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STATISTICAL ORGANIZATION

THE ORGANIZATION OF NATIONAL STATISTICAL SERVICES: A REVIEW OF MAJOR ISSUES

Report of the Secretary-General

SUMMARY

At its eighteenth session, the Statistical Commission requested that "statistical organization" should be included in the agenda for its nineteenth session. The present paper has been designed to provide a setting for discussion by the Commission. It describes alternative forms of internal organization, stressing that, whatever form is used, there is an overriding need to render visible and effective the across-the-board (horizontal) activities with a view to evolving harmonization in the statistical process and the statistical outputs (paras. 8-33). It proceeds to a discussion of the desirable degree of centralization of the statistical services and its limits (paras. 34-52). Attention is then turned to the "external capability" of the statistical agency, covering arrangements designed to enable the agency, on the one hand, to enhance the probability that the statistics are used and, on the other, to gain the co-operation of respondents (paras. 53-73). This is followed by a discussion on the "internal capability" required to enable the statistical agency to reach its objectives. Emphasis is given to the interdisciplinary character of the statistical process, the vital role of a permanent field organization and related cartographic and sampling expertise to carry out regular surveys and censuses, the need for organizing flexible storage and retrieval systems to provide prompt and diverse services and the important place of research and analysis in statistical work (paras. 74-104). The role of planning of statistical programmes to take account of the essentially unified character of the statistical system, the time intervals involved in producing new or improved statistics, the need for timeliness in outputs and the far-reaching impact of the computer are then discussed (paras. 105-127). The Commission may wish to comment on the paper and to indicate the topics that should be considered in further work on statistical organization.

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INTRODUCTION

1. At its eighteenth session, the Statistical Commission requested that "statistical organization" should be included in the agenda at its nineteenth session. 1/ The present paper has been prepared to provide a setting for discussion by the Commission. The paper takes a broad approach and, aside from organizational structures as such, it covers some related management aspects. The paper draws on the report of the United Nations Interregional Seminar on Statistical Organization held in 1973, 2/ the papers prepared for the seminar and a number of other sources.

I. ACTION BY THE COMMISSION

2. The Commission may wish to comment on the paper and to specify the topics that should be included in further work in the area of statistical organization.

II. SOME PRELIMINARY CONSIDERATIONS

3. The Interregional Seminar on Statistical Organization held at Ottawa in 1973, and its predecessor held at Ottawa in 1952, defined statistical organization to include certain related management aspects. The Seminars covered a variety of facets: internal organizational structures, centralization and decentralization, co-ordination, planning and priority setting, relationships with users and suppliers of data, dissemination, data processing, legislation, recruitment, training, status, research and analysis and several others. The present paper, which has been designed from the vantage point of top management of the statistical agency, will touch on these facets under the following main headings: internal organizational structure of a statistical agency; degree of centralization of a national statistical service; external capability; internal capability; planning, priority setting and programme co-ordination. The term "national statistical service", as used in the paper, refers to all the autonomous national entities engaged in statistical work. The terms "statistical agency", "statistical organization" and "statistical office" are used interchangeably and refer to the individual entities of the national statistical service.

4. In the most general terms, it may be said that the term "organization", as used at the interregional seminars and in the present paper, deals with various ways to facilitate efficiency ("to do things right") and effectiveness ("to do the right things") in the utilization of scarce resources, especially human resources. An institution "does things right" if it makes maximum use of the resources at its disposal, that is, if it maximizes output per unit cost (or minimizes cost per unit of output). The organization "does the right things" if its actions lead to the fulfilment of its objectives, that is, if its outputs are relevant and have the desired impact.

1/ Official Records of the Economic and Social Council, Fifty-eighth Session, Supplement No. 2 (E/5603), para. 181.

2/ Report and Proceedings of the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 3-12 October 1973.

5. The objectives of a statistical service are reflected in the role statistics are designed to play. This role is highlighted in the following quotation which, though written 22 years ago, is even more true today: "The demand for statistics of the highest quality by Governments, business, economists, social workers and others, has increased enormously. This is accounted for partly by the growing complexity of the modern world, but even more by the fact that many Governments today have accepted wide responsibility for the welfare of the citizens and have embarked upon a wide variety of /economic planning, regulation and/ social security measures. To function efficiently, such Governments must have a basis of sound statistical information to assist them in formulating their policies. Governments which do not have well developed statistical organizations are severely handicapped ... In all fields, both national and international, the work of the statistician is fundamental for comprehending the numerical aspects of the problems to be dealt with, for setting more or less isolated phenomena in their proper perspective, for indicating the significance of parts in relation to the whole and for substituting realistic data for wishful thinking, biased claims and political oratory. In short, statisticians help to shape /economic and/ business policy, they furnish navigational guides for the ship of State, they help social agencies which work for the welfare of the people and they help students and the general public to have a more realistic view of the complex economic and social environment in which they live." 3/

6. For statistics to play such a wide-ranging role they, and the agency producing them, must possess certain characteristics. These may be briefly summarized:

(a) Statistics are not end products - they are intermediate products to be used in decision-making and research. Hence, a user orientation must pervade the statistical service.

(b) The same statistics are used by many users, and in a variety of ways. Hence, there is a need for an orientation to serve many users rather than one or a few exclusively.

(c) Statistical series are not used in isolation - they are used jointly with other statistics. Hence, an integrated product is essential, in terms of concepts, definitions, classifications, methods.

(d) Time series covering some years in the past are more revealing of current and emerging events than isolated single observations. Hence, there is a need for maintaining historical continuity in the data and for storing them in a systematic way as elements of data capital accumulation.

(e) Timeliness is essential for use in decision-making. Hence, there is a need for it in collection and production and promptness in the release of the data.

3/ Handbook of Statistical Organization. (United Nations publication, Sales No. 1954.XVII.7), p. 55.

(f) The statistical product is based on raw materials (data) supplied by households and private and public enterprises and institutions. Hence, good public relations and the safeguarding of confidentiality of individual returns are essential for good quality.

(g) A condition for the acceptance of statistical results is that the statistical office is, and appears to be, impartial and objective and beyond any professional reproach.

(h) The production of reliable, timely statistics is an interdisciplinary - and costly - process requiring continuity in operations and management, and competent professional and administrative leadership.

7. These characteristics are of importance in considering various alternatives in the organization and management of statistical services. They will be referred to again below.

III. INTERNAL ORGANIZATIONAL STRUCTURES OF A STATISTICAL AGENCY 4/

A. General considerations

8. It is worth recalling that organizational structures are but shells. Shells are important. They protect, attract or repel. Thus, they may be a condition for survival and growth. But they are no substitute for good contents. In the last analysis, what is really decisive in the life and growth of an institution is its professional, technical and management capability - the calibre and suitability of its staff and the people that it can attract and retain. Thus, it is worth adjusting, within limits, organizational arrangements in order to accommodate outstanding and creative people. It is also worth recalling, in contemplating changes, that the new grows out of and is founded on the old; that in statistics, as in other forms of human endeavour, new developments usually have to evolve from existing institutions and the resources tied up in them. Thus, time and planning are important elements in transforming purely formal changes into substantive ones. Nevertheless, it is useful for the management of statistical offices to identify underlying organizational principles and the various options that changing circumstances make more or less desirable.

9. The head of a statistical agency must delegate many of his or her responsibilities and endow those to whom responsibilities are delegated with corresponding authority. They, in turn, may delegate responsibility and authority to others, with the approval of the head. It is of the greatest importance that lines of reporting and communication are spelled out clearly so that all levels of management are fully aware of their responsibilities and authority. It is

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4/ Most of this chapter is based on a paper by S. A. Goldberg, "Organization by subject matter and by function" (ESA/STAT/AC.1/5), prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, pp. 1-13.

incumbent upon the head of the organization to ensure that lines of reporting are adhered to in a systematic, though flexible, way and that senior assistants maintain active lines of communication within their spheres of responsibility. To function well, communication in an organization must flow in two directions - from the bottom up as well as from the top down.

10. The need for systematic delegation in a statistical agency is greater the larger the size and complexity of its mandate, but a degree of delegation is necessary even in small organizations. It is important to come to terms with this as a matter of deliberate, well thought out policy; an individual can effectively look after the manifold details of his responsibilities when the latter are narrow in scope. As the scope broadens, he should relinquish detailed involvement even in areas where his competence and interests may excel those of his colleagues. In line with the comprehensive character of his responsibilities, the head of the agency should aim to preserve his time and energies for formulating policies and strategic over-all plans, strengthening bridges with the outside world and providing unifying leadership. To encourage in the staff a sense of belonging to the organization as a whole rather than just to the constituent branches, the head should retain direct control of key decisions, such as the appointment and promotion of senior personnel. Moreover, he should ensure that those who wield delegated authority feel accountable for their actions and are oriented to further the goals of the organization as a whole.

11. The need for delegation in a statistical agency is accentuated by the highly diverse and complex nature of the statistical production process, involving a variety of subject-matter fields (the number depending on the degree of centralization, discussed in chapter IV), and a diversity of functions, such as administration, finance, budgeting and personnel, training, planning, specification and evaluation of subject-matter needs, specification and design of questionnaire content, survey design including sampling, field operations, data collection, editing and coding, construction and maintenance of central registers, electronic and manual data processing, tabulation design, evaluation of the statistics, research and analysis, integration and co-ordination, dissemination, printing and other reproduction, external relations. Thus, a division of labour and a corresponding degree of specialization are essential though the extent to which they can be carried out in practice is limited by the size of the organization, and, in particular, by the number of suitable people to whom the various tasks can be delegated. In small countries and in many developing countries, one person must often carry out a number of specialized tasks which in larger countries may be assigned to several people. It is none the less useful to identify the various elements of the statistical management and production process and to consider various alternatives as the technical and professional composition of the organization changes, and in order to profit from opportunities, when they arise.

12. There are, broadly speaking, two major ways in which the needed specialization, and the corresponding delegation, can be viewed: one in terms of subject matter; and the other in terms of function. In practice, a mixed or rather a dual system is used. The discussion that follows is abbreviated and illustrative. It begins with a brief description of a subject-matter plan of

organization with little functional centralization, and then proceeds to consider an alternative arrangement with substantial functional centralization. The latter is really an example of a dual system.

B. Organization primarily by subject-matter

13. Historically, statistics have come into being through endeavours to satisfy specific demands in individual subject-matter fields, e.g. agriculture, population, health, manufacturing, labour, trade. The advent of the national accounts, and more recently, social indicators (and model building) have facilitated comprehensive approaches to statistical planning and programming but, by and large, the process of evolution of statistics still reflect a strong pull to serve detailed needs in specific fields as they arise. This is often reflected in an organizational structure by subject-matter fields, with direct assignment of as many resources as possible to those fields to carry out the various functions involved in producing the statistical outputs.

