Introduction

Information on capital spending provides a useful indication of market conditions both in the economy at large and in particular industries. Since such expenditures account for a large and relatively variable proportion of gross domestic expenditures, the size and content of the investment program provides significant information about demands that have been placed upon the productive capacities of the economy during the period covered by the survey. In addition, information on the relative size of the capital expenditures program planned, both in total and for individual industries, gives an indication of the views management hold on future market demands in relation to present productive capacity.

The following sections of the "Data quality, concepts and methodology" will provide the information necessary to use the statistical tables to their full potential. The "Data quality, concepts and methodology — Concepts" section explains the basic definitions used during data collection and publication, the target survey units and the classifications used to categorize industry and geographic location. The concepts section also contains information concerning the comparability of the capital expenditures series with other data sources.

The "Data quality, concepts and methodology — Sources" section identifies the different types of questionnaires used to survey data, the sources for non-surveyed data and the data collection arrangements used during the collection process. "Data quality, concepts and methodology — Quality assurance" section delineates the steps taken to insure data quality during, and after, the collection process.

The "Data quality, concepts and methodology — Methodology" section encompasses the steps taken and the sources used to determine the survey frame and the method used to develop a stratified sample from that frame. In addition, the methodology section deals with the processes of imputation and estimation for non-respondents within the sample for the non-surveyed portion of the frame. The final two sections, "Data quality, concepts and methodology — Users and uses" and "Data quality, concepts and methodology — Expenditure series chronology", provide information related to the uses of the data and the availability of historical capital expenditures data, respectively.

Concepts

Definitions

Capital expenditures

Capital expenditures include the cost of procuring, constructing and installing new durable plant and machinery and equipment, whether for replacement of worn or obsolete assets, as additions to existing assets or for lease or rent to others. Also included are all capitalized costs such as feasibility studies, architectural, legal, installation and engineering fees, the value of capital assets put in place by firms either by contract or with their own labour force, as well as the capitalized interest charges on loans with which capital projects are financed. Gross outlays have been reported without any deduction for scrap, trade-in value of old assets and include any grants and/or subsidies received.

Capital expenditures by government departments exclude grants and/or subsidies to outside entities (for example, municipalities, agencies, institutions or businesses) and budgetary items pertaining to any departmental agency and proprietary crown corporation as they are surveyed separately. Federal department expenditures on capital include expenditures paid for by each department, regardless of which department awarded the contract. Provincial department expenditures include any capital expenditures on construction and/or machinery and equipment, for use in Canada, financed through revolving funds, loans attached to revolving funds, other loans, the Consolidated Revenue Fund or special accounts.

The intention is to include the cost of all new plants and machinery and equipment which normally have a life of more than one year. For this reason respondents are asked to report, as capital expenditures, all purchases to be charged to fixed asset accounts. This method of reporting omits certain types of equipment which are bought and charged to current accounts.

Capital Construction

Expenditures on construction represent a process of human endeavour resulting in the erection, assembly, completion of free standing, static buildings or other types of structures, generally on a permanent foundation, bedding or location. Construction expenditures excludes the purchase price of land but includes outlays for land servicing and site preparation. Construction also includes modifications, additions and major renovations, conversions and alterations where either a structural change takes place or the life of an existing asset is extended beyond its normal life expectancy. Such structures may be above or below the surface of the earth for the passage or storage of materials and/or people. A structure, not classified as machinery, in the form of a building or "other structure" may be defined as an output of construction activity. Such outputs are produced to shelter, support, retain or convey something to someone. All construction activity can be categorized as either building construction or engineering construction.

Building construction represents any permanent structure with walls and a roof affording protection and shelter from and for a social and/or physical environment for people and/or materials. Such structures may also include portable or temporary shelters intended to remain in a particular location for a significant length of time, any subordinate or ancillary attachments to the structures needed to contain, to provide support, access or protection, and the component machinery and equipment which form a part of the structure with functions such as plumbing, electrical wiring, air conditioning, or elevators. For example, building construction represents expenditures on aircraft hangars, factories, hospitals, hotels, office buildings, railway stations, schools and shopping centres.

Engineering construction encompasses the direct or indirect conveyance of people, machinery, materials, gases, and/or electrical impulses. It also includes free standing structures which contain or restrain such objects either as part of such conveyance or separately and independently. Free standing structures erected for the transmission of electrical impulses may also include structures designed to provide light as static illumination of an area or as periodic signalling from a static location. In addition, the cost associated with significantly altering any terrain in the preparation for specialized use of that terrain will fall under engineering construction. Engineering construction includes such items as bridges, roads, highways, waterworks, sewage systems, dams, street lighting, railway tracks and pipelines.

This represents a comprehensive definition of capital construction, however, several industries operate under unique conditions which warrant special consideration. Apart from the above definition, the mining industry incurs expenditures for mine-site exploration, mine-site development, mineral lease rental, field expenditures and general overhead which are included under capital construction. The petroleum and natural gas industry's expenditures on exploration drilling, development drilling, production facilities, enhanced recovery projects and natural gas processing plants are also included under capital construction. For utilities, capital construction encompasses expenditures for transformation, switching stations, production plants and general plant expenditures.

Although **housing** is not considered a capital expenditure in the sense mentioned above, it has been included in this report because it forms a large proportion of construction expenditures and has cyclical fluctuations similar to those which characterize business, institutional and government capital expenditures.

Capital machinery and equipment

Machinery and equipment corresponds to any combination of interrelated parts which are physically or electro-magnetically dynamic, which use or apply pressure, heat, mechanical, electrical or other energy to do work or where not dynamic, to complete a work environment for people.

Capital expenditures on machinery and equipment represent the total capitalized cost of machinery such as automobiles, boilers, compressors, earth moving and materials handling machines, generators, motors, office and store furniture, professional and scientific equipment, pumps, tools, and transformers.

In addition, machinery and equipment expenditures encompass the cost of any other machinery and equipment not already reported as part of building or engineering construction, exploration or development work (non-production facilities), items that may be termed manufacturing or mining equipment and other related capital goods, whether for the firms own use or for lease or rent to others. Also included are capitalized costs associated with tooling, progress payments paid out before delivery and any balance owing or holdbacks incurred during the survey year. Gross outlays have been reported without any deduction for receipts from the sale of fixed assets or allowance for scrap or trade-in value of old equipment.

Leases

In accordance with the recommendations of the Canadian Institute of Chartered Accountants, leases are divided into two types, operating and capital. Fixed assets purchased for own use or for lease to others, either as a capital lease or as an operating lease are categorized as new capital expenditure. The Canadian Institute of Chartered Accountants recommends that assets acquired through capital (financial) lease be accounted for by the lessee. However, for survey considerations, the assets are reported by the lessor.

