

NAPCS Discussion Paper*

Identification and Classification of Service Products:

Phase I of

Initiative to Create a North American Product Classification System

**Michael F. Mohr
ECPC Coordinator For Product Classification
Office of the Director
Bureau of the Census**

**Paper prepared for
Census Advisory Committee of Professional Associations Meeting
April 22-23, 1999**

Abstract: On February 2, 1999, in partnership with its counterparts in Canada and Mexico, the Economic Classification Policy Committee of the U.S. launched a three-country initiative to develop a comprehensive and integrated North American Product Classification System (NAPCS). It is intended that NAPCS will be to product classification what the North American Industry Classification System (NAICS) is to industry classification. The Initiative will be conducted in two phases. Phase I will be an exploratory effort that focuses on the identification and classification of the products created by industries in four selected service sectors; Phase II will extend the classification process to all industries -- goods and services alike. This paper outlines the objectives of the Initiative, discusses the needs for and the uses of a product classification system for service industries, and summarizes the concepts and process that will be used to implement Phase I.

*** NAPCS Discussion Papers are provided to foster and facilitate professional exchange on matters related to the development and implementation of NAPCS.**

I. Background

In a **Federal Register** notice of July 26, 1994, OMB announced that the Economic Classification Policy Committee (ECPC) had agreed to work in concert with Mexico's Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Statistics Canada to develop a new and common industry classification system -- the North American Industry Classification System (NAICS) -- that would replace the existing system used in the United States, the Standard Industrial Classification System (SIC). Final agreement on NAICS was announced in a **Federal Register** notice of April 9, 1997. This agreement resulted in the publication of the new *North American Industry Classification System, United States, 1997* manual in 1998.

In addition to announcing the development of NAICS, the 1994 **Federal Register** notice also indicated that each country would provide product data compiled within the framework of its respective statistical system, to meet the need for such information. Recognizing the increasing international trade in goods and services, each country envisaged working cooperatively to help improve existing commodity classification systems, including the Harmonized System (HS) of the Customs Cooperation Council and the United Nations' Provisional Central Product Classification System (CPC) for services.¹ In particular, the three countries agreed that such cooperation would entail coordinating their product classification efforts and keeping each other informed of proposals for change in this area. Integral to the product classification accord was a common recognition by the statistical agencies of the three countries that

market-oriented, or demand-based, groupings of economic data are required for many purposes, including studies of market share, demand for goods and services, import competition in domestic markets and similar studies.²

Having now largely accomplished the industry classification objectives for NAICS, the ECPC, in conjunction with Canada and Mexico, launched a three-country initiative (hereafter, the Initiative) to develop a comprehensive North American Product Classification System (NAPCS) on February 2, 1999.³ It is intended that NAPCS will be to product classification what NAICS is to industry classification. The Initiative will be conducted in two phases. Phase I will be an exploratory effort that focuses on the identification and classification of the products created by industries in four selected service sectors; Phase II will extend the classification process to all industries -- goods and services alike. The balance of this paper outlines the objectives of the Initiative, discusses the needs for and the

¹The provisional CPC has since been replaced by version 1.0; see United Nations [1998].

²See Economic Classification Policy Committee [1994], p. 38094.

³This date was the occasion of the Product Classification System Kickoff Conference. The Office of Management and Budget will formally announce the Initiative in a **Federal Register** notice expected in March 1999.

uses of a product classification system for service industries, and summarizes the objectives, concepts, and process that will be used to implement Phase I.

II. Needs and Uses

There are two reasons for the focus on services in Phase I. First, the value of final production produced by industries included in NAICS service sectors now accounts for about 45 percent of private sector Gross Domestic Product (GDP) in the U.S., and these sectors include some of the fastest growing segments of the economy, such as computer services, communications, management consulting, temporary help services, and health services. Second, despite its importance in the overall private economy, the U.S. currently has no product classification system for service industries. In contrast, the Census Bureau has been collecting product-level data for manufacturing industries since at least the 1899 Census of Manufactures; by 1939 it was collecting data for approximately 6,400 manufactured products. Moreover, the Census Bureau has had a published list of manufactured products and product codes since 1947 -- the *Numerical List of Manufactured and Mineral Products*, which has been revised and updated every five years (in conjunction with the economic censuses). By 1967 the list of manufactured products had grown to 10,500, but more than 12,000 products were included under the NAICS classification system for the 1997 Economic Census.