14. The major organizational block, according to this plan, is a "division" which is composed of a related set of subject-matter fields and is managed by a senior official who is fairly knowledgeable in the subjects under his jurisdiction. The divisions may be subdivided into sections, comprising more or less homogeneous subject-matter areas, and the sections may be further subdivided into still more homogeneous units. The section and unit heads are expected to have a detailed grasp of the subject matter in their domain and very detailed knowledge of the various facets involved in the collection, compilation and publication of the statistics in that domain. In large organizations, the divisions may be assembled into several broad subject-matter branches for ease of management. In the extreme versions of the subject-matter pattern of organization, almost all manpower resources, aside from those engaged in central administrative and personnel work and in computer operation, would be allocated on the basis of subject matter.

15. A major advantage of the subject-matter plan of organization is that it facilitates the detection of demand for specific data in specific fields. 5/

5/ It should be noted, however, that delineation of divisions or sections by subject matter is more complex than appears on the surface. The term "subject matter" has several connotations. One is in terms of institutional source of the information, that is, the kind of supplier of the data. Education statistics, for example, could be classified on the basis of the sources from which they are collected, and all statistics coming from educational institutions, including, say, finance and investment, would be the responsibility of the education division. An organization based on institutional sources could assemble divisions into, say, three subject-matter branches - enterprises, households, and Governments and institutions. An alternative arrangement is on the basis of main category of data. On this basis, elements of "subject matter" pertaining to the same category may be grouped into distinct divisions, for example, employment and unemployment, finance, investment expenditures, prices, though the data originate from different institutional sources. In practice a mixed system is used.

It is, moreover, conducive to personnel developing a thorough knowledge of the accounting practices and reporting problems of suppliers of primary data. It facilitates the building of an esprit de corps with suppliers of data and Government and private users of the data in specific fields. However, these advantages can be retained and even strengthened, under the alternative organizational form discussed below. The unique advantage of the subject-matter pattern is really that it facilitates clear-cut specification of delegated responsibility for outputs with correspondingly visible control over the input resources required to produce them. It thus provides opportunities for unambiguous accountability for performance in specific fields. It also fits the ministerial structure in many countries.

16. The major disadvantage of the subject-matter organizational form is compartmentalization in statistical programming and operations with ensuing risks of duplication in the utilization of scarce resources and inconsistent practices. Problems of statistical integration and co-ordination are rendered much more difficult and, in view of the growing interest in across-the-board statistics, this is a serious limitation. In general, the greater the self-sufficiency of the various divisions and branches, the greater the dangers of compartmentalization and the stronger and more sustained must the efforts be to render statistical outputs coherent and statistical operations efficient, without duplication.

17. The question of the extent to which subject-matter divisions should have under their separate jurisdictions the resources needed to produce their outputs is particularly troublesome in regard to sampling and survey design, computer systems design and programming, and research and analysis. However, there are also difficult problems in regard to other functions, including the utilization of clerical resources. Clearly, the aim should be to retain the advantages and to minimize the disadvantages of the subject-matter plan of organization. Considerations of efficiency, and particularly the extreme shortages of specialized technical and professional personnel, lead to a consideration of functional arrangements.

C. Organization with substantial functional centralization

18. Resources may be grouped on the basis of the functions or combinations of functions listed in paragraph 11 with the heads of the groups having delegated agency-wide responsibilities and corresponding authority in their respective areas. As with the subject-matter plan, the groupings may be established as divisions and subdivided into sections and units and combined into branches, for convenience of management.

19. Thus, one way of organizing an office with substantial functional centralization would be to establish, say, three or four branches. 6/ Branch I, which could be labelled the administrative services branch, could have delegated responsibility for budgeting, recruiting, personnel (including training) and general administration.

6/ Paras. 19-25 are based on an unpublished memorandum by P. J. Bjerve.

20. Branch II, which could be labelled the statistical subject-matter branch, could have delegated responsibility for planning and specifying subject-matter needs, specifying and designing questionnaire content, designing the tabulations and analysing, evaluating and preparing the statistics for publication. It would provide the necessary subject-matter know-how to the processing operations. The branch would be subdivided into subject-matter divisions, each encompassing a range of subject-matter fields. Each division would maintain contact with users of statistics and evaluate their needs. It would also evaluate substantive reporting problems as they arise. External relations and dissemination may also be located in this branch, although it may be preferred to locate these functions in yet another branch.

21. Branch III could be labelled the supporting services and survey methodology branch. It would, in effect, provide specialized services to branch II, including maintenance and up-dating of central registers, designing of sample and other surveys, managing of field operations, electronic and manual data processing, including systems design and programming, printing and other reproduction. Each of these functions could be established as a division which, where appropriate, would be subdivided into sections (and units) on the basis of specialized subject-matter applications. For example, the division of survey design could be subdivided into several sections, one dealing with statistics collected from households, another dealing with statistics collected from establishments and enterprises, and a third dealing with institutional sources. The sections, in turn, could, if necessary, be subdivided into distributive trades and services, manufacturing and mining, population and labour-force statistics, etc. The degree of specialization within divisions and the corresponding subdivision into sections and units would depend on the size of the staff and size and diversity of the operation.

22. A question that arises is to what extent data collection, editing and coding should be the responsibility of a division in the supporting services and survey methodology branch (branch III) subdivided, as appropriate, by subject-matter specialization. A case can be made that all but routine collection, coding and editing should be located in divisions of the subject-matter branch (branch II), to the extent that specialized subject-matter knowledge is needed to carry out these functions. However, similar considerations could be conducive to allocating some of the other functions, or portions of them, to branch II. The most practical solutions have to be determined on the basis of trade-offs of a variety of conflicting considerations, as well as the size of the operations.

23. Because of its great importance, especially in developing countries, special attention should be given to the field function, and it may be preferred to establish it as a separate branch. Establishment of a centralized and efficient field organization for collecting data by visits to respondents, either to interview them or to secure returns they failed to supply by mail, and the establishment of a flexible multipurpose master sample, which is brought up to date periodically, are vital vehicles for building an effective statistical service. Particularly in countries where skills are scarce and illiteracy considerable, concentration of experienced field and sampling expertise through centralization to serve a variety of statistical subject-matter needs, including those in other

government departments, seems essential. Such resources are, of course, also needed to assist in the taking of censuses. Whether these functions are located in branch III, or in a separate branch, close collaboration with branch II is essential on problems involving subject-matter knowledge.

24. The functions of integration, co-ordination and over-all (as opposed to project) planning are discussed in some detail below. They should be located centrally with a mandate cutting across the boundaries of branches and divisions. The location of research and analysis is also discussed below.

25. Functional centralization, in virtue of structuring resources into specialized compartments, makes it impossible for any one division or branch to carry out statistical programmes unilaterally. Indeed, this organizational pattern is premised on the utilization of interdisciplinary teams for carrying out major statistical projects (especially important developmental projects) and effective communication between team members. Thus, for major projects, it facilitates the setting up of task forces composed of specialists from various sections (and, as appropriate, other government departments). These task forces should be dissolved upon completion of the projects, and the individuals in question assigned to other projects (although the assistance of team members should be available, as required, for projects which are repeated periodically). However, the success of such arrangements depends greatly on the availability of competent project managers to whom team members report and who, in turn, report to a designated senior official or small senior committee for the duration of the project. Moreover, the proper functioning of interdisciplinary arrangement is contingent upon detailed planning of all activities, detailed scheduling and strict adherence to schedules by all concerned. Members of the interdisciplinary teams must dedicate the required time to the project, without diversion by other duties.

26. The functional arrangements facilitate the building up of corps of specialists in the various functional areas where resources are very scarce, for example, in sampling and survey methodology and computer systems analysis and programming. Moreover, they can provide the corps of specialists with a head who is experienced in the particular discipline and is, therefore, in a better position than a subject-matter expert to exercise effective leadership and to ensure that the methods recommended are appropriate. At the same time, it is economical since relatively few specialists can serve the whole office. It facilitates taking advantage of the fact that the statistical survey process consists of elements which are similar from survey to survey and utilizing the experience of any one for the others.

27. However, the compartmentalization of the functions may generate barriers between them. In particular, subject-matter personnel may experience a sense of loss of control over the outputs. As methodologies and systems become complex and highly specialized, those familiar with them assume strategic positions in the statistical production process. When the functional specialists use their knowledge unwisely or thoughtlessly, serious problems arise. Coupled with this is the danger that the systems and methodologies may assume a life of their own with insufficient attention being given to the needs of the subject-matter outputs for which the methodologies and systems are merely a means. It is worth noting also,

particularly in regard to computer use, that the subject-matter experts may not be sufficiently aware of the vital importance of clearly specifying their output requirements in detail. As a consequence, the computer specialists may make decisions on the basis of incomplete or faulty information resulting in inconsistent or unusable outputs.

28. Aside from the training programmes discussed below, one way of reducing the probability of such problems becoming serious impediments is to place the functional specialists in the same physical location as the subject-matter personnel within whose areas they concentrate. This is conducive to achieving a better rapport between the subject-matter and other specialists and a fuller appreciation of requirements and procedures. Indeed, the functional specialists should be regarded as having a dual reporting relationship - to the subject-matter head in the area for which the work is performed and, on specialized technical (and administrative) matters, to the head of the functional division or branch. Such partnership arrangements require good communication and a mutual respect by those concerned for each other's competence and responsibilities.

29. Another way of overcoming problems of functional centralization in regard to computer use, is to distinguish between various applications and to make due allowance for them. 7/ To illustrate, in the case of computer systems analysis and programming, a useful distinction can be made between (a) development of computer systems and their documentation for production and storage of massive basic data; and (b) the utilization of the stored data for the purpose of index number construction, input-output tables and similar aggregates, model building, population projections and so on. While the former (a) is best carried out under centralized functional conditions (though in close collaboration with the subject-matter people), programming for the latter type of activity (b) can be carried out most effectively by subject-matter specialists who should either be trained or have at their disposal programming assistants to do the work. Similarly, with the availability of generalized retrieval programmes which require little or no programming to operate, ad hoc demands for data can be best handled by subject-matter people who are in close contact with users.

