the introduction of new technology

- Strengths: those characteristics of the new process or methodology that give it an advantage over others
- Weaknesses: those characteristics which put the process or methodology at a disadvantage compared to the others
- Opportunities: those elements of the process or methodology that can be exploited to its advantages or the advantages of others
- Threats: those elements that create risks, or present challenges,

➢ comparative advantages and disadvantages of adoption of new technology

4. Analysis of Information

B. Cost-benefit analysis: comparison of total costs with its benefits

- a tool for explaining the benefits of adopting an electronic data collection technology by comparing its cost with the costs of current data collection mode
- If a multi-mode data collection methodology is an option, the cost estimates, benefits and risks should be determined for each type of data collection method under consideration

- ✓ Results of analysis should be the basis for making a decision
- ✓ Results should be used for preparing a justification for transferring to new technology
  - ✓ *Especially for convincing the government and stakeholders about the value of the new approach*

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5. Components of decision making

- **Data collection mode(s):** Understanding the data collection mode (or modes if a multi-mode approach is decided) is one of the first considerations. PAPI, PASI, CAPI, CASI, CATI or some combination of these be adopted?
- **Type of hardware :** Types of hardware (such as servers, handheld devices, tables or smartphones) needed for census operations should be decided
- **Software development:** Method of developing software and applications should be decided- (commercial, in-house, out-sourced, customized)

5. Components of decision making

- **System development:** Understanding and balancing an investment in refreshing or updating existing systems
- **Management structure and capacity**: There should be decision on how to manage census project.
  - Is there a need for restructuring organisation?
  - What would be management structure of census project?
  - What new skills are needed?
  - How can the existing capacity be developed?

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6. Documenting decisions and evaluation

- Statistical agencies should clearly document the discussions and procedures followed at each stage during the whole of the decision- making process from start to finish. Each stage of this process should be described by linking all decisions with relevant documents

- Systematic recording of this process will be very useful document for designing and implementation census operations affected by the decisions, and crucial if there is a need for revising the decisions during later stage of census planning if the conditions/requirements underlying particular decisions change

Management structure for decision making

- Decisions should be given through consultations with managers within the agency and with a variety of external stakeholders including technical experts, subject specialists and end users
  - **The high-level management group** would be responsible body for making the decision
  - **An advisory board on technology** would be responsible for reviewing types of technology available
  - **Technical working groups** would be formed for specific areas such as IT, census methodology and field operation, census legislation, budget, procurement/outsourcing, logistics, etc. - more detailed research for possible alternatives