Used assets

Used assets are defined as existing buildings, structures or machinery and equipment which have been previously used by another organization. Outlays for used Canadian assets are excluded since they constitute a transfer of assets within Canada and have no effect on the aggregates of our domestic inventory. On the other hand, all expenditures for assets imported from outside Canada increase our domestic inventory and are, therefore, included in the capital expenditures series.

Work in progress

Included in the capital expenditures series are expenditures on work in progress, which represents accumulated or accrued costs on capital projects not completed and which are intended to be capitalized upon completion.

Repair and maintenance expenditures

Repair and maintenance expenditures on structures and machinery and equipment are also given in the report and are shown separately. **These expenditures are not considered capital**.

Repair and maintenance activity is that portion of current or operating expenditures which is charged against revenue in the year incurred and made for the purpose of keeping the stock of fixed assets or productive capacity in good working condition (preventive function) during the life originally intended. Repair and maintenance allow such fixed assets to operate at output producing capacity during the asset life without undue amounts of down time. A second purpose is the returning of any portion of the stock of fixed assets into a state of good working condition after any malfunctioning or reduced efficiency for whatever reason (curative function) short of replacement of such fixed assets or adding significantly to their life or productive efficiency. These outlays give a more complete picture of all demands likely to be made on labour and materials.

Repair construction

Repair and maintenance expenditures on construction include expenditures which do not extend the expected useful life of the structure, increase its capacity or otherwise raise its capacity. Maintenance expenditures on buildings and other structures may include the routine care of assets such as janitorial services, snow removal and/or salting and sanding by the firm's own employees or persons outside the firm's employ.

Repair machinery and equipment

Repair and maintenance expenditures on machinery and equipment include expenditures which do not extend the expected useful life of the structure, increase its capacity or otherwise raise its capacity. Maintenance expenditures on machinery and equipment may include oil change and lubrication of vehicles and machinery.

Accumulated depreciation

The sum total of the annual capital consumption allowance (depreciation charge) since the purchase of the asset is referred to as the accumulated depreciation.

Capacity utilization

Capacity utilization is calculated by taking the actual production level for an establishment (production can be measured in dollars or units) and dividing by the establishment's maximum production level under normal conditions.

Contract work or own account

Contract work refers to work put in place by construction contractors. Own account consists of construction work done by any organization's own work force.

Disposal / sales / write-downs of fixed assets

These are defined as the Gross Book Value of fixed assets which were disposed, sold, retired, destroyed, or otherwise discarded (including write-downs) and/or traded in for credit in the acquisition or purchase of new fixed assets. Accumulated capital cost should represent total capital expenditures for an asset at and since the time of construction or purchase.

Expected useful life

Expected useful life of an asset refers to the expected useful life for new assets regardless of their lives reported for income tax purposes. With respect to mines, expected useful life of an asset is defined as the expected productive life of the mine. This relates to amortized expenditures (or expensed in some cases) for mine-site exploration and /or mine-site development. The expected life is based on the company's original commitment to go into production for a number of years (for example, unit of production method) assuming no significant decrease (increase) in the price of minerals to lengthen (shorten) the life. The number of years of operating or productive life may not be the same as the life used for income tax purposes or measures of mineral deposits.

Expected remaining life of assets

The expected remaining life of assets represents the number of years remaining in the life of a used asset at the time of acquisition.

Gross book value

This refers to the cost of the asset in terms of the original purchase price.

Classification

The establishment is used by the capital expenditures survey as the primary statistical unit in its measurement of capital and repair expenditures. By definition, the establishment is the smallest operating entity which produces as homogenous a set of goods and services as possible and for which records provide data on the value of output together with the cost of materials used and the cost and quality of labour resources employed to produce the output, and for which records or estimated allocations can provide the full range of production account variables to calculate value added.

The term establishment refers to an organized capacity of production with some degree of specialization. To compensate for diversified production, the **North American Industry Classification System** (NAICS, catalogue no. 12-501-X) is used to distinguish between primary, secondary and ancillary activities; ultimately grouping individual establishments by primary activity. Under this NAICS version, establishments are grouped into industries, major groups and sectors according to the production of homogenous goods or services and/or participation in similar economic activity. Grouping of establishments in this manner applies to all private and public establishments as well as government owned enterprises. All other government operations are categorized as federal, provincial or municipal services within the government services division. In addition, the concepts and definitions employed by the capital expenditures series are those outlined in the **United Nations Concepts and Definitions of Capital Stock and Capital Formation Series F No. 3** of 1953.

Since establishments may have operations in several provinces, the **Standard Geographical Classification** (SGC, catalogue no. 12-571-X) has been integrated into the capital expenditures survey. The SGC has been designed to subdivide Canada into areas based on provinces, census divisions and census subdivisions as well as separating the census metropolitan areas. The capital expenditures survey has adopted geographical classification at the provincial level, which provides the basis for the stratified sampling of establishments. Extending the geographic breakdown to include census divisions and census subdivisions would require an increased sample for many industries.

Comparability

Although the capital expenditures series complies with the standards set fourth by Statistics Canada for the classification of geographic location and industry, there are cases whereby differences exist in the value of capital expenditures being reported by the capital expenditures series and other data sources.

New investment as surveyed by the Investment and Capital Stock Division (ICSD) of Statistics Canada includes all capital outlays of private organizations and governmental agencies acquiring durable physical assets. The totals do not, however, correspond exactly with the details published for gross fixed capital formation in the National Income and Expenditure Accounts because of further adjustments made for the purpose of the national accounting system. These adjustments comprise deductions for defence construction, net sales of used motor vehicles, scrap and salvage and an addition for transfer costs of land and existing buildings.

The totals for capital expenditure published by Industrial Organization and Finance Division (IOFD) will not correspond exactly to this report as a result of IOFD's concentration on company level data for the private sector. Also in contrast to the capital expenditures series, IOFD includes the purchase price of land and used buildings.

The present report by ICSD differs in several ways from related upstream expenditures published by Natural Resources Canada (NRCan), Energy Policy Sector and the Industry Accounts Division of Statistics Canada. First, the comparability of exploration and development statistics in the petroleum and natural gas industry is restricted because Industry Accounts Division of Statistics Canada includes in its presentation land sites purchased for construction purposes, as well as land acquisition and rentals. In the non-conventional sector, Industry Accounts Division also includes the acquisition of housing. The Energy Policy Sector of Natural Resources Canada, and Industry Accounts Division in its presentation, include expenditures for geological and geophysical activities. These expenditures are not considered as part of "Capital Formation" for National Accounts purposes and are not included in this report. Further, NRCan and Industry Accounts Division collect "Other Capital Expenditures" at a national level while ICSD requests them provincially. Finally, Industry Accounts Division collects its data for the calender year, where feasible, and not by fiscal year, in contrast with NRCan and ICSD. Impact of this difference, however, should be minimal.