30. It would appear that a dual system with a high degree of functional centralization, though more complex to manage, is likely to be more efficient and effective than an organization structured by subject matter with little functional centralization. In chapters V, VI and VII, a number of functions (in particular external relations, dissemination, planning, co-ordination and research and analysis) are discussed further but in a different context, designed to highlight three elements comprising the major preoccupation of top management of a statistical agency, namely, its external capability (chapter V), its internal capability (chapter VI) and planning, priorities and programme co-ordination (chapter VII). The strengthening of these elements can serve as a guiding criterion in determining

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7/ See a paper by I. P. Fellegi "Organization of statistical processing, storage and retrieval" (ESA/STAT/AC.1/12) prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, pp. 27-32.

changes in internal organizational structures, or in the degree of centralization (chapter IV). The present chapter concludes with a discussion of the integration function.

D. The integration function: the horizontal dimension of statistical organization

31. Whether the basic organization pattern used is primarily by subject-matter or one containing substantial functional centralization, the various administrative units (divisions, branches, etc.) represent elements of line responsibility of a portion of the agency's activities. These elements may be viewed as comprising the vertical dimension of the organization. By contrast, the integration function as defined here relates to the across-the-board interdivisional and interbranch activities. It may be viewed as the horizontal dimension of the organization. This dimension is less visible than the vertical; it does not appear on organization charts, except perhaps in an impressionistic way. But it is no less important, especially in a statistical organization concerned with the integration of its outputs (that is, that the myriad pieces should somehow fit together) and the co-ordination of its programmes (that is, that balance is maintained among the various projects and activities). Indeed, it is, or should be, one of the constant challenges of top management in a statistical organization to keep the horizontal dimension alive, visible and effective. In a small office the head, aided by assistants, or a small steering committee, may wish to carry out this function himself. In larger offices, this may not be practical and it is necessary to delegate it to someone who, assisted by small staffs and committees, should be dedicated to this function, undisturbed by day-to-day operational responsibilities. Ideally, this person should be the most senior deputy with very broad knowledge and experience but more important than seniority is the visible support provided by the head of the agency. The functions of over-all planning, co-ordination (discussed below) and evaluation may also be assigned to him. In a decentralized system, the across-the-board horizontal activities are generally the responsibility of the central co-ordinating office. Indeed, this is often the major role of such an office. In a centralized system most, if not all, of this responsibility rests within the central statistical organization.

32. The importance of ensuring that the horizontal dimension is kept alive and effective bears repetition, because the sub-division of the office into separate units, which is essential for administrative purposes, usually breeds a considerable degree of parochialism. The day-to-day external pressures concentrate on getting things done within the sections and divisions - the meeting of deadlines within specified periods of time and the like. The impact of the horizontal dimension is rather more subtle - it is, or should be, reflected in the guiding philosophy of the organization; it should permeate the actions and policies in all parts of the organization. It should provide a corporate consciousness, maintain checks and balances in the face of differing pressures from the individual sections, foster interdisciplinary project planning and execution and overcome barriers, real or imagined, between the various parts of the organization. It should ensure that common concepts, definitions, classifications and methods are not only

available but actually implemented in the various divisions and sections so that the statistical series represent elements of an integrated framework and are as consistent and comparable as possible.

33. The need for the horizontal dimension renders the management of the statistical organization rather more complex. Fortunately, a range of instruments is available to help render it operative. These include standard classification systems, business registers of enterprises and establishments, central questionnaire control and, in general, devices for ensuring the adherence to standards and a range of task forces and committees. The system of national accounts and balances can be used as a powerful integration instrument since it provides a unifying conceptual and definitional framework and feedbacks for collecting and organizing primary economic statistics. The evolving frameworks of social and demographic statistics promise to provide similar instruments in these spheres. Thus, it is a great advantage for these integrating frameworks to be placed in the central statistical office or the co-ordinating office in a decentralized system. However, it cannot be taken for granted that merely because the accounts, for example, are prepared within the statistical office they will automatically serve as an integrating instrument. To carry forward the unifying influences of the accounts, special machinery must be established. This machinery may take the form of interdivisional and interdepartmental task forces, committees and the like. In a decentralized system, such machinery is utilized by the central co-ordinating agency but it is no less essential within a centralized agency. The horizontal dimension may also be promoted through appropriate utilization of certain functions, where they exist, such as the central field organization and central computer programming and systems design to ensure that uniform standards and practices are used.

IV. DEGREE OF CENTRALIZATION OF A NATIONAL STATISTICAL SERVICE

A. General considerations

34. In contrast with the internal organizational arrangements discussed above, where the head of the statistical agency may have considerable authority to carry out changes though, usually, subject to final approval by the appropriate central government agency, amendments in the scope and range of activities of the central statistical agency require specific high-level policy decision by the central Government and may even involve special legislation. Such changes are not likely to be influenced entirely by the results of an objective analysis of trade-offs of alternative possibilities. Inevitably, past practices, interdepartmental rivalries, the structure and size of government, the impact of tradition and personalities, and so on, come into play. Moreover, short-run disruptions in services which may be induced by the changes must be weighed against the long-run gains. Nevertheless, it is useful to analyse the merits of alternative forms of organizing national statistical services, especially from the point of view of countries whose statistical services are in the earlier stages of evolution where there may be opportunities for change not always present in countries with a pattern of organization which is long established and deeply entrenched.

35. There is wide agreement that it is beneficial to a country to have a strong central statistical office which is administratively autonomous and whose head serves as the country's chief statistician. The range of fields which the central office should cover and the authority of the chief statistician over the statistical activities of other departments are subject to controversy. There appears to be a consensus that the central statistical office should be responsible for population censuses, household surveys, demographic statistics and a wide range of economic statistics involving establishment and enterprise censuses and surveys, as well as prices, international trade, the national accounts, and other across-the-board activities. There seems to be less of a consensus in regard to agriculture and labour, and still less in regard to the social sphere - education, health, crime, etc. - where statistics are based to a substantial degree on administrative records collected by other government departments, giving rise to special considerations discussed below. It should be noted also that even in a highly decentralized system there are centralizing influences: usually a centrally located co-ordinating agency is charged with the vitally important responsibility of integration and co-ordination of the statistical services. Moreover, a few large agencies in decentralized systems tend to be predominant, for example, the Bureau of the Census and the Bureau of Labor Statistics in the United States of America. Thus the main issues are probably best conceived as involving "degrees of centralization", rather than the two extreme poles within the broad spectrum of centralization and decentralization. Nevertheless, it is convenient to discuss the major issues under the headings "centralized system" and "decentralized system".

B. Centralized system

36. This is a system where the management and operations of the statistical programmes are predominantly the responsibility of a single autonomous government

agency, headed by the country's chief statistician. Centralization can include out-posting of staff to other departments or the delegation of certain functions to geographically separate units, which, however, remain subordinate to the central authority. In other words, centralization of the statistical system is fully compatible with the physical decentralization of certain functions and personnel, departmentally or geographically. What characterizes a centralized system is that the management and operations of the predominant portion of the national statistical services are vested in an autonomous department headed by a single individual or board.

C. Decentralized system

37. This is a system where the statistical programmes are managed and operated under the authority of separate government departments. Under this arrangement, a particular agency is usually charged with the responsibility for co-ordinating the statistical activities of the various departments, for the maintenance of standards and similar across-the-board activities. Thus, this co-ordinating agency may be responsible for the system-wide horizontal functions described in chapter III. The co-ordinating agency can carry out its horizontal responsibilities more effectively if it has under its jurisdiction certain operational programmes (especially major across-the-board programmes such as the national accounts and certain central functions such as the field and survey-taking organization) and/or if it can exercise control, or at least substantial influence, in the allocation of statistical resources between government departments, in setting standards for professional grades and in the recruitment of senior personnel.

D. Advantages of centralization

38. Individual Governments will, of course, decide for themselves in which direction a country's statistical system should go - the centralized or decentralized way. However, the scarcity of skilled manpower and other resources provides strong incentives to take advantage of the economies of scale facilitated by centralization. It is, furthermore, convenient and efficient for users to secure statistical materials in a variety of fields from a single source; a single repository of the major portion of official statistics provides an efficient means of disseminating data to a wide range of users. Similarly, respondents to censuses and surveys find it convenient to deal with a single agency, especially if they suspect duplication. 8/ Other advantages stem from the fact that it is usually easier for an administratively autonomous, politically neutral agency, concerned only with statistics, to be free from special departmental influences and interests and to be seen by the public in this light. This is, of course, vital for the preservation of its reputation for objectivity. Thus, it should be easier for a central office to gain public acceptance as an agency which has a vested interest in safeguarding the secrecy of the information it collects in respect of persons, enterprises or

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8/ It should be noted, however, that as a centralized institution grows larger it must make sustained efforts to avoid or eliminate duplication.

government departments. Finally, it should be easier for a central statistical office to maintain balance in the priorities assigned to different statistical fields, that is, to co-ordinate the system.

39. The preceding favours centralization mainly on the basis of efficiency in the utilization of scarce resources and provision of services. The strongest arguments for, as well as against, centralization, however, deal with the effectiveness of the system, that is, with the relevance and impact of the outputs.

40. The distinguishing advantage of a centralized statistical system, from the point of view of the statistical outputs, is that it is better geared than a decentralized one to plan and implement an integrated system of statistics. Centralization makes it easier to develop and implement uniform standards, definitions, classifications and, in general, to maintain the horizontal influences and, therefore, the production of integrated statistics. In view of the growing awareness that policies and programmes of various government departments are interdependent and, in view of the ensuing need for comparable statistics so that the impact of any one policy action on the others can be analysed in quantitative perspective, the integration of the statistical outputs is of very substantial importance.

41. It should be noted, however, that the mere existence of a centralized system by no means guarantees that the statistical outputs are in fact integrated. Indeed, a de jure centralized system without strong horizontal influences and effective machinery to ensure that the various instruments for integration are fully implemented by its separate divisions would really represent a de facto decentralized system, without the cohesive impact of a co-ordinating agency. The outputs of a decentralized system with a strong co-ordinating agency can be more integrated than those of a centralized system with weak central influences. In a strongly led decentralized system, there may be greater consciousness of the need for maintaining effective horizontal influences designed to harmonize the outputs of the various autonomous departments and to provide countervailing forces to tendencies of departments to go their own way. In a centralized system, the existence of these may be taken for granted so that the needed dedicated resources, special and sustained efforts and machinery, and visible support by the chief statistician may in fact not be forthcoming. However, there can be no question that, given the same quality of leadership and its dedication to integration, it is much easier to ensure integration in a centralized than in a decentralized system.