The collection of product data for these manufactured products by the Census Bureau and the collection of associated producer price data by the Bureau of Labor Statistics (BLS) have long provided national accountants and researchers with the information necessary to estimate, monitor, and analyze the growth in real output, prices, productivity, international trade, and competitiveness in the manufacturing sector. In turn, these manufacturing estimates and analyses have long served to influence and guide the formulation of government policies, including industrial, international trade, fiscal, and monetary policies. And, within the business community, Census Bureau tabulations of the detailed products made and used by manufacturers have been highly valued and much utilized, as a reliable and comprehensive source of information on trends and new developments in the product markets in which businesses operate and compete.

Over the last several decades, however, the share of U.S. national output derived from service sector industries has grown to exceed the share derived from manufacturing and all other goods-producing sectors combined. Moreover, that share seems certain to grow over the long-term and, perhaps, accelerate its pace. In recognition of this profound structural change, the ECPC believes it is critical to provide the business and economics community -- business analysts, policy makers, researchers, and statistical agencies -- with the kind of comprehensive, well-organized data on the products produced by service industries that presently exist for the products produced by manufacturing and other goods-producing industries.

III. Objectives and Strategy

The long-term objective of the Initiative is to develop a market-oriented, or demand-based, classification system for products that (a) is independent of the NAICS industry classification system,

(b) is consistent across the three NAICS countries, and (c) promotes improvements in the identification and classification of service products across international classification systems, such as the Central Product Classification System of the United Nations. In recognition of the scope and complexity of this undertaking, as well as the resource constraints facing their respective statistical agencies, the three NAICS countries have agreed to conduct the Initiative in two phases.

A. Phase I

Phase I of the Initiative, which began in February 1999, is scheduled for completion in the Summer of 2000. Phase I will be confined to identifying and classifying the products produced by the industries in four selected NAICS service sectors -- Information (sector 51); Finance and Insurance (sector 52) except Insurance (subsector 524); Professional, Scientific, and Technical Services (sector 54); and Administrative and Support, Waste Management and Remediation Services (sector 56). The overriding objective of Phase I is to systematically explore the development of a formal classification system for services that can be used throughout the economics community of users to coordinate the collection, tabulation, and analysis of data on the value of the detailed products produced by service industries and on the prices charged for those products. Although preliminary, the results from Phase I will be used to guide the collection of data for service products in the affected industries during the 2002 Economic Census.

B. Phase II

Phase II of the Initiative will begin after the 2002 Economic Census, and it is scheduled for completion in advance of the 2007 Economic Census. In contrast to Phase I, the ultimate objective of Phase II of the Initiative is to develop an agreed-upon, integrated, and comprehensive list of products, product definitions, and product codes as well as a demand-side/market-oriented classification framework that will encompass both services and goods alike.

IV. Guiding Principles

A. General Principles

The ECPC has adopted three general principles to guide the overall process of identifying and classifying the products produced by industries:

1. The aim of the classification process should be to identify, define, and classify the final products produced and transacted by the reporting units within each industry.
2. An understanding of the production process of the reporting units included in the respective industries is a required first principle for identifying and defining the product(s) actually sold or produced for final consumption by those industries.
3. The classification of products produced by industries should be based on a market-oriented, or demand-based, conceptual framework (July 26, 1994 **Federal Register** notice).

B. Product Identification Guidelines

Identifying the final products of each industry is the first step in developing a product classification system. Recognizing that this step can be difficult for many service industries, private sector respondents to this Initiative and the classification committees have been directed to formulate proposals for the products of a given industry in the context of the following definitions and guidelines.