When possible, the capital expenditures survey complies with the practices of the Canadian Institute of Chartered Accountants (CICA), however, the data reported by establishments often reflects the expensed cost of items which should be capitalized. Leased assets are reported by the lessor for the capital expenditures survey, whereas the CICA recommends that assets acquired through capital (financial) lease be accounted for by the lessee.

Sources

Surveyed data

The majority of industries covered under the expenditures series are surveyed. All establishments selected for the sample during the three survey periods (see "Survey periods") will receive either the regular survey questionnaire (short or long form), a specialized survey questionnaire (long or short form) or the new project questionnaire. The type of questionnaire an establishment receives depends on the industry, the expected level of expenditure, the survey being conducted and whether or not the establishment is classified as a new project (for example, out of frame or outlier).

The regular short questionnaire is most often used during each of the three survey periods. This questionnaire collects basic information on capital construction, capital machinery and equipment, repair construction and repair machinery and equipment, gross book value, capacity utilization in the manufacturing and mining sectors, reasons for change in expenditures, work in progress and leasing. Note that establishments are asked to report repair expenditures on the actual survey only. An establishment will receive one of the other questionnaire types if it is expected to spend a large amount on capital, has been operating in a specialized industry or has been categorized as a new project.

The regular long questionnaire is used only during the actual survey period and is distributed to establishments that have previously reported large capital expenditures. This questionnaire goes beyond the basic data assembled by the short form to collect information related to asset detail, asset value, reason for disposals, interest payments capitalized, number of robots and leases by type of asset (see survey 2803).

Specialized questionnaires are used for the mining industry and the petroleum and natural gas industry. New project questionnaires are sent to new establishments that are considered to be either not yet on the frame because they are not in production or outliers on the frame.

Apart from surveying establishments, the capital expenditures series also uses reporting arrangements in the data collection process. Some respondents operating within Canada are unable to provide the required provincial breakdown of expenditures during the reporting periods. Consolidated reports are used to collect data from such respondents. These reports are subsequently allocated to the provinces based on related charactistics. It might also be the case that the number of locations administered by an establishment are too numerous for conventional sampling. To facilitate the reporting of capital expenditures by these establishments, data are collected through a reporting entity known as provincial establishments. However, the locations covered under the provincial establishment's report must all be within the same industry.

All respondents are asked to report expenditures for their 12 months fiscal period for which the final day occurs between April 1 of the reference year and March 31 of the following year.

Non-surveyed data

Although the capital expenditures series provides estimates of the expenditures attributable to each NAICS division, they are not all surveyed. In these cases, estimates of capital expenditures are produced based on indicators of production, consumption and costs associated with operation in that industry.

The value of capital expenditures in the **fishing** industry (Division B), for all survey periods, is based on the statistical modelling of data obtained from the Department of Fisheries and Oceans Canada and from Industrial Organization and Finance Division of Statistics Canada. Nevertheless, industry group 032, Services to Fishing and industry group 033, Trapping, are not covered by these other sources and are not estimated for in the capital expenditures series.

Modifications to non-surveyed data

Agriculture

The data for the crop and animal production industries incorporated into the Private and Public Investments estimations are provided by Statistics Canada Agriculture Division. Indeed, the capital expenditures for these two industries are collected in the Farm Financial Survey (FFS) conducted by Agriculture Division.

Agriculture Division introduced changes to the survey frame for the reference period 2007 which impact the capital expenditures data. Comparison with earlier capital expenditures estimations for these two industries should be done with caution since there could be a break in the series.

Construction

The construction sector is non-surveyed for the purpose of the Private and Public Investment survey and estimates for this sector are based on the trend observed in construction activity in the whole economy. It has been observed that the value of capital expenditures by province obtained from the statistical modeling of trends could be skewed. In order to offset this problem, starting with reference period 2007 we will use tax data to derive provincial distribution of the capital investment that will apply to the statistical modeling estimation for this industry.

Estimated changes in capital expenditures in the **construction** industry (Division F) for all survey periods are based on the trend observed in construction activity in the whole economy. The underlying assumption is that the value of new construction work put in place, both in residential and non-residential sectors, is providing a reliable indicator of the demand placed on the construction industry, and therefore of the industries' own investment in capital. However, major group 44, Services to Construction, has not been covered by the capital expenditures survey and is not estimated for in the capital expenditures series.

In addition, **housing** investment is produced by the Current Investment Indicators Section and is based on projected housing starts, building costs and the value of alterations and improvements in each province. **Residential infrastructure** put in place by developers has been estimated for and the value of that infrastructure which will be turned over to municipalities upon completion has been included in the capital expenditures series under local government investments in capital.

Data collection arrangements

Within Statistics Canada several divisions participate in the collection of data which are incorporated into the final production of capital expenditure estimates by the Investment and Capital Stock Division. The Agriculture Division collects information on actual and preliminary actual capital expenditures from the Farm Financial Survey and Crop Surveys. The Public Institutions Division expedites the collection process by providing information from its Local Government Capital Expenditure Survey, while Industry Accounts Division contributes small establishment data from the Net Cash Expenditures Survey of the oil and gas industry. Housing estimates are produced by the Current Investment Indicators Section (Investment and Capital Stock Division).

Furthermore, the capital expenditures series consolidates data collected by agencies or departments external to Statistics Canada. Data collected by each provincial/territorial statistical focal point related to education (provincial/ territorial schools), health and provincial governments are incorporated into the capital expenditures series. Mining industry data are collected at the provincial level by provincial energy, mines and resources departments in Newfoundland and Labrador, Nova Scotia, Quebec and Manitoba.

Survey periods

Both survey periods are organized and timed to collect three sets of annual data related to intentions, preliminary actual and actual capital and repair expenditures for all sectors of the economy (See text table 1).

Text table 1
Capital expenditures series data collection

Data	Collection period	Release date
Intentions (Y [1])	November (Y-1) to February (Y) [1] [1]	February
Preliminary actual ((Y [1]-1)	November (Y-1) to February (Y) [1] [1]	February
Actual (Y [1]-2)	March (Y-1) to October (Y-1) [1] [1]	February

1.
Y = current calendar year.

Quality assurance

Non-Response follow-up

Low response rate to the survey within a specific industry and province/territory represents the primary reason for follow-up. Initially, a general reminder is sent in the form of a mailout to the entire delinquent portion of the sample. If non-response continues, establishments in areas of lowest coverage are solicited by telephone for the return of the completed questionnaire. Actively canvasing sampled non-response establishments increases the response rate and, as a result, estimation for the non-sampled portion of the frame are made more accurate (see "Data quality, concepts and methodology — Methodology").