E. Disadvantages of centralization (advantages of decentralization)

42. The strongest argument that is usually made against the centralized system is that the statisticians may become isolated from the users of statistics. This may result in the statistical service losing touch with the practical needs of users and impairing its capacity to be effective. It is argued that, when the statistical work is undertaken within a policy department, the statisticians are in a better position to ensure optimum use of the data in virtue of the fact that

they are in close proximity with their policy-advising colleagues. This leads to a better understanding of the uses of the statistics and accordingly to better and more relevant statistics being produced. It is argued, further, that there are dangers that a central statistical agency, especially when it has grown large, may not be responsive enough to the changing needs of users. Moreover, the central statistical agency may interpret the secrecy provisions of the Statistics Act too rigidly and suppress useful information that might otherwise be available to other departments.

43. The validity of these points requires examination. There are government departments that require across-the-board statistics not just those pertaining to a particular field, for example, departments of finance, planning, trade and industry. A centralized system should be in at least as good a position to serve them, without duplication, as a decentralized one. Even where departments deal with single fields, for example, education, labour and agriculture, the analysis of policy and action programmes requires not only statistics pertaining to these fields but a host of statistics in related fields. For example, in developing and evaluating education programmes, there is a need not only for statistics on education but related manpower, occupational, demographic, income and many other data all of which are used for other programmes as well, as indeed are the education statistics. All these data must be sufficiently comparable to permit interrelated, cross-classified and diverse analyses. Definitions, classifications and methodologies should, of course, be mutually coherent not only between the various fields but, as far as possible, over time so as to preserve continuity to facilitate analysis of change. As already indicated, to the extent that users require such integrated statistics, and a growing number do, a centralized system has major advantages.

44. Furthermore, it is possible to come closer to government users of statistics in specific fields by outposting, if necessary, personnel of the central agency to the departments in question, where this can be done without contravening the statistical legislation. Also, task forces and committee arrangements and the fostering of close day-to-day informal contacts are conducive to closer working arrangements with users. Furthermore, an appropriate degree of functional centralization may be conducive to an output and user orientation. Activities of research and analysis, discussed below, can help the central statistical agency to anticipate future user needs for data and adjust its resources accordingly, possibly with greater ease than in a decentralized system. To the extent that the statistical legislation has become too restrictive, in changing circumstances, or where the central agency interprets its administration too rigidly, these can be modified to suit the established needs of users. Thus, it may be said that just as inadequate management may fail to profit fully from the advantages of centralization so may good management reduce to a minimum the disadvantages of centralization.

45. Nevertheless, Sir Claus Moser, after careful consideration of the various issues, came to the conclusion that, while the organization of statistics in the United Kingdom has moved in recent years in the direction of centralization the United Kingdom does not intend to go all the way. "This is largely because,

although there are clear advantages of centralisation if one thinks of the production of data, a decentralised system has many advantages for better utilisation of data. I believe that the GSS /Government Statistical Service/ must continue to develop along lines of greater user orientation and the increasing involvement of statisticians in analysis and interpretation of data, and for these purposes I believe a mixed system ... to be the most effective." 9/

46. By contrast, after a comprehensive review of the strengths and weaknesses of centralization and decentralization the Committee on Integration of Data Systems established by the Government of Australia came to the following conclusion in its report of April 1974 with respect to Australia:

> "The Committee agrees that some departments may on occasions suffer some difficulties under a centralised form of statistical organisation. Follow-up of some evidence tendered on this point suggests, however, that a number of the claims were not substantiated. The Committee does not believe that these difficulties outweigh the multiplicity of advantages which a centralised system offers to most departments, to the Government as a whole, to non-governmental users of statistics and the reporting public." (para. 64)

F. Limits of centralization

47. Whatever the net advantages of centralization, there would probably be wide agreement that the process should not be carried too far. There are types of statistical work which should be decentralized even in a highly centralized system. Moreover, there may be a point where the net advantages diminish and are overshadowed by the problems of managing a very large and complex department. However, it is not clear just when this point is reached, or whether it exists at all. Thus A. Yezhov, 10/ in describing the very large statistical organization of the USSR, attributes to the centralization that took place in the late 1950s "improvement of the organization by Soviet statistics and of all statistical work in the U.S.S.R. ...".

48. The limits of centralization are probably set, in practice, by factors other than size alone. Several of these are mentioned here. First, the external and internal capabilities of the central statistical office, described below, may fall short of users' expectations, especially those of government users. Government departments may embark on survey activities (and, if necessary, seek enabling legislation) either because the central statistical agency does not have the resources to satisfy them or because its image and reputation for delivery are weak. Over and above that, special surveys may be undertaken by a department to secure urgently needed statistics to serve mainly its policy or administrative needs; or the department may need to collect statistics which require specialized

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9/ Paper by Sir Claus Moser, "Organisational matters relating to the statistical services in the government hierarchy" (ESA/STAT/AC.1/6), prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, p. 23.

10/ A. Yezhov, Organization of Statistics in the USSR (Moscow, Progress Publishers, 1967), p. 25.

technical or scientific knowledge not available in the central statistical office. In such cases, the central statistical agency should have authority to exercise some control over the decision to initiate the work, and at the very least, to ensure that the concepts and classifications used facilitate statistical integration. The Australian Committee on Integration of Data Systems cautioned in its report that "If this is not done, many departments will seek to rationalise their needs as being 'exceptional' and unnecessary proliferation of official data-collecting agencies will result" (para. 73). In Canada, no government agency is permitted to undertake new surveys involving more than 10 respondents without prior consultation with the Chief Statistician of Canada. However, for such arrangements to work well, the central statistical office must be so staffed as to enable it to evaluate the proposals of other government departments judiciously and quickly.

49. Another, and historically major, factor arises from the collection of records by government departments, that is, administrative records containing data of statistical interest. Despite frequent lack of standardization and incompleteness in coverage, especially in developing countries, a large part of official statistics, in many countries, are based, in total or in part, on such records, for example, in the fields of trade, taxation, health, education, crime, vital events (births, deaths, marriages), etc. The collection of such records is naturally decentralized and, incidentally, this is among the factors which explain why official statistics have been decentralized in many countries, especially in the social fields.

50. With the advent of the computer, administrative records have achieved a new importance for statistical purposes. When administrative data are transferred on magnetic tape, statistical offices have added incentives to work with the departments concerned to promote improvements in content, standardization, and editing of the administrative records. The central statistical office can make arrangements to receive copies of the tapes, enabling it to exploit more fully the microdata for statistical purposes. It is important to emphasize that such arrangements, as indeed all access to administrative records by the statistical office, must be a one-way street; that is, the statistical office may have access to the departmental administrative records without the department having access to individual records collected by the statistical office.

51. Thus, the central statistical office should endeavour to participate actively in the design of administrative records having a general statistical use and ensure that the definitions and classifications used facilitate statistical integration. An advanced arrangement has apparently been worked out in Norway. In general, collection of administrative records, transfer of data to machine-readable media and editing are decentralized, that is, they are carried out by the administrative department concerned. On the other hand, tabulation, presentation and analysis and, as necessary, assistance in editing are carried out by the Central Bureau of Statistics of Norway, except in those instances where the administrative data are of use exclusively to the department concerned.

G. Centralization and the developing countries

52. The merits of centralization, on balance, seem particularly great in the case of newly independent and most developing countries. In these countries, there is a chronic severe shortage of skilled personnel, professional and clerical. In recruiting from this restricted number, and holding them, the statistical services have to compete with other departments with which they are often at a disadvantage in respect of status and pay. Centralization provides at least some possibilities for building up a "critical mass" - a large enough work force and momentum for getting off the ground. In the absence of centralization the staff is spread thinly over a number of statistical units scattered among the various departments or among the states of the country. As Ramesh Chander of Malaysia said in an unpublished paper*, "While the size of the country and its system of government may dictate the need for a decentralised statistical system, by way of generalisation one is led to argue strongly for a centralised system in the context of the situation prevailing in most developing countries. Even in the context of a federalised system of government a case exists for a high degree of centralisation of statistical activity." What adds strength to this statement is that in most developing countries the external capability of the statistical office and, in particular, the status of the chief statistician are not sufficiently strong to act as a balancing influence on departments which wish to go their own way when this is not warranted.

* #10 of 1975 loc. Bar-Conf. of Commonwealth Stats. (Barbados) ~~Entry~~ Malaysia file
Copy in ~~Handbook~~ "Statistical Organization" file cabinet ("General info")

V. EXTERNAL CAPABILITY

A. Definition of external capability

53. It is well to be reminded that statistics come into being by editing, adjusting, aggregating, cross-classifying and analysing information which respondents include in surveys and censuses, and administrative records provide. Thus, the production of good statistics is ultimately dependent upon the co-operation and goodwill of those who supply the basic data - individuals, enterprises, municipalities, government departments, and so on. Similarly, close contact and co-operation with the users of the statistics are essential in order to keep abreast of their evolving needs so as to ensure that the statistics are relevant, useful and used. The statisticians (who, incidentally, must co-operate among themselves to produce an integrated product) must strive to understand the problems of suppliers and users of the data. At the same time, they must ensure that their obligations and constraints are understood by the suppliers and users.

54. A statistical office that has effective facilities for creating and maintaining such co-operation and understanding may be said to have an effective external capability. More precisely, the external capability relates to the set of relationships with the outside world and procedures which enable the statistical agency, on the one hand, to identify and assess the most urgent needs of users, to disseminate the information widely and to enhance the probability that the statistics are used; and on the other, to gain the compliance of respondents and their confidence that the information requested is needed for important purposes, that constant efforts are made to reduce the burden on them to a minimum and that the confidential nature of the individual data supplied is fully safeguarded. The issues are discussed below.

B. External bridges 11/

55. A major goal in structuring and managing a statistical agency is to keep its external capability strong. Thus, a statistical office must endeavour to ensure that the necessary expertise is available to it in the various subject-matter fields it encompasses so that it can provide effective bridges for communicating with users of the statistics and facilitating the detection and evaluation of demands for data in the light of their feasibility and burden on respondents. If the statistical office is equipped with the necessary multidisciplinary resources to carry out its work, including research and analysis, as described in chapter VI, it can be in a better position to ask the right questions and to evaluate in precise and operational terms the practicality as well as the importance of demands for data (which are often expressed by users in vague and general terms) and even to anticipate the demands.

11/ Sections B and C are based on a paper by S. A. Goldberg, "The demand for official statistics and their utilization in Canada with special reference to the role of the national accounts", Bulletin of the International Statistical Institute (Sydney), vol. XLII, book 2 (1967), pp. 960-963.

