PAPER 8.3

STATISTICAL INFORMATION QUALITY, NEW TECHNOLOGIES & MARKET DEVELOPMENT IN THE ITALIAN SERVICE SECTOR: PROBLEMS AND PERSPECTIVES

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Abstract

The main goal of this paper is to stress the close relations existing between the development of automatic data capturing techniques and quality improvement in statistical surveys. Notwithstanding the field under observation is mainly the service sector, many considerations could be applied to the whole economy as well. After a brief description of the technical advantages deriving from the use of modern survey techniques, a deep analysis is given on the Italian retail and wholesale trade sector, with a particular attention to the actual statistical gaps. Then a brief discussion is presented on the use of modern relevation systems in ISTAT and the projects that the institute is actually carrying out in the field of electronic data interchange, under the EUROSTAT coordination. After a summary of definitions and aspects regarding quality, some proposals are raised in order to better specify methods to measure increase in quality when using a concept of *global quality* instead of subjective evaluations that often reveal to be, generally speaking, too linked to