Editing

After the questionnaires have been completed and returned, the process of quality assurance continues through data editing. Data are screened at the micro level for internal, survey over survey and year over year inconsistencies.

Add-check edits identify expenditure data that are incorrectly reported in dollars rather than thousands, percentage data failing to add to 100 percent and/or inconsistencies related to the reported totals. Large difference edits evaluate the consistency of reported expenditures by comparing the current data with reports from a previous survey within the same year and from a different year. On the actual survey for respondents receiving long forms, asset detail edits identify all establishments reporting expenditures on assets or asset details which are inconsistent with previous questionnaire returns or inconsistent with assets commonly used in the respondent's industry. Edit tests will flag reported data for confirmation based on thresholds which are set after evaluating industry coverage and geographic location. In addition, new and large project data are collected from newspapers, trade journals and industry reports. This information is compared to reported data and any inconsistencies are flagged for confirmation.

Once an establishment's reported expenditures data have been flagged by the edit process, additional questionnaire data are consulted for an explanation. For example, the questionnaire section entitled, "Reasons for changes in capital expenditures", contains respondent supplied explanations for changes in capital expenditure. However, if the reason for the inconsistency cannot be ascertained from the questionnaire or other industry information, the reporting establishment is contacted directly for confirmation. Based on this inquiry the data reported are updated to include either new data or an explanation of expenditures.

Other micro data editing may occur for reported Gross Book Value or Capacity Utilization. Gross book value edits occur when the reported gross book value of an establishments assets does not coincide with the previously reported gross book value plus current investment in new capital net of disposals. In this case, the establishment is contacted for confirmation of (or an update to) the reported data. Capacity utilization edits identify all those manufacturing and mining establishments operating at less than expected manufacturing or mining capacity. If previous reports are significantly different from the current questionnaire response, the establishment is contacted to confirm or update the reported data.

Macro data evaluation

After the estimation process (see "Estimation"), a comprehensive data set exists for the surveyed and non-surveyed portions of the universe (frame) and therefore trend analysis for the various industries can begin. Commencing with an evaluation of the year over year (or percentage) change in each industry, provinces/territories that have industries or sub-industries experiencing unusual activity are highlighted. In addition, this type of analysis also identifies industries which have the largest impact on Canadian aggregates.

Macro analysis continues with the assessment of information which may be effecting the expenditures in a specific province or industry. This additional information might come in the form of economic indicators such as GDP, productivity, capacity utilization, profits or technological innovation. Factors influencing the expenditures might also include government policies (fiscal policy, monetary policy, grants and/or subsidies) or industry specific information such as meters drilled, import/export data or building permits. Although causality is not drawn, the analysis attempts to link information directly and indirectly related to the industry with recent trends in capital expenditures. As a by product of this analysis, those industries experiencing exceptional activity will undergo further micro data evaluation to determine the reason for the large year over year change.

Methodology

Introduction

The Capital Expenditures Survey (CES) produces data on investment made in Canada, in all types of Canadian industries. These data are gathered twice a year, at two very specific times. This permits follow-up on intentions and achievements in terms of investment, on an annual basis. A single sample is used to collect data for three different fiscal years. An initial questionnaire is mailed to sample units in March of fiscal year Y. It collects actual data for fiscal year Y-1, which has just ended. A second questionnaire is then mailed to the same units in October of fiscal year Y. That questionnaire collects preliminary actual data for fiscal year Y, which will end in a few months, and intentions data for fiscal year Y+1. The sample is selected in November of fiscal year Y-1.

Just as one sample is used to collect data for three different fiscal years, one fiscal year is covered by three different samples. One sample produces intentions data for fiscal year Y. One year later, a second sample produces preliminary actual data for fiscal year Y. One year further on, a third sample produces actual data for fiscal year Y.

In February of year Y, Investment and Capital Stock Division (ICSD) publishes the results of the Survey on Actual Data (SA) for fiscal year Y-2, the Survey on Preliminary Actual Data (SPA) for fiscal year Y-1, and the Survey on Intentions (SI) for fiscal year Y.

In the SI and SPA surveys, the variables of interest are capital expenditures on new construction (CC) and capital expenditures on new machinery and new equipment (CM). In the SA survey, we add repair expenditures on construction (RC) as well as repair expenditures on machinery and equipment (RM). In addition, the SA survey produces more detailed estimates for new capital. In fact, capital expenditures by type of assets are also available in the publication catalogue no. 61-223-X **Capital Expenditures by Type of Asset**.

Methodology by industrial sector

As in any survey covering several industrial sectors, the methodology for the CES survey differs from one sector to another and thus requires very detailed explanations that are impossible to cover in one section. The following is how the methodology for the various industrial sectors is divided under the North American Industrial Classification System (NAICS):

Sector 11, sub-sector 111 and 112 (Crop and Animal Production Industries):

- The survey is conducted by Agriculture Division (AD) which adds investment questions to some of their surveys of farmers. The data are processed by AD and the estimates are re-integrated into the bi-annual publication. Refer to "Non-surveyed data" in "Data quality, concepts and methodology — Sources" for more details.

Sector 11, sub-sector 114 (Fishing, Hunting and Trapping Industry) and sector 23 (Construction Industry):

- There is no survey. The data published are based on economic indicators. For more details, refer to "Non-surveyed data" in "Data quality, concepts and methodology — Sources".

Sector 91, sub-sector 913 (Local Governments):

- The survey is conducted by Public Institutions Division **(**PID**)** which uses this opportunity to request the distribution of investment expenditures by function for their own publication "Public Sector Finance". The data, however, are processed by ICSD and usually are in the same format as most of the data gathered by ICSD. For more details on the sampling methodology, see Pandher (1995). It should be noted that in the case of Quebec, a special arrangement provides investment values for the province.

Sectors 21, sub-sectors 211 (Crude Petroleum and Natural Gas) and 212 (Mining) and 91 sub-sectors 911, 912 and 914 (Federal Government, Provincial and Territorial Governments and Aboriginal Government):

- A sample using a model based methodology has been preserved. The treatment is the same for the remainder of the samples with only a few exceptions. For more details, see Lacroix (1991).

Sector 21 Canadian industry 213119 (Other support activities for mining), sector 55 Canadian industry 551114 (Head-office), and sector 81, sub-sector 814 (Private households):

- There are no surveys and no estimates for these sectors.

Other industrial sectors:

- The methodology used will be described in this section, in particular a model-assisted estimation method.

In fact, the next sections discuss primarily the methodology used for sampling and for calendarization, imputation and estimation of the other sectors. The information on the methodology of the industrial sectors other than that described in the last point, is available in the reference documents cited.