56. Various arrangements are often made to supplement and strengthen these bridges. Formal arrangements take the form of conferences, committees and panels. Interdepartmental committees on specific subjects may be established while committees with diversified membership may be set up to discuss issues on a wide range of data of interest to government agencies concerned with fiscal and monetary policies, industrial and trade development, social welfare, etc. At the apex of the committee structure could be an interdepartmental committee, meeting infrequently, to review the over-all programme of economic and social statistics and to make recommendations. Some countries have over-all advisory committees composed of representatives of the private sector, the universities and the Government to provide guidance and evaluation. In countries with a federal structure, it is useful to establish federal/provincial committees in specific fields, with an over-all policy committee at the apex.

57. The meetings and conferences of such committees are extremely useful for maintaining communication with users. Not only do they throw light on past achievements, current deficiencies and future requirements but the very process of preparation for these conferences and meetings forces the statisticians to take stock and to become more attuned to needed changes.

58. However, perhaps of even greater beneficial and durable impact is the more informal type of personal relationships which are cultivated between the statisticians and the user organizations in the course of carrying out their daily work. The telephone, the luncheon, the personal visit, the ad hoc working team, are important tools for a meeting of minds and for developing a mutual appreciation of each others' needs, problems, knowledge and capacities. Informal personal occasions can serve, as well, to clarify issues and resolve misunderstandings. Moreover, they can provide opportunities for gaining support for the statistical programme and for establishing the fact that it is in the users' interest that the statistical office should be kept strong through the provision of the needed resources. Treasury officials are likely to be more impressed when users speak up on behalf of the statistical office and its need to be equipped adequately with professional resources in order to enable it to live up to users' expectations.

C. Dissemination

59. A vital element of an agency's external capability is its facility for dissemination of the statistics it has produced, but only brief reference is made to it here. Clearly, the more a particular set of statistics is used, the greater the benefits and the smaller the cost of production per unit of output. Moreover, the wider the utilization the better known the agency becomes. A well known organization providing a good service grows in national stature and its image benefits. The appearance, as well as contents, of the publications, the manner of presentation of statistics, the kind of compendiums and monthly and quarterly bulletins produced, the provision on request of special tabulations, including material in machine-readable form when needed, are all important elements of dissemination. For a further discussion, see chapter VI.

60. There are various ways in which an agency can promote the utilization of its statistics. These include special programmes designed to acquaint the user community with its outputs (and their limitations), including the stationing of representatives in local communities to strengthen contact with users, the setting up of seminars and discussion groups, and so on, and the carrying out of surveys of users, their characteristics and the difficulties encountered in using the statistics. Well arranged descriptive catalogues are important media for facilitating access to the agency's outputs. Booklets and other educational materials describing how statistics could be used (and misused) can be very effective. Thus, a booklet produced by Statistics Canada some years ago under the title of How to Profit from Facts has enjoyed remarkable distribution. However, even in developed countries the funds needed to implement a robust programme of dissemination, including devices such as those mentioned above, are not easily obtained in the face of alternative needs for scarce resources but its importance is, nevertheless, difficult to exaggerate in view of the fact that the justification for assigning resources for statistical programmes is that the statistics are not only useful but actually used.

D. Objectivity, impartiality, professional independence

61. A strong external capability is contingent on the public's recognition that the statistical office is, in fact and appearance, objective, impartial and professionally independent. The statistical service must be objective and impartial in all aspects of its operations, and in particular in the content and release time of its publications. It must be immune to special influences and the results of censuses and surveys should be published at the earliest possible time. Like the judiciary of a country, it must stand above any special interest groups. Moreover, it must be seen to be that way. Otherwise, its external capability and indeed its utility are undermined. In the maelstrom of changing economic and social events and views, it is a towering national asset to have a service which displays the facts regularly in an objective and orderly manner.

62. The maintenance of impartiality and professional independence is also of great importance in gaining the confidence of respondents who frequently are called upon to provide information that they consider confidential and would not wish imparted to any other government department or, more generally, to any body outside the statistical office. Not only must the information not be used against them but they must feel assured that this would not happen. Otherwise, response to questionnaires is less likely to be forthcoming and, where it is forthcoming, the likelihood of getting the true situation is diminished.

E. Status and location

63. The external capability is much influenced by the status of the head of the statistical service in relation to his colleagues in the government hierarchy. It may also be influenced by the location of the service, that is, the ministry to which the office is attached, for administrative purposes.

64. These are, of course, matters of decision for individual Governments but there can be no doubt that the building of a robust statistical service is contingent on assigning top people to it. In view of the great national importance of many decisions which may be affected by statistics, it would appear to be in the national interest for the statistical service to have an equal opportunity to compete with other government departments for an outstanding individual of proven capabilities to be its leader and manager. Such an individual would be instrumental in enhancing its internal capability (discussed in chapter VI), as well as its external capability. He should be in a position to develop rapport with policy advisers of other government departments and to negotiate various proposals on statistics with authority and insight. Clearly, his background must enable him to understand the needs of users and the problems of suppliers so as to manage effectively. He should have the status of a deputy minister or its equivalent. In most centrally planned economies of Europe, he is a member of the cabinet.

65. In regard to location for administrative purposes the situation is less clear-cut. There may be some advantages to having the head of the central statistical office report directly to the prime minister. This would be in keeping with the fact that the statistical service is designed to serve the needs of all government departments and, indeed, all users of the country. However, it would probably be the exceptional case where a prime minister would wish to give the statistical function high priority along with all the other issues of vital national importance that compete for his time and attention. Thus, he may delegate the statistical function to a subordinate. Other favoured locations are the ministries of planning, finance and trade and commerce. As already indicated, in most centrally planned economies of Europe, the head of the statistical service has, in effect, ministerial status while in New Zealand the 1975 Statistics Act provides for a Minister of Statistics to whom the Chief Statistician reports.

66. Perhaps of greater importance than actual location is the interest and understanding of the minister in question and senior officials and their readiness to support the programme. Thus "the issue is not so much one of location as of the attitudes of the relevant decision-makers, political and non-political, towards the statistical function". 12/ It bears emphasizing that wherever the statistical office is located it should be seen to serve the legitimate needs of all users.

67. In developing countries, location of the central statistical office in the same ministry as the planning agency is probably an advantage, at least for a time. The needs of planners are frequently comprehensive and the planners should become staunch allies in building an effective statistical service. Proximity of physical location should be conducive to mutual understanding. However, the

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12/ S. S. Heyer, "Development planning and statistical organization" (ESA/STAT/AC.1/8), paper prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, p. 10.

statistical service, while serving the vitally important needs of the planning department, should not be subordinate to it; its status in the government hierarchy should reflect the fact that, in order to carry out their functions in an efficient and rational manner, it is essential not only for planners but also for other policy-makers and administrators, to have statistical information on the current state and past trends of situations. Moreover, an independent and co-ordinate statistical agency is better geared than one subordinate to the planners, to provide objective data for reviewing and monitoring the implementation of plans prepared by the planning department.

F. Legislation

68. Much of the external capability of a statistical service derives from the character of its legislation often incorporated in a separate Statistics Act. Clearly, one cannot legislate goodwill, competence and tact, all of which are essential ingredients in establishing an effective external capability. However, good statistical legislation provides a necessary framework within which to win the willing co-operation of users, respondents and other government departments.

69. The subject of statistical legislation has many aspects but they can be reduced to two major issues. First, the compulsory aspect, that is, the power the Government asserts, through the statistical agency, for data collection; and secondly, the guarantee it provides for safeguarding the confidentiality of the information collected from individual respondents.

70. Without the compulsory aspect, it would not be possible to carry out censuses involving complete coverage. Compulsion involves the sharing of the burden of response by all, not just those who are conscientious enough to answer voluntarily. Another important element is that compulsion makes it easier for the statistical office to negotiate effectively with other government departments for access to administrative records for statistical purposes. This is clearly facilitated if the statistical office can argue that in the absence of such access it can resort to independent collection which it has the powers to effect on a compulsory basis, giving rise to unnecessary duplication. This has in fact been argued successfully to obtain access to income tax records for statistical purposes in some countries. Thus, compulsion is important even though delinquents are rarely prosecuted.

71. The government powers for data collection must carry with them a legal guarantee of protection of the confidentiality of individual returns or, more particularly, an "assurance of harmlessness" to the individual respondents. But as important as the secrecy provisions of the law are the administrative practices of the organization to protect confidentiality. The legal provisions have to be "supplemented by critical awareness of the overriding importance of maintaining confidentiality by all concerned in the data collection, compilation and dissemination processes. Furthermore, it must be implemented with suitable

procedures and continual attention to guard against inadvertent disclosures and to relate confidentiality concepts to new statistical methodologies and processes". 13/

72. However, while the secrecy legislation is essential to the survival of the statistical organization it does at times create problems with users in certain government departments who feel that they need access to individual returns. One solution is to indicate the department's interest in receiving a copy of the returns and leaving it up to the individual respondent to decide whether he wishes to send the copy to the department, at the same time indicating what confidentiality protection, if any, this entails. The important principle is that there should be "informed consent" by the respondent. Safeguarding the confidentiality of replies may be particularly difficult in developing countries where an entire industry or foreign trade is dominated by one or two large firms. Some countries have taken note of this situation in their basic statistical legislation. Sierra Leone, for example, provides that, in such cases, basic figures may be published on a restricted number of specified items.

73. Other problems arise from the growing interest in micro-analytical techniques, resulting in the demand by researchers for information on individual cases to carry out various cross-classifications. In response to this, the United States Bureau of the Census has developed sample files of data pertaining to persons, which are made publicly available, without any identifying information. Problems also arise, particularly but by no means exclusively, in a decentralized system, when the statistical production process involves matching information from one file to another, giving rise to fears of invasion of privacy. While the statistical agency should endeavour to satisfy reasonable demands through legitimate devices, it must withstand all pressures which would be conducive to disclosure not provided for in the law. In the words of the late S. S. Heyer: "Such pressures, motivated by short-term considerations, are inimical to the long-term goals and integrity of the statistical agency and prejudicial to the very rationale of its existence as a desirable and essential activity of Government. Autonomy offers some protection against such demands". 14/

13/ Margaret E. Martin, "Statistical legislation and confidentiality issues" (ESA/STAT/AC.1/9), paper prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, pp. 14-15.

14/ S. S. Heyer, "Development planning and statistical organization", p. 17.

VI. INTERNAL CAPABILITY

A. Definition of internal capability

74. Having identified and defined the objectives in operational terms, it is the supreme challenge of management of a statistical agency to build up the internal capability needed for reaching them. Clearly, user needs can only be satisfied indirectly - through the instruments comprising the internal capability. The internal capability also determines the level of external capability that the office can sustain. The limits of expectations generated and commitments made should be set by a realistic appraisal of delivery that can be supported by the internal capability. Otherwise, frustration and damage to the credibility of the agency results.