- **Conceptual Definition of a Service Product:** A service is a change in the condition of a person, or a good belonging to some economic entity, brought about as the result of the activity of some other economic entity, with the approval of the first person or economic entity.⁴ To correctly define the product(s) of a service industry it is essential to specify exactly what the producer agrees to sell and what the customer agrees to buy. That is, a determination must be made of what is implicitly or explicitly “contracted for” when a transaction takes place.⁵
- **Final Service Product:** The final products of reporting units in an industry are the service products (simple, composite, or bundle) that are created and transacted (sold or transferred) by the reporting units to other reporting units, enterprises, institutions or persons; domestic or international.
- **Types of Service Products:** The final service products may include one or more of the following broad types:⁶
 - (a) simple service: a standard service whose real output can often be measured in physical units or counts; e.g., a traditional haircut or basic phone service.
 - (b) composite service: a product that embodies several distinct services that are produced together (by virtue of regulations, production process, safety or hygiene requirements, or industry practice). The customer is not free to pick and choose among the several services in the composite -- the consumer buys all or none; e.g., a conventional hotel room rental includes maid service, salon haircuts include shampooing, or the final product (diagnosis or course of treatment) created by a doctor’s office visit may embody a variety of required diagnostic services (see related discussion in section C below).
 - (c) service bundle: a product containing a collection of services negotiated between the service provider and the customer and whose composition may vary by customer; e.g., traditional phone service plus call waiting and/or caller ID, etc., a bundle of information services that can be transmitted through a common medium (cable, satellite) and that may include voice, data and/or visual services, etc., or different bundles of janitorial services, or legal services, or accounting services, etc.

⁴See Hill [1977, p.318].

⁵See Sherwood [1997, p.3].

⁶See Chadeau [1997, p.2].

- **Product Detail:** Identify and define products for the selected industry at a level of detail that accords with prevailing marketing practices and record keeping practices in the industry.

C. Product Identification and the Production Process

It is important to distinguish between the final products the industry produces and the activities carried out by the industry to produce those products. For example, the final product that is contracted for in many service industries may be a composite product that contains a collection of services that are created by the activities embodied in the production process of the reporting units in the industry. However, these individual services -- whose costs frequently appear on an invoice or bill -- do not represent distinct final products of the reporting unit unless they are also transacted to producers or consumers outside the reporting unit. Consider, for instance, an itemized health insurance bill that is received pursuant to a doctor's office or a stay in the hospital.

- In either case, the document is likely to display line-item charges for a wide menu of activities, including one or more of the following: x-rays, blood tests, other diagnostic tests/procedures, room charges (for hospital stay), administering drugs, remedial treatment, etc.
- Without benefit of understanding the production process, some observers might conclude that each of the charges on the itemized bill is prima facie evidence that the establishment in question is producing several distinct service products that should be included in the product classification system for these industries.
- However, a systematic description of the production process reveals that none of these activities constitutes final contacted-for product of either a visit to a doctor's office or a stay in the hospital.
- Rather, this description indicates that all of the listed activities are best interpreted as intermediate inputs that are either produced internally or purchased externally and then consumed by the health provider in the course of obtaining the final contacted-for product created by its production process -- a diagnosis or a defined course of treatment.

V. Classification Process

The ECPC anticipates that the project to classify service products will be a comprehensive effort that addresses both the conceptual issues and the data collection issues necessary to ensure that the system is conceptually sound, feasible to implement, and relevant to analytical and operational objectives. Phase I will be confined to identifying and classifying the products of the industries in four selected NAICS service sectors:

**Information (sector 51);
Finance and Insurance (sector 52) except Insurance (subsector 524);
Professional, Scientific, and Technical Services (sector 54); and
Administrative and Support, Waste Management and Remediation Services (sector 56).**

This work is being accomplished by four concurrently operating product classification committees, one per sector. The classification committees are implementing a comprehensive product classification process for each NAICS service industry in the aforementioned sectors; in particular the committees are operating under a mandate that incorporates the following responsibilities:

1. Developing a heuristic but informed description of the production process for each industry
2. Identifying/defining the final products produced by each industry
3. Determining the appropriate unit for measuring the nominal output of a given product and assessing the feasibility of collecting both nominal output and price measures for these units
4. Researching the reporting unit that is appropriate for collecting product data for each industry
5. Developing formal definitions for the identified products
6. Creating a formal classification system that allows users to:
 - a. identify the amount of each product produced by each industry,
 - b. aggregate common products across all industries, and
 - c. group and aggregate products in a manner that satisfies the demand-side classification framework adopted by the three NAICS countries.