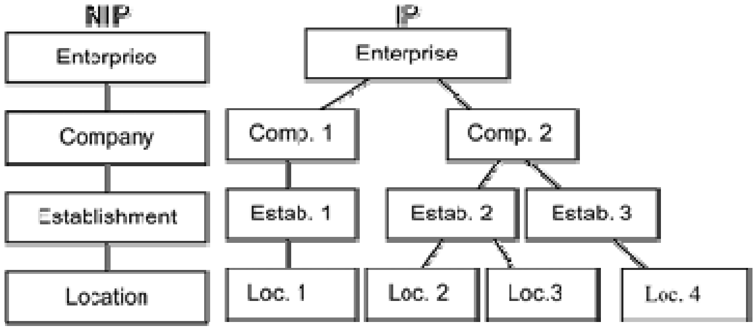
Survey frame

The frame consists primarily of the Business Register (BR) developed by Statistics Canada. Business Register Division (BRD) is responsible for maintenance and updating of the register. The register is used by a large number of surveys that in turn provide it with feedback to ensure that the latest changes in the business world are incorporated into the BR as quickly as possible.

The BR contains the units required to establish our final survey frame. They are arranged hierarchically as follows: Enterprise - Company - Establishment - Location. An enterprise may comprise several companies, each of which may have several establishments that in turn may operate in several locations. This so-called “statistical” structure is in fact a model of the operational structure described by the enterprise itself. Based on the information available for each level of the operational structure, we define the corresponding statistical structure. For example, to be considered an establishment, a respondent must be able to supply the BR with the wages and rates of pay, income and major inputs in the operational process.

For these units that are part of the non-integrated portion (NIP) of the BR, the statistical structure is linear: an enterprise is related to a single company, a single establishment and a single location. In the integrated portion (IP), the structure may be linear but usually is more complex. Figure 1 illustrates both structures.

Figure 1
Statistical structures



The sampling unit selected for the Capital Expenditure Survey is the establishment, which best corresponds to the gathering and disclosure of investment data. For more details on the BR, refer to Cuthill (1996).

When the sample is drawn in November, a new ”image” is taken from the BR. With the new Unified Enterprise Survey, the BR has improved its coverage therefore the “image” is now more complete and up to date. Since the Capital Expenditures Survey is part of the unified survey, it uses this new image for the purpose of sampling.

Since the questionnaires are mailed out in the following March and October, and given the dynamic nature of businesses, we can be certain that new projects will start up after the sample is selected. To be sure that major investments are not “overlooked”,units are added to the sample even after the first mailing when the project is deemed important enough. These “new projects”, as they are called, are found from newspapers, company reports or lists of building permits. These are sampled with certainty and allow us to avoid gross under-estimation of the value of investment in their industries.

It should be noted that certain units, such as new projects, which we want to have in the sample have incomplete information.Income, which is known for all units on the frame, may be unknown for these units. Since income is used in a range of processes (imputation, estimation, etc.), these units are grouped together to be dealt with separately during data processing.

Grouping

Before sampling begins, all units from the private sector not in the mining and manufacturing industries are grouped together using the following method. All establishments operating in the same province, in the same six-digit-code industrial sector and under the same enterprise have been grouped together in a single super-establishment. The income of the super-establishment is the sum of all income for the establishments that comprise it, while the remaining information is taken from the head of the group, either the head officewhere possible, or the establishment with the highest income, where applicable. For the public sector, all the units are in the sample.

Once the new universe is constructed with the new super-establishments, all units with income of less than a certain limit are eliminated from the frame unless they constitute head offices or laboratories, in which case the units are chosen with certainty. This procedure is instituted to avoid “losing” these units, which generate practically no income, but might account for substantial investment.

The limit that delineates the units non-surveyed is determined as a function of province and industry. It varies from $100,000 to $3,185,000 depending on the size of the units within the industry and the province grouping. The limit is calculated in such a way that a maximum of 10% of the total revenue in the group is excluded from sampling. This allows reducing the response burden for small units and thus follows the bureau guidelines. The non-covered portion is estimated using administrative data when it is available (refer "Estimation" for more details).

When all groups have been assembled and the small units have been eliminated, the survey population is ready for stratification.

Sampling

The sampling is divided into the three traditional parts: stratification, allocation and selection. These are described in the following text.

Stratification

The sample has first been stratified by geographic location, industrial classification and also by country of control in order to answer new needs. The geographic division is based on the 13 provinces and territories, with no other refinement (no infra-provincial stratification). Twelve countries of control were considered in the stratification this year: Canada, USA, Germany, Japan, France, Great Britain, Sweden, Italy, Netherlands, China, Hong Kong and Australia.The remaining countries were grouped together. For the industrial stratification, the 1997 NAICS is used at the level required for estimation purposes. If, for example, for a certain industry, the most disaggregated level published corresponds to the 3-digit NAICS, this will be the stratification level. It should be noted that for the remainder of the section, the 6-digit NAICS will be abbreviated as NAICS-6, the 5-digit NAICS as NAICS-5, and so forth.

Text table 1 shows, by industry, the most disaggregated possible publication levels for provincial and Canadian estimates.

Text table 1
Most disaggregated publication levels

Industry sector	NAICS code sector	NAICS publication level
Agriculture, forestry, fishing and hunting	11	3

Industry sector	NAICS code sector	NAICS publication level
Mining and oil and gas extraction	21	3 to 6
Utilities	22	4
Manufacturing (NAICS -3 316 and 323)	31-33	3
Wholesale trade	41	3
Retail trade	44-45	3
Transportation and warehousing	48-49	3
Information and cultural industries	51	3
Finance and insurance	52	3
Real Estate and rental leasing	53	4
Professional, scientific and technical services	54	4
Management of companies and enterprises	55	2
Administration and support, waste management and remediation services	56	3
Education services	61	4

Industry sector	NAICS code sector	NAICS publication level
Health care and social assistance	62	3
Arts, entertainment and recreation	71	3
Accommodation and food services	72	3
Other services	81	3
Public administration	91	3

All provincial publication levels are at the sector level except for the Manufacturing industry where it is at the NAICS-3 level for four provinces: Québec, Ontario, Alberta and British Columbia.

Allocation

Once the initial stratification has been introduced, we compute the coefficient of variation (CV) (see "Estimation" for more information on CV) to be targeted using the revenue variable to reach the CV set for the most disaggregated publication level, in our case by province and different industrial classification level as defined previously. An example helps to better define the situation.

Assume that we want to publish estimates for sector 72 (Accommodations and Food Services), which corresponds to NAICS-3 at the Canada level and the whole industry at the Province / Territory level. We then construct text table 2, in which the number of provinces has been reduced to 3 and the number of NAICS-3 for the industry as a whole is 2, specifically the sub-sectors (SS) 721 and 722.