75. The internal capability consists of a multiplicity of elements - the range and level of human skills, infrastructures for taking surveys and censuses, including the field organization, facilities for data processing, storage, retrieval, printing and dissemination, integrating instruments including business registers and standard classification systems, facilities for collecting data and accumulating and storing them into "data banks" or "data bases" permitting flexible response to unanticipated demands, research and analysis, and so on. The internal capability is much affected by the intellectual environment prevailing in the organization. It is enhanced when the agency is receptive to methodological and technological innovation, when decisions take the form of conclusions arrived at after objective evaluation of all relevant factors and when an awareness of the interdependence of the activities of individuals in various parts of the organization prevails. Several elements of the internal capability will be discussed here, but it should be emphasized that an essential condition for evolving a strong internal capability is continuity in management and operations. Abrupt or frequent changes in management, such as have occurred in the past in a number of developing countries, tend to weaken substantially the internal capability. It is extremely difficult to regain lost ground in statistics quickly.

B. Range and level of human skills

76. Reference has already been made to the fact that the decisive factor in the performance of a statistical agency is the calibre of its staff. Too much attention cannot be given to building up the right kind of staff in organizing and managing a statistical agency.

77. Although in many countries all professional employees in a statistical office are automatically referred to as "statisticians", it bears emphasizing that the production of official statistics is an interdisciplinary endeavour involving inputs from a variety of fields of knowledge, in addition to those of mathematical statistics and the like. Advanced statistical or mathematical techniques are, of course, required in such activities as survey design, sampling and the like, and mathematical statisticians provide indispensable inputs both through direct contributions to the statistical production process and through advice and

assistance to subject-matter colleagues. However, typically, in a well established statistical office, the greater part of the professional employees do not have degrees in statistics as such, but rather in economics, econometrics, demography, sociology, accountancy, cartography, business administration, computer science, etc. Most of them are trained in particular subject-matters and have a bent and interest in quantitative work. They should have sufficient grasp of statistical theory and methodology needed in their work.

78. In order to communicate with the user effectively, identify his needs, specify his needs in precise operational terms, design relevant questions, and construct appropriate questionnaires, a good knowledge of the subject-matter is needed as well as a familiarity with the characteristics of respondents and their record-keeping practices. Good knowledge of the subject-matter is also essential in making judgmental adjustments to estimates on the basis of related data and, above all, in appraising whether the statistical results are sensible. When carried out by experienced subject-matter experts, such appraisals can lead to the detection of serious errors which have eluded the checking procedures previously used in preparing the estimates. Of vital importance, too, and often overlooked, is for the statistical agency to acquire specialists in operations management.

79. The preceding needs emphasizing because in the words of Tulo Montenegro: "It has rightly been observed that resolutions of international conferences calling for the training of more 'statisticians' may inadvertently lead to a misleading oversimplification of the scope of the skills required in compiling basic statistics. The term 'statistician' evokes the stereotyped picture of the statistical analyst or the mathematical statistician. Nevertheless, the crucial work of gathering basic statistics involves skills which are not considered statistical in origin or even in application", 15/ even though they are essential elements of the statistical operation.

80. In many countries the knowledge acquired in universities, both in subject-matter fields and in statistics, is often too general and abstract to be immediately well adapted to the needs of statistical offices. 16/ In a number of countries, there are institutes which provide more suitable training for statistical offices. Developing countries have access to regional institutes of statistics, sponsored by the United Nations, or international training institutes, sponsored by several countries, that contain tailor-made curricula for work in statistical offices.

81. Over and above the training thus acquired, there is need for a great deal of on-the-job training, especially at the intermediate and clerical levels. Thus, many statistical offices have specially designed in-service training which concentrates on highly practical day-to-day aspects of the statistical production

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15/ Tulo H. Montenegro, "Recruitment, preparation and status of statistical personnel" (ESA/STAT/AC.1/14), paper prepared for the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, p. 24.

16/ Report and Proceedings of the United Nations Interregional Seminar on Statistical Organization, Ottawa, Canada, 1973, pp. 29-36.

process, such as elementary calculations, index number construction, work-sheet construction, checking devices, tabulation procedures, and so on. Such training programmes should also be designed to train a corps of "technical officers" who can carry out critical tasks of the production process requiring know-how in between that of professionals and clerks. The importance of such training in day-to-day operations cannot be over-emphasized, especially in developing countries.

82. Despite the enormous contributions of national, regional and international institutes to the trained statistical work force, critical shortages that impede progress exist in developing countries. In part, this is due to the fact that the demand for statistics continues to outstrip available resources. In a more fundamental sense, the shortages reflect the disadvantaged position of the statistical services in many developing countries with respect to pay scales and related working conditions. Thus, the most promising young people do not enter the statistical service as a first choice. Those who join the statistical office are often tempted before long to consider more attractive prospects elsewhere. Some countries try to slow the outward flow by contractual arrangements which ensure that the graduates from institutes, or fellows who were given opportunities to study abroad, stay with the statistical office a minimum period of, say, five years. It is particularly difficult to fill posts, or to keep people for any length of time, in the computer programming area where competition from other government departments is compounded by the even more severe competition from private sources.

83. In Africa, the depressed conditions of many statistical offices compared with those of other government departments prompted the Conference of African Statisticians, at its 1973 session, to submit a draft resolution for adoption by the Conference of Ministers, urging African Governments "To establish more attractive conditions of service for statisticians, including more adequate salary scales where necessary in order to retain their services". 17/

84. It should be noted that another important factor in developing a strong and productive work force is office accommodation. Suitable accommodation, facilitating ready communication between people working in related fields, is conducive to the integration of statistics because, in a real sense, the integration of statistics is contingent upon the "integration of statisticians".

85. In the final analysis, the relative position or status of statistical offices reflects the recognition given by Governments to statistical work. Despite the widely acknowledged essential role played by statistics in planning, policy-making and administration, there is still a lack of awareness of the importance of statistics in government work in a number of countries, especially developing countries. It is one of the great challenges of statisticians in those countries, and their user allies, to raise this awareness to the point where the statistical services are given an equal chance to compete for scarce human resources and the provision of reasonable working conditions.

17/ "Report of the eighth session of the Conference of African Statisticians" (E/CN.14/611), para. 290.

C. Continuing survey capability

86. Mention has already been made, in chapter III, of the vital importance of equipping a statistical office with a permanent field organization and related cartographic and sampling expertise to carry out regular surveys and censuses. This clearly represents a vital element of internal capability which requires priority attention, particularly in developing countries. Since this is discussed at length in a document entitled "African household survey capability programme" (E/CN.3/473) and one entitled "Cartography in the work of a national statistical office" (E/CN.3/481), both also before the Commission, no further comment is made here.

D. The computer and "data base" organization

87. Despite the disappointments with the computer in some offices and its premature utilization in others, there can be no question that, on the whole, the computer has enhanced enormously and decisively the internal capability of statistical services. Access to up-to-date electronic data processing systems and the availability of adequate programming and systems analysis staff have become paramount prerequisites for responding effectively to the contemporary demands for statistics. Only one aspect will be discussed here, namely "data-base organization".

88. In the past, the first utilization of the computer in a country was often associated with the taking of censuses. Thus in Africa in recent years, countries have used the computer for the first time in connexion with their censuses. The census also provides an example of how the computer can be used to enhance substantially the capability of the statistical office to serve user needs in a flexible way by embarking on what may be termed a "data base" approach to the organization of statistical storage and retrieval.

89. In the case of the census, the "data base" consists of the edited and organized individual items of data collected in the census. This is the primary outcome of the census operation. While the regular tabulations included in the publication programme of the census are still considered the most important visible product of the census, the census "data base", from which the published tabulations are derived, is more and more seen as a rich source of information available for a variety of unanticipated purposes in addition to the planned publications. With the low cost of storing the data, if appropriate hardware, software and human and other support services are used, it has become relatively inexpensive and relatively easy to use the census "data base" for special tabulations and analyses. These may include detailed cross-tabulations for small urban areas or other subsets of the over-all data that may be of special interest for purposes of transportation planning, administration, education or health activities, etc.

90. This process may be generalized. The major element in the "data base" approach is the concept of data files as the main capital asset resulting from censuses, surveys and administrative records. In earlier concepts of

computerization, the data files were viewed merely as a stage in the automation of various links in the chain of processes from questionnaire to publication. In the data-base approach, the files are the end products. These end products are a source from which all kinds of retrievals are made both for publication and for a variety of unanticipated needs. Such files have, of course, to be documented in a special way for them to provide such flexible all-encompassing retrievals. In particular, each item in the file has to be labelled in a formal and unique way with a number of descriptors that state its characteristics attached to it. Furthermore, rigorous standards have to be established for the files with respect to structure, format, documentation and "data cleanliness".

91. To generalize further, when the items included in each file are consistent in terms of concepts, definitions, classifications and methods, it is possible to relate the individual items of each file to one another. Such a "data base" file system would represent an integrated system of statistics, in machine-readable form, the individual items of which could be retrieved to be utilized in conjunction with each other, as required. Such flexibility in the utilization of statistics from a variety of sources enhances enormously the internal capability of statistical offices to provide prompt and diverse services from the same investment in its data capital accumulation. Such a capability takes time to evolve and requires careful and sustained planning and phasing of activities.

E. Research and analysis 18/

92. "Research and analysis", if well done, enhances the internal capability of the statistical office and also its prestige and external capability. Moreover, it is conducive to forming closer working relationships with universities and research institutes. However, while very important, these functions are often overlooked in organizing statistical offices, either because of lack of resources or because of insufficient recognition of their role in producing good and timely statistics. They therefore merit special mention here.

93. The question may be asked: what kind of and how much research and analysis is it appropriate for a statistical office to do? The answer to this question may be inferred from what follows, but it must be emphasized that unless it is in the right hands, research can be wasteful and analysis dangerous. A rule that should be insisted on is that the impartiality of the statistical office must be maintained; published commentary must be factually based and objective, with no value judgements in regard to policy.

94. Since the terms "research" and "analysis" are ambiguous, it is necessary to define them. In general, research may be described as an activity aiming to bring forward new knowledge usually involving considerable study, testing and experimentation. The activity is usually undertaken in a statistical office with

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18/ This section is based on a paper by S. A. Goldberg, "Organization by subject-matter and function" (ESA/STAT/AC.1/5), part III.

a view to implementing a change for the better - in the reliability or composition of the statistical output, in the methods or procedures of producing it or in the manner and detail in which it is stored, retrieved or presented. The process of testing, evaluating and generating research findings necessarily involves a degree of analysis, but the word analysis is often applied to the statistical outputs. While the distinction between research and analysis is arbitrary, it is convenient to use the word "research" in relation to the process of developing and producing statistics and "analysis" in relation to the operations on the resulting data.