Thus, each committee will consider and investigate issues related to the unit of measurement and to the feasibility of measuring and collecting data on output and prices for the products identified for the respective service industries, including industry record-keeping practices and reporting units.

VI. Outreach Program

The ECPC recognizes that the development of even a preliminary classification system for selected service products will be a complex endeavor that will tax the expertise of the statistical agencies which currently lack familiarity both with the products produced by many service industries and with how industry produces these service products. Accordingly, the ECPC is actively seeking assistance from the academic and business communities to identify information sources and to identify and recruit industry experts to serve as advisers to the classification committees charged with identifying the products created by the service industries included in Phase I. The ECPC is also soliciting proposals for an initial identification of the service products created by included service industries. To facilitate this outreach effort, the ECPC has established A Web Page -- entitled Product Classification System -- for the Initiative, which can be found at the address www.census.gov/products. This site not only provides extensive information and news about the Initiative; but it also provides a structured medium through which interested parties can participate electronically in Phase I -- identify expert advisers and submit proposals for the products produced by the covered service industries.

VII. Issues for the Census Advisory Committee

The ECPC would like input from the Census Advisory Committee on the following issues.

A. Under What Conditions Can a Service Bundle be Unbundled?

Some observers have argued that a service bundle should be unbundled and its component products listed as separate products. In contrast, the ECPC guidelines for product identification in section IV.B stipulate the existence of three broad types of final products; one of which is a service bundle. This stipulation is consistent with accepted practice in the service industry literature, conforms to the marketing practices of many service industries, and acknowledges that economies achieved through the joint production and/or marketing of multiple products likely produces a price for a service bundle that is less than the linear sum of the prices charged for the separate purchase of each element in the bundle. As such the guideline implicitly states that, unless there is strong evidence that this linear additivity condition exists, the bundle should not be unbundled. **Do you agree with this conclusion, and are there other practical/theoretical conditions that we need to incorporate into our guidelines.**

B. Managing Product Proliferation in Service Bundles

In some industries it is possible to select from a large number of possible products in arriving at the composition of the service bundle that is negotiated for by the buyer and seller. This possibility raises serious concern that the product identification process could result in an impractically large number of products. The guidelines set forth in section IV.B direct that product identification for a given industry proceed in a manner that is consistent with the marketing and record keeping practices of the industry. As such, the ECPC suspects that the problem of unmanageable product proliferation may be more imagined than real. Nevertheless, the potential problem remains, and we want to be prepared for the contingency.

What practical and theoretically defensible guidelines can be established to allow the product identification process for a given industry to transform N possible service bundles into a manageable number of products?

In formulating your response please recognize that, while the classification process described in section V treats feasibility of price measurement as an important consideration in that process, it does not require that product identification be constrained by BLS' current capacity to measure prices for service products. Also consider that, in the area of price measurement, the PPI address product differentiation in service bundles in one of two ways. First, by pricing a service bundle with a fixed base-year composition, as long as the that bundle continues to be observable in the current year; thereby assuming that the prices of other bundles move the same as the price of the reference bundle.⁷ Second, by treating observed differences in bundles, relative to a base-year reference bundle, as quality

⁷It should be noted, however, that respondents to the BLS survey are requested each month to update the content of the reference bundle if the specification has changed.

differences that can be adjusted out, using observed differences in input costs (hedonic techniques could also be used for this purpose in the future).

C. Designing a Product Classification System Based on Demand-Side Principles

Once the product identification process is complete, the products are to be grouped and aggregated within a formal classification framework that is based on demand-side/market-oriented principles. It is intended that this classification framework will be common across the three NAICS countries down to a certain level of disaggregation. However, as noted by Robert McGukin (1991), it is difficult to design a framework that will satisfy the varied needs of individual users. Indeed, when translated to the Initiative at hand, McGukin's thesis suggests that the statistical community should confine its efforts to identifying and measuring products and leave designing the classification framework for those products to users of the product data:

The statistical system must provide flexibility -possibilities for generating multiple groupings of data to satisfy multiple objectives -- if it is to satisfy users.... Flexibility in the statistical system implies that the basic data are sufficiently detailed to support use needs and are processed and maintained in a fashion that makes the use of a variety of aggregation rules possible.... The idea is to develop very specific lists of the basic data. These lists should be independent of the aggregation rules used to develop various groupings and categories of the basic data.