Text table 2

	Province 1	Province 2	Province 3	CV
SS721	...	...	...	15%
SS722	...	...	...	15%
CV	15%	15%	15%	...

The initial stratification corresponds to each cell in text table 2 and the marginals correspond to the estimates we wish to publish. If, for example, we wish to publish estimates with a target CV of 15%, we must first compute the CV to be targeted for each cell, so that the marginal CVs are met.

Before we can compute the CV required at the cell levelto reach the CV set for the marginals, we must adjust the marginal CVs. In fact, we cannot obtain 15% CVs in both directions, because when we set the variance in one direction to obtain the targeted CV, we automatically set the variance (thus the CV) for the other direction and we are "subject to" the resulting CV. With the knowledge that the CVs in both directions cannot be simultaneously equal to the targeted CV (unless by chance), we have chosen to minimize the distance from the marginal CVs to the target CV. In one direction, we then obtain a resulting CV greater than the target CV and in the other, a CV less than this same CV. This is done by minimizing the distance between the resulting CVs and the target CV under the constraint that the variances must be the same in both directions. In mathematical terms:

Figure 2

$$\text{Minimize } (CV^c - CV^A)^2 + (CV^c - CV^B)^2$$
$$\text{under the constraint } V^A = V^B$$

where CV^A and CV^B represent the CVs attainable in both directions, CV^c represents the target CV and $V^A$and V^B represents the variances in both directions.

Let us call the resulting CV the new target CV. In the preceding example, we could end up with new target CVs as in text table 3.

Text table 3
New target CVs (closest to the targeted CV)

	Province 1	Province 2	Province 3	CV
SS721	...	...	...	11%
SS722	...	...	...	11%
CV	18%	18%	18%	...

To reach the new target CV, we must compute what the targeted CVs should be for each of the initial strata by using a raking ratio algorithm as described in Latouche (1988).

Using the letters A and B again to designate the two directions (A the geographic direction and B the industrial direction, for example), we recompute the cell CVs until the combination of the CVs on the same line or in the same column is close enough to the target CV for the corresponding marginal.

Figure 3

$$CV_r^B(\hat{Y}_{ij}) = CV_{(r-1)}^A(\hat{Y}_{ij}) * \frac{CV(\hat{Y}_{.j})\hat{Y}_{.j}}{\sqrt{\sum_j (CV_{(r-1)}^A(\hat{Y}_{ij}))^2 \hat{Y}_{ij}^2}}$$

$$CV_r^A(\hat{Y}_{ij}) = CV_{(r-1)}^B(\hat{Y}_{ij}) * \frac{CV(\hat{Y}_{i.})\hat{Y}_{i.}}{\sqrt{\sum_j (CV_{(r-1)}^B(\hat{Y}_{ij}))^2 \hat{Y}_{ij}^2}}$$

where:

r denotes the current iteration,
r-1 denotes the preceding iteration,
i. denotes the marginal in direction A,
.j denotes the marginal in direction B,
ij denotes a crossover of directions A and B and
Y corresponds to the total for the income variable for a given group.

The algorithm stops when the convergence criterion (0.1%) is met or after a maximum of 10 iterations. It should be noted here that the algorithm converges very quickly and is almost certain to reach the targeted CV for the marginals. Text table 4 illustrates the result of the iterative procedure.

Text table 4
Cell CVs after iteration

	Province 1	Province 2	Province 3	CV
SS721	20%	23%	24%	11%
SS722	!7%	20%	21%	11%
CV	18%	18%	18%	...

Now that the CV is set for each of the initial strata (these correspond to the cells in the preceding table), we can stratify them into two major strata: large, in which the sample is conducted with certainty, and small, in which the sampling is conducted under a probability scheme so the new target CV can be attained. The preferred method for splitting cells in two is that advanced by Hidiroglou (1986) which has the merit of minimizing the sampling size while attaining the target CV. The technique is simple: start with the equation that gives the CV for the initial stratum

Figure 4

$$CV(\hat{Y})^2 = \frac{\frac{(N-t)*(N-n(t))}{(n(t)-t)} S^2_{(N-t)}}{\hat{Y}^2}$$

where N denotes the population size,
n(t) denotes the total number of units to be sampled,
t denotes the total number of units in the take-all stratum,
S^2 (n-t) denotes the variance in the take-some stratum and
Y corresponds to the total of the income variable for the stratum.

It can be rewritten to isolate n(t), the total number of units to be sampled based on t, the number of units sampled with certainty:

Figure 5

$$n(t) = t + \frac{(N-t)^2 S^2_{(N-t)}}{CV^2\hat{Y}^2 + (N-t)S^2_{(N-t)}}$$

We then must clearly understand the function to find its minimum point. This can be attained through an iterative process that computes the following two parameters after converging: the dividing value separating the initial stratum into two final strata as well as the sample size for each of the strata. There will be t units in the take-all stratum and n(t) - t units to be taken in the take-somestratum. This process will have taken the minimum number of units to attain the target CV set.

It is highly likely that we will not obtain the precise target CV for the cells. The CV reached is usually close, but for some cells may be as much as 2% below the target CV. The effect of this is a slight change in the CVs targeted for the marginals. Text table 5 reproduces the results from text table 4 following application of Hidiroglou's algorithm.

Text table 5
Final cell CVs after iterations

	Province 1	Province 2	Province 3	CV
SS721	20.10%	22.80%	24%	10.80%
SS722	17.20%	21.50%	20.40%	11.70%
CV	18.10%	18.90%	17.80%	...

Once this step is complete, we can then proceed with the actual selection of the sample.

Selection

For the take-some strata, selection is based on a simple random process under the constraints of minimizing the overlap with the Unified Enterprise Survey (UES) (For more details on this survey, see Simard and al (2001)). A minimal sampling fraction of 1% and a minimum of 3 units sampled by stratum. In the take-all strata, all units are sampled with certainty.

Data editing

Once the sample has been selected, a questionnaire is mailed out and respondents are urged to complete and return it. Units that have not responded are subject to mail and telephone follow-up to ensure the data is obtained. A special effort is made for units in the take-all strata.

Once the data have been captured, some edits are conducted for each establishment. For example, several rules of consistency are in place to ensure that if some fields are coded, all related fields are also coded. For example, we can ensure that the sum of the parts equals the whole, that certain cells are properly filled out, etc.

Some edits focus directly on investment data. For example, if historical data are available, some tolerance rules are applied.

When no historical data are available, all respondents reporting investment of $10,000,000 or more are the subject of thorough checks. It should be noted that these rules are subject to change.

Finally, a large number of qualitative (rather than quantitative) editing rules are also in place. For more details on editing rules, see Corneau (1995).