95. The process of developing and producing reliable and timely statistics involves many intellectually challenging activities which can be appropriately classified as research. Major changes in the statistical process - whether in the form of new statistical series, of significant improvement in existing data or of the efficiency and timeliness of producing them - are not, or should not be, a matter of routine. They are often intricate and time-consuming. They involve, or should involve, much study, testing and experimentation. Thus the notion that a statistical office is nothing more than a "figure factory" is wrong, even though a substantial amount of routine is necessarily involved.

96. Examples of research in a statistical office include work leading to improved design of sample surveys and censuses; research in developing generalized computer processing systems; research into methods for estimating information for small regions; research into methods for constructing or improving the national accounts and balances, including input-output tables; research into seasonal adjustment of time series; demographic research and projections. With the growing attention to planning, there has been a growing demand on many statistical offices to carry out projections of population, labour force and school enrolment. Since projections are basically the arithmetic consequences of the assumptions underlying them, it is essential that the latter should be as realistic as possible. This involves extensive research into the individual components comprising the projections - mortality trends, fertility trends, immigration and emigration, and so on.

97. We turn to the question of where the research should be carried out. Where there are only a few people available to carry out this work, the choice is limited - of necessity the work will be carried out at a central location. Even as the group grows larger, practical considerations may dictate that this activity should continue to stay centralized, at least for a time. The activity requires to grow beyond a certain minimum size to surpass the "critical mass" stage and make its influence felt throughout the organization. There are career considerations as well as those of economy which may render centralization more realistic. A further factor militating against decentralization in the earlier stages is that pressures of day-to-day work in the divisions tend to absorb research people in the purely production activities. Location at the centre provides a degree of protection. It is, however, vitally important that such "protection" should not result in isolation; those engaged in research at the centre must work closely with subject-matter personnel on specific projects. Every attempt must be made to render the research relevant and purposeful.

98. When resources become adequate, a capability for carrying out research within the various divisions should be evolved. As is true of most other activities, the

point of optimum trade-off between concentration of scarce research resources at the centre and in the divisions changes as the organization grows in size and professional resources grow more plentiful. But the necessity for strong integrating and co-ordinating influence increases as the research activities become more pronounced in the divisions. At any rate, the development or adaptation of integrating instruments, such as the national accounts and standard classification systems and across-the-board devices, such as seasonal adjustment, involve centrally located research. Central location is also most practical in the case of research in developing new or more efficient methods for collecting, processing retrieving, or disseminating information.

99. Analysis is involved in preparing reliable statistical data for publication, even when the results of the analysis, as such, are not published. At various stages of the statistical process, judgements must be made on whether the results up to that stage make sense, and this frequently involves systematic probing of the consistency of the data. Such probing becomes particularly critical at the final stages prior to publication. This type of analysis is clearly done more effectively in the various subject-matter divisions.

100. In addition, there is the type of analysis which consists of distilling the highlights of the statistical results and expressing them in written form. The process of producing statistics is often incomplete if it does not include this type of analysis. Numbers, even if reliable and valid, are not enough to convey information to the public. This type of analysis must be non-controversial and yet avoid blandness. This is a difficult objective to achieve. It is carried out most effectively in the subject-matter divisions of the statistical office, as it requires great familiarity with the data.

101. Another type of analysis is employed to explain changes in movements and relationships of data in the light of associated events, with the intent of interpreting their significance. Such analysis requires not only familiarity with the data in a variety of related fields, but a good grasp of relevant theory and the general institutional and other factors at play. It is usually carried out within the context of models, at least by implication. The process of carrying out and writing up such analysis provides a discipline and stimulus for exploring more deeply the validity and significance of the statistical results, and for identifying important gaps and inconsistencies in the data. It is essential that the narrative, especially if it is intended for publication, be prepared by people who have the capacity for detecting and explaining significant trends and interrelationships in the face of detailed and, at times, conflicting data. This sort of analysis can best be carried out at a central location, in particular in conjunction with national accounting and balance-of-payments work.

102. A similar but more general type of interpretative analysis is illustrated by monographs or papers on special topics, e.g., income, fertility, migration, the labour force, involving a synthesis and sifting of large masses of data derived from censuses, surveys and other sources. This requires thorough familiarity with the characteristics of the data, as well as competence to bring out and describe

the underlying features from a massive amount of detail. The work can be carried out either at the centre or in the appropriate subject-matter divisions, depending on the topic and circumstances.

103. Every effort should be made to develop a capability in the statistical office to carry out analytical work competently. Among other benefits, such work has important feedback effects in that it helps to clarify difficult conceptual, methodological, data and presentational issues. Further, it provides practical experience by helping statistical officers to develop the kind of comprehension that evolves from actually working with the data - a comprehension not only of the surface problems but of the more complex and practical ones as well. Such comprehension strengthens the capability of the statistical office to evaluate, with insight and authority, the practicality as well as the importance of user demands and the most effective ways of responding to them, as indicated in chapter V. Unfortunately, few statistical offices in developing countries, and by no means all in the developed ones, are in a position at present to undertake this type of work which, given the resources, can often be carried out more efficiently in the statistical office in view of its ready access to a massive amount of detailed information. The absence of such work is a factor in the reluctance of many university graduates to join statistical offices. They prefer work which involves using, not just producing statistics. It should be stressed, however, that collection and dissemination of data are the primary obligation of a statistical office, and the analytical work it undertakes should in no way cause delays in making the basic statistics available to outside users.

104. It should be noted, finally, that the decisions on priorities made in the statistical office have a considerable and perhaps decisive influence on the type of analysis that users will be able to make in the future. In order to carry out these decisions in a perceptive and responsible way, it is in the interest of the users as well as of the statisticians that the statistical office should be intimately familiar with the prevailing analytical developments. This is best achieved by equipping the statistical office to carry out analysis; but failing this, the statistical office should seek opportunities for being involved in analysis carried out in other government departments so that at least some of the feedback from this work is available to it. To facilitate this, it is necessary for the statistical office to have at least some qualified, centrally placed personnel.

VII. PLANNING, PRIORITIES AND PROGRAMME CO-ORDINATION

A. General considerations - over-all planning

105. The day-to-day pressures and periodic crises confronting top management of a statistical agency and, in particular, the obstacles it has to face in its endeavours to build up basic elements of its external and internal capability may absorb all its energies, leaving little time for planning. This is most likely to happen in the earlier stages of evolution of a statistical agency when its expansion may be "beset by all the problems of development - inadequate manpower and financial resources, lack of experience and unclear objectives" 19/ but it also occurs in well established offices. Yet it is vitally important to establish a visible over-all planning function, at the earliest possible moment to ensure that appropriate planning takes place in the various sections and divisions as well as at the centre. Some general considerations will be discussed here from the vantage point of top management of a statistical agency.

106. Planning is, of course, involved at various stages of the statistical process - at the design stage of projects to ensure that the outputs are as effective as possible; at the execution stage of projects to ensure that the various steps in the production process are carried out on time and efficiently; and so on. Planning is also involved in making changes in the internal organizational structure and in the degree of centralization to ensure that the implementation of the changes takes place at a time when the statistical office has adequate resources to carry them out effectively.

107. Efficient and effective utilization of new resources for strengthening the capabilities of the office and changes in the allocation of available resources between programmes and activities involve comprehensive and sustained planning. Such over-all planning is needed to give direction and purpose to the further development of an organization.

108. Over-all planning is particularly important in statistics because of (a) the need to ensure that the detailed data are designed within an integrated framework so that they can be used for a large variety of aggregations and cross-classifications; (b) the long intervals involved in producing new data or improving substantially existing ones; (c) the need to ensure that outputs are timely and that balance prevails between statistical programmes; (d) the need to ensure that the statistics are relevant to emerging needs while at the same time maintaining continuity in them so that current issues can be seen in historical perspective; and (e) the far-reaching impact of the computer on the character of the operations and outputs.

109. The over-all plan may consist of a multitude of interrelated modules covering the further development or major changes in the various subject-matter fields encompassed by the statistical office (population statistics, social statistics, national accounts, manufacturing, trade, prices, labour, etc.), the various

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19/ S. S. Heyer, "Development planning and statistical organization", p. 9.

functions (field organization, personnel including training, dissemination, research and analysis, computerization, etc.), as well as office accommodation, finance, legislation, etc. Ideally, the plan should include procedures for monitoring and evaluating progress in relation to targets, but even when this cannot be carried out systematically and even when many targets have to be altered because of changing circumstances, the planning activity can engender a perceptive, purposeful and unifying atmosphere in the statistical organization.

110. The objectives of over-all planning in a centralized system are the same as those in a decentralized system even though the implementation of the plan may be more difficult in the latter system. The objectives should reflect the concerns of the society, even though some concerns are formulated vaguely (e.g., the quality of life) and the conversion from these concerns into practical statistical programmes is often difficult; and even though the statistical implications of many concerns overlap, while some are open ended in that they could be used to justify almost all statistical programmes, for example, economic growth and its concomitants and the elimination of regional economic and social disparities.

111. In countries with well established national planning agencies, many of the national concerns are distilled in the national plans which therefore provide a framework for the statistical plan, keeping in mind, however, that statistics are used by a large variety of users, not just the planners, and for a variety of purposes, not just planning. In developing countries, in particular, it is of great benefit to statistical development for the objectives of the over-all statistical plan to reflect the concerns to which the national development plan is addressed. Indeed, efforts should be made to include the statistical plan as a module of the national development plan, ensuring, however, that the statistical plan encompasses the needs of a broad range of users, in addition to planners, as just indicated.

B. Planning and priority setting

112. In view of the acute shortages of human skills and other resources for statistics, especially, though not exclusively, in developing countries, it is particularly important that over-all planning should take place within the context of rational priority setting. 20/ Ideally, priorities should be determined on the basis of analysis of costs and benefits of various alternative ways of using the scarce resources.

20/ See, for example, Joseph W. Duncan, "Developing plans and setting priorities in statistical systems", paper prepared for the fortieth session of the International Statistical Institute, Warsaw, 1-9 September 1975. Paras. 113-115 of the present document are based on an article by W. E. Duffett and S. A. Goldberg, "Planning and co-ordination of statistical programs in a central statistical office", Bulletin of the International Statistical Institute (Washington, D.C.), vol. XLIV, book 1 (1971), pp. 121-123.