Points 6.a and 6.b in section V recognize the validity of McGukin's fundamental argument. However, point 6.c also recognizes the commitment of the three countries to construct and publish an official product classification framework according to demand-side principles. Of such a system, Triplett (1993, p. 46) says:

For uses that imply a demand-based concept, grouping according to characteristics of the demand for commodities will provide the appropriate statistics. Examples of such data users include calculating market share for studies of monopoly power, marketing studies concerned with either the demand for consumption goods or demand for inputs to production. For these uses, one groups commodities by similarities in the way commodities are used - close substitutes, for example, or alternatively, commodities that are used together.

It should be evident, however, that even this guideline contains competing frameworks for grouping and aggregating product data. For example, one kind of market research would like to see data arrayed in a manner that identifies all close substitutes for a given product, a second might want an array that identifies the production of given products by all industries that produce that product, and a third might

want data arrayed to identify all close complements to a given product. Moreover, within the statistical community, an arrangement that is ideal for international trade in products might not well serve the needs of national income accountants and price measurements analysts.

In the face of the many competing interests, what suggestions can you offer for structuring the official Product Classification System? Would a reasonable paradigm be a system that assumes multistage optimization of an expenditure function in which the products are grouped in the macro-expenditure function in a manner that conforms roughly to the sectors defined by NAICS?

References

- Chadeau A. [1997], "Prices of Services to Enterprises," paper presented in Twelfth Meeting of Voorburg Group on Service Statistics, Copenhagen: Denmark, September 15-19, 1997.
- Economic Classification Policy Committee [1994], "Standard Industrial Classification Replacement," **Federal Register**, July 26, p. 38092-96.
- _____ [1993a], "Issue Paper No. 6, Services Classifications," Bureau of Economic Analysis (BE-42), U.S. Department of Commerce, Washington: D.C., September.
- _____ [1993b], "Issue Paper No. 1, Conceptual Issues," **Federal Register**, March 31, pp.16991-17000.
- McGukin, R.H. [1991], "Multiple Classification Systems for Economic Data: Can A thousand Flowers Bloom? And Should They?" paper presented at 1991 International Conference on the Classification Economic Activity, Bureau of the Census, Williamsburg, VA, November 6-8, 1991.
- Hill, T. P. [1977], "On Goods and services," **Review of Income and Wealth**, vol. 123 (4), pp. 315-38.
- Mohr, M. F. [1998], "Developing a Product Classification System for Products Produced Service Industries: Issues and Insights," Discussion Paper prepared for ECPC Product Classification Initiative, mimeo, Bureau of the Census, December.
- Office of Management and Budget [1998], **North American Industry Classification System, United States, 1997**, Bernan Press: Lanham, Maryland.

- _____ [1997], “1997 North American Industry Classification System–1987 Standard Industrial Classification Replacement,” **Federal Register**, April 9, pp. 17287-17337.
- Sherwood, M. J. [1997], “Output of the Property and Casualty Insurance Industry,” paper (revised February 1998), presented at the Centre for the Study of Living Standards Conference on Service Sector Productivity and the Productivity Paradox, Ottawa, April 11-12, 1997.
- Triplett, J. E. [1994a], “Economic Concepts for Economic Classifications, **Survey of Current Business**, November, pp. 45-49.
- _____ [1994b], “Economic Classification in the New North American Industry Classification System (NAICS),” paper presented at Seminar on New Directions in Statistical Methodology, Washington, DC, May 25, 1994.
- _____ [1990], “The Theory of Industrial and Occupational Classifications and Related Phenomena,” in **1990 Annual Research Conference**, Proceedings in Arlington, Virginia, March 18-21, 1990, by the Bureau of the Census, Washington, DC: U.S. Government Printing Office), pp. 9-25.
- United Nations [1998], **Central Product Classification (CPC), Version 1.0**, Statistical Papers, Series M, No. 77, Very 1.0, Department of Economics and Social Affairs, Statistics Division, New York.