Calendarization

Once data has been collected and edited, we can proceed with the calendarization of the data. This process will generate data for the January to December period for the reference year when the respondent has given data on another period. In fact, to reduce the response burden, we acceptthat the respondent provides data on a fiscal basis. For a given year, its fiscal period must end between January 1st of the target year and March 31st of the following target year.

To prevent the production of estimations linked to many different fiscal periods, calendarization is done. The main idea is relatively simple: first “break” the annual data into monthly data, extrapolate if needed and then sum the monthly values forming the year of interest to get the calendarized data of the respondent.

The method developed by Cholette (1984) is used to “break” the data into monthly portions and extrapolate. The method is similar to a benchmarking technique. We can summarize the algorithm in the following manner:

We are trying to minimize the function

Figure 6

$$O(x) = \sum_{m=2}^{T}((x_m - x_{m-1}) - (z_m - z_{m-1}))^2$$

in such a way that the sum of the monthly values (x_m) over the fiscal period is equal to the respondent’s reported data.

The series of z_m correspond to known auxiliary information about the respondent such as its cycle or trend. For the survey, this option is not used and the series is simply a constant value which corresponds to minimizing the month to month change (while the fiscal total is still respected).

The available number of months (T) on which the minimization function is calculated depends on the historical information of the respondent. However, since usually a respondent gets at least two questionnaires covering two distinct calendar years, T should at least be equal to 24. Periods that are not covered by the fiscal data (at the beginning and at the end of the series) are extrapolated using the last (or the first) calculated monthly value. The rest of the process can be applied on both calendar and fiscal data of the respondents.

Outlier detection

Once the reported data are on a calendar basis, we proceed with the detection of outliers.Detection may be conducted at four levels, beginning at the most disaggregated. If there are not at least 25 units at this level, we proceed to the next level. As many as three variables may be involved in defining these levels: industrial level, size and geographic area.

There are three size categories: take-all stratum with known income, take-all stratum with unknown income, and take-some stratum.

With respect to geographic areas, units are located in large provinces (Que., Ont., Alta. and B.C.), mid-sized provinces (N.S., N.B., Man. and Sask.), or small provinces (P.E.I., Y.T., N.W.T., Nvt. and N.L.).

The four detection levels are:

Level 1: NAICS-3 * Size *Que., Ont., Alta., B.C., small and mid-sized provinces (separated)
Level 2: NAICS-3 * Size * large provinces and small and mid-sized provinces (together)
Level 3: NAICS-3 * Size *Canada
Level 4: Sector *Canada

When publication is at the Sector level for an industry, detection begins at the most aggregate level, for example, level 4.

In addition, the outlier detection module is run before and after imputation. After imputation, this is done with the imputed data and permits detection of outliers among the imputed data.

The Hidiroglou-Berthelot (1986) method is used to detect them. Establishment “i” is considered an outlier if one of the two relations is checked:

$Y_i < M - C^* DQ_1$

$Y_i > M + C^* DQ_3$

where:

$DQ_1 = \mathrm{Max}(M-Q_1, |A*M|)$,

$DQ_3 = \mathrm{Max}(Q_3-M, |A*M|)$,

M is the median (the point at which exactly 50% of establishments lie on either side),

Q_1 is the first quartile (25% of establishments are smaller and 75% are larger),

Q_3 is the third quartile (75% of establishments are smaller and 25% are larger),

A and C take the values of 0.5 and 20 respectively.

Four ratios are used to detect outliers: calendarized CC over revenue, calendarized CM over revenue, CC over revenue and CM over revenue. If an establishment is found to be an outlier for one of these ratios, it is automatically considered an outlier for both investment variables, CC and CM, both calendarized and fiscal. In the case of the SA, the same procedure is carried out for the RC and RM variables as for the CC and CM variables.

Imputation

Records found to be outliers are not imputed since the consistency rules have already been applied and the investment reported by the respondent is deemed valid. These records are simply excluded from calculation of the average during imputation of non-respondents. Moreover, if some of the establishments found to be outliers form part of the take-some strata, they are moved up to the take-all strata with known revenues and the selection probability for residual units is recomputed.

For records to be imputed, three imputation methods are used to proceed with evaluation of the missing data. There is no partial imputation: the two variables of interest, CC and CM (RC and RM are added in the case of the SA) are available or missing for each establishment. The three methods therefore allow us to impute all of the variables in parallel. The first method is simply the substitution with the historical value. For the following surveys, we use the historical value as long as that value is available for the same reference year:

$Y_{its} = Y_{it(s-1)}$

where t is the reference year, s the current survey, s-1 the most recent preceding survey for which the data are reported and y is the variable of interest.

For the Survey on Intentions (SI), since it is the first survey for a given reference year and then, no historical data are available for the same year, we use historical information from the previous year:

$Y_{its} = Y_{i(t-1)(s-1)}$

Where t-1 is the previous reference year.

We should note that this last imputation is also used for the variables RC and RM since these variables are required only for the Survey on Actual Data, so no historical value is available for the same reference year.

In both cases, the imputation is done (whenever possible) before the calendarization process. Hence data imputed from a period that could be different from the calendar year are calendarized as well.

The second method is used when no historical value is available for a unit. In this case, we impute using the current ratio method:

Figure 7

$$y_{it} = \frac{\overline{y}_t}{\overline{x}_t} x_{it}$$

where x is revenue.

The third method is used for units without historical value and a revenue unknown. In this case, we use the imputation by the average of current values:

Figure 8

$$y_{it} = \overline{y}_t$$

An important factor when computing the imputed value is the level at which imputation is conducted. In fact, the imputation is conducted if the imputation group includes at least 10 establishments for which the questionnaire is complete and if these represent at least 25% of units in the group.

Imputation groups

The initial imputation group corresponds to the stratum used for sampling once it is updated with the new data gathered. If one of the preceding constraints (10 units, 25% of units) is not met, we move to a more aggregated imputation group within the same industrial group and in the same size group, but in which all provinces are combined. As in outlier detection, the possible sizes are take-all stratum with known income, take-all stratum with unknown income and take-some stratum.

If the constraints still are not met, the industries are grouped. For example, all NAICS-6s from a given NAICS-5 are combined. We remain at the Canada level and within the same size group. The most aggregated level we can reach corresponds to the groups for all NAICS-3s in a given sector, at the Canada level, for one size group where the last level of the take-all stratum with known and unknown revenues are regrouped. Two examples will provide a better understanding.