113. It is feasible to develop data on the cost of various projects although in situations of relentless pressures to meet deadlines with inadequate resources, managers may be understandably reluctant to add this chore to their work. It is, however, extremely useful, and a great tactical advantage in negotiating for more resources with treasury officers, to be able to answer questions such as: how much do you spend on this or that statistical project? The availability of output-oriented cost records, including conventions for splitting overheads among projects, is a prerequisite not only for cost-benefit analysis, which underlies balanced priority determination, but also for meaningful estimation of the future resource requirements of various projects included in the plan. When used in conjunction with information on the progress of various projects and the timeliness of reports in relation to target dates, such data also provide a means of monitoring resource utilization during the implementation cycle of the plan. However, one element of cost is usually excluded from such estimates, namely, the costs incurred by respondents included in surveys and censuses. This vital element should, however, be weighed carefully in the analysis and process of priority setting.

114. Although, with the exception noted, the cost of statistical projects can, in principle, be identified and measured, this is rarely the case with their benefits. The problem here arises from two main factors. First, statistics are intermediate products not end products. The benefit of a statistical series is a function of its impact on policy decisions and their importance; it is generally very difficult to pin it down and attach a meaningful value to it. Secondly, the process of identifying benefits is all the more difficult to the extent that the series are part of a system in which the diverse elements are interdependent and the value of each is enhanced by the availability of the others; and in the degree to which the same series is used by a variety of users and for a variety of purposes. What complicates this process further is that, inevitably, difficult choices must be made between subject-matter programmes, the benefits of which cannot be compared, e.g., the balance of payments and crime statistics. Choices must also be made between strengthening the infrastructure to support subject-matter programmes some years hence and more immediate improvements and extensions of surveys in various fields, between timeliness and accuracy, and so on.

115. Thus priority setting and allocation of resources among competing possibilities in statistics on the basis of precise cost-benefit calculations are practically impossible. In general, such calculations are likely to be wasteful, and even misleading. However, this does not detract from the importance, and usefulness for efficient and effective management, of analysing benefits in relation to costs on the basis of judgements and insights based on past experience and the fullest information, particularly of user needs, in order to render priorities and related resource allocations as rational and balanced as possible. The sources of much of this information have been discussed in chapter V.

C. Planning and programme co-ordination

116. It is indeed a major aim of over-all planning to achieve broad balances in the statistical programmes. 21/ These balances define further the co-ordination function, and are described briefly:

117. First, there is the balance between satisfying various types of users. A balance must be achieved between serving users needing detailed data in specific fields and those needing across-the-board aggregative data for macro-economic and social analysis. The needs of the central government are accorded high priority. In countries at early stages of statistical development, the planning agency usually gets priority attention. However, it is the obligation of the head of the statistical agency to represent the interests of all users - provincial and municipal government departments, business, labour and farm organizations, universities and so on - to ensure that their needs, including the increasing concern for local statistics, are reflected adequately in the priorities underlying the plan. Fortunately, many of the statistics required by Governments and planning departments also satisfy important needs of other users.

118. Secondly, there is the balance between different subject-matter fields. In guiding the system, the head of the central agency should strive for a judicious distribution of resources in the face of divergent pressures to concentrate on particular fields. He should also ensure that some resources are assigned to projects which are in their early stages of development, to strengthen weak areas, and to carry out at least a minimum of research and analysis.

119. Thirdly, there is the balance between timeliness, accuracy and publication of detail. One aspect of timeliness relates to the interval between collection and release of regular statistics. Once management devices for improving timeliness have been exploited, procedures for solving systematically the conflicts between timeliness, on the one hand, and accuracy and detail, on the other, need to be developed and this requires some resource allocation.

120. A second aspect relates to needs for special tabulations not anticipated in the publications. The lengthy time intervals often involved in preparing special tabulations are a source of great inconvenience to users. The solution to this problem requires, among other things, the development of general utility computer programmes and systems of storage permitting quick and flexible retrievals as indicated in chapter VI. A third aspect relates to the time interval involved between (a) a commitment to carry out a new survey or census and (b) the availability of the results for use. The problem here arises at times from underestimation of the resources needed to do the job and from insufficient forethought to the logistical problems involved in preparing material for release. In its anxiety to please an important user, the statistical office may over-extend

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21/ Paras. 116-121 are based on an article by C. A. Moser, "Planning and integrating statistical programmes in a decentralised system", Bulletin of the International Statistical Institute (Washington, D.C.), vol. XLIV, book 1 (1971), pp. 132-135.

itself in its commitments. Those in charge of the planning function should ensure that commitments are realistic even when they are optimistic, and that full account is taken of the manifold logistical problems involved in producing the statistics. The image and status of the office are damaged by tardiness in providing requested data and by incomplete fulfilment of commitments.

121. Finally, there is the balance between satisfying user needs and avoiding undue burdens on the suppliers of the primary data, that is the individual, enterprise and government respondents included in surveys or censuses. The suppliers are invisible partners in the statistical process, and it is an important responsibility of the central agency to represent their interests judiciously. This should involve ensuring that available information is used more extensively, duplication is avoided, sampling is used where appropriate, administrative records are exploited for statistical purposes, and so on. It also means ensuring good questionnaire design and clear definitions and instructions and that the confidential nature of the returns is fully safeguarded.

122. We now turn to a brief discussion of some instruments for effective planning of an integrated and co-ordinated statistical system. In the sphere of economic statistics, the System of National Accounts (SNA) and the System of Balances of the National Economy (MPS) can serve as powerful balancing (as well as unifying) instruments in planning and executing statistical programmes. The SNA and the MPS provide integrated frameworks for the appraisal of available statistics and the existing gaps, inconsistencies and other imperfections in quantitative perspective. Work on econometric and simulation models (such as carried out, for example, in Norway and Brazil) can serve a similar purpose. Thus the quantitative importance of the various demands can be appraised more effectively and the usefulness of the statistics examined in an analytically oriented context, providing added insights for the fixing of priorities. Incidentally, this analytical context also facilitates anticipating demands. 22/ Further, the various accounts and balances have added a major dimension in negotiating for resources with treasury officials - an additional "justification" for new or existing series in virtue of the fact that, aside from being used for specific purposes, most series can also be used either for strengthening or extending the accounts or in conjunction with them. In the social and demographic fields, the evolving frameworks for the integration and analysis of social and demographic statistics should provide similar, albeit less powerful, instruments. Meanwhile, more complete utilization of administrative records should play a prominent role in the planning of statistical programmes in the social fields.

22/ However, the demands for statistics which are not important for the national accounts and balances should be accorded full recognition and evaluated on their merit. There is at times some danger, in planning national accounting systems, of overlooking the need for such statistics even though they may be very important for other purposes.

D. Planning and the computer 23/

123. Finally, reference should be made to the impact of the computer on planning in statistical offices. Hardware and related software must be planned for sufficiently in advance, and with care, to ensure that it is suitable to the needs and capacity of the statistical office. Planning is also necessary to ensure that the hardware and software components are supplemented by appropriate procedures and services that support the effective use of the entire facility.

124. The planning of computer capacity has to be related to the planning of the statistical programmes. This is no easy task since the computer requirements of the numerous statistical projects can be forecast realistically only after detailed forecast and analysis of the nature and scope of the projects have been made. It bears emphasizing that the computerization of individual projects should be planned in the context of other related projects so as to facilitate their integration, spread overheads (such as utilization of central registers), and prepare the ground for the computerization of derived aggregates (for example, the national accounts and indexes of production) and the establishment of flexible storage and retrieval systems to facilitate quick and effective response to the data requests of users.

125. Computer technology also necessitates extensive planning for establishing effective arrangements with enterprises and government suppliers of information who have automated or are planning to automate their operations. Clearly, planning will be designed not only to take advantage of the opportunities afforded by the automation of suppliers of data and to minimize the ensuing problems, but also to establish various modes of serving users quickly and effectively through further development of general retrieval systems requiring little or no programmer intervention, remote terminals and the like. In this process, relationships with users will undoubtedly assume new characteristics.

126. The computer imposes much more detailed and comprehensive advance planning in the specifications of survey design, data inputs, processing and outputs. Furthermore, the computer has introduced major economies in carrying forward the statistical production process to include various ratios, regressions and a multitude of analytical operations. The development of large projects, therefore, involves interdisciplinary participation from the outset to ensure that the right considerations are taken into account and are included in the specifications. Thus, it is necessary in the appropriate phases of the statistical process, to envisage, more than in the past, the use of the skills of the mathematician, demographer, econometrician, as well as those of the subject-matter expert and computer analyst and programmer.

23/ This section is based on articles by W. E. Duffett and S. A. Goldberg, "Planning and co-ordination of statistical programs in a central statistical office", Bulletin of the International Statistical Institute (Washington, D.C.), vol. XLIV, book 1 (1971), pp. 119-121; and I. P. Fellagi and S. A. Goldberg, "Some aspects of the impact of the computer on official statistics", Bulletin of the International Statistical Institute (London), vol. XLIII, book 1 (1969), pp. 168-173. The discussion assumes that the statistical agency has administrative control over the computer, but the points made are substantially applicable where this is not the case.

127. The build-up of these relatively scarce skills and their blending into interdisciplinary teams require careful planning. Furthermore, suitable training programmes must be organized to fill gaps in the background of personnel, resulting from technological change. Manpower planning is also involved as more work is transferred to the computer. This process should facilitate a greater degree of functional centralization providing subject-matter experts more time for analysis, research and evaluation of the statistics, problems of users and suppliers, more effective planning of reliable, integrated and relevant statistical programmes, and more effective exploitation of computerized administrative data bases.

VIII. CONCLUDING REMARKS

128. The present paper has endeavoured to review the major issues regarding statistical organization and its functioning. It has covered various facets, viewing them from the vantage point of top management of a statistical agency. After a discussion on internal organizational structures and the degree of centralization, the various facets were considered under three headings - external capability, internal capability and planning, priority setting and programme co-ordination - which highlight the major challenges top management of a statistical agency must face.

129. Despite its comprehensiveness, the paper omits a number of important topics, for example, the planning and organization of censuses and major surveys; programming, budgeting and cost-control; and the relationship of the central agency to provincial or State statistical offices. At the same time, the level of generality of the paper has precluded detailed or complete treatment of any single topic, while the discussion of a number, for example, dissemination, training, legislation and confidentiality, field and regional organization, is very brief. Only limited attention could be given to the special problems of developing countries. Several other topics, for example, relationship with users (including universities) and suppliers of data and computerization, could also be usefully expanded. In considering future work, the Commission may wish to take account of these topics, as well as the impact of the activities of international agencies on the organization of national statistical services and their functioning.