If an establishment in the Canadian mining industry 212114 in Ontario that is part of the take-some group is to be imputed, we obtain the following sequence:

212114 - Ontario - take-some stratum

212114 - Canada - take-some stratum

21211 - Canada - take-some stratum

2121 - Canada - take-some stratum

212 - Canada - take-some stratum

21 - Mining and Oil and Gas Extraction sector - Canada - take-some stratum

If an establishment in sector 55 (Management of Companies and Enterprises) in Quebec that is part of the take-all group with unknown revenues is to be imputed, we obtain the following sequence:

Sector 55-Quebec-take-all stratum (unknown revenues)

Sector 55-Canada-take-all stratum (unknown revenues)

Sector 55-Canada-take-all stratum (known and unknown revenues)

We should also point out that a record imputed at a disaggregated level can be used to compute the averages during imputation of another record at a more aggregated level. For example, if we manage to impute all records for Alberta at the first imputation level and must move to the next level for records from New Brunswick, these will be imputed at the Canadian level and the imputed Alberta records will be used in computing the averages at the Canadian level.

Once the missing values for establishments are imputed, we can move on to the estimation stage.

Estimation

The ratio estimator is used for estimation with revenue being the auxiliary variable. This method ensures that the final weight multiplied by the income for each unit in the sample matches the known total for the income variable for the entire population in the group. The groups used in this instance correspond to the lowest industry level published within a single size group at the

Canadian level. The difference from the original stratum is the grouping at the Canadian level. The following example provides a better understanding.

For an establishment for which the stratum corresponds to NAICS-3 323 of the Manufacturing sector in Nova Scotia for the take-some stratum, we use the estimation group

323 - Canada - take-some stratum

During the survey, an establishment may be reclassified into a new industry or province. This new classification is used to define the domain of publication and it is this classification that will determine where the investments will appear in the final table. The following example provides a better understanding.

If an establishment sampled in Quebec under NAICS-3 411 is found in Ontario under NAICS-3 444, it will have the following characteristics:

stratum: 411 - Quebec

group for computing outliers: 444 - Ontario

initial imputation group: 444 - Ontario

estimation group: 411 - Canada

domain of publication: 444 - Ontario

Figure 9

Here is the ratio estimator formula

$$\hat{Y}_d = \sum_h \sum_{i \in s_h} w_i y_i(d)$$

where for each unit i of a group g,

$$wi = Di \times Gi, Di = \frac{Nh}{nh}, G_i = \frac{\sum_{i \in R_g} x_i}{\sum_{i \in s_g} \frac{x_i}{\pi_i}} \quad \text{and} \quad y_i(d) = \begin{cases} y_i \text{ if } i \in d \\ 0 \text{ otherwise} \end{cases}$$

where:

x is the auxiliary variable (revenue),

h denotes the stratum,

g denotes the estimation group,

d denotes the domain of publication,

n denotes the sample size,

N denotes the population size,

s denotes the sample,

P denotes the population,

w denotes the final weight,

D denotes the sample weight,

G denotes the control weight ("G-weight"),

y is the variable of interest (investment) and

p denotes the selection probability.

Note that the G-weight calculation is done in such a way that the final weight *wi* cannot be lower than one. In doing that, we ensure that a respondent's value will be at least that value once it is weighted.

Estimation of variance and calculation of CV

Variance is estimated using Taylor's linearization formula in the case of ratio estimator. This is available in Estevao (1991). Using the same notation as before:

Figure 10

$$\hat{V}(\hat{Y}(d)) = \sum_{h} \frac{N_h - n_h}{n_n - 1} \frac{n_h}{N_h} \sum_{i \in s_h} (u_{hi} - \bar{u}_h)^2$$

Where $u_{hi} = \frac{N_h}{n_h} G_i \left(y_i(d) - x_i * \frac{\sum_{i \in s_g} y_i / p_i}{\sum_{i \in s_g} x_i / p_i} \right)$

and $\bar{u}_h = \sum_{i \in s_h} u_{hi} \Big/ n_h$

The coefficient of variation (CV) is computed using the ratio:

$$CV(\hat{Y}(d)) = \frac{\sqrt{\hat{V}(\hat{Y}(d))}}{\hat{Y}(d)}$$

Estimation adjustment for the non-surveyed portion

Administrative data is used when it is available, for the non-observed portion of the survey.

For the survey on actual data, administrative data from the three previous years is used for creating a model to derive capital expenditures.

For surveys on intentions and preliminary actual data, there is no administrative data covering the reference periods for these surveys. The non-surveyed portion is estimated using the surveyed trend between actual data, intentions and preliminary actual data, which is applied to the estimation of the non-observed portion that has been calculated for the survey on actual data.

On average, estimating the non-observed portion contributes 2% to the total estimation.

Quality indicator

When the estimates are published, a scale distinguishes between the various qualities of accuracy. It combines the effect of sampling (since we did not do a census) and the imputation rate (each imputation (other than historical imputation) adds to the uncertainty of the results). The scale is presented in text table 6.

Text table 6
Quality indicator interpretation

	Imputation rate			
CV	0.00 to 0.10	0.10 to 0.33	0.33 to 0.60	0.60 and more
0.00 to 0.05	A	B	C	F
0.05 to 0.10	B	C	D	F
0.10 to 0.15	C	D	E	F
0.15 to 0.25	D	E	F	F
0.25 to 0.50	E	F	F	F
0.50 and more	F	F	F	F

Note(s):
[A]Excellent;[B]Very Good;[C]Good;[D]Acceptable;[E]Use with caution; F Too unreliable to be published.

Due to some technical considerations, the quality indicator will not be implemented for the present publication.

Confidentiality

Some confidentiality rules obviously are used to suppress any information that might lead to disclosure of the data supplied by a respondent. These rules allow Statistics Canada to comply with its mandate of non-disclosure of information supplied by respondents. The rules themselves are confidential and are not available for consultation.

Sampling error and non-sampling error

The difference between an estimate based on sample data and the value obtained by surveying the entire population is called the sampling error. This difference varies with sample size, expenditure variability, sampling scheme, and estimation method. In general, the larger a sample, the smaller its sampling error. If the population is very heterogeneous, a larger sample size is required to produce a reliable estimate. The sampling error is measured by a quantity known as the standard deviation. The latter indicates the expected variability of the estimate that will be produced if the expenditures are sampled repeatedly. The actual value of the standard deviation is unknown, but it can be estimated from the sample.

Another measure of precision is the coefficient of variation (CV). The CV is simply the standard deviation expressed as a percentage of the estimate. Hence it is a relative measure of precision and can be used for comparisons across industries or provinces. The smaller the CV, the more reliable the estimate. (See "Data quality, concepts and methodology — Quality measures" section).

Another kind of error is non-sampling error. Although every effort is made to keep such errors to a minimum, they always exist. They are not taken into account in computing the CV, nor are they measured by the CV. Measures such as response rate, coverage rate and imputation rate can be used as indicators of the possible extent of non-sampling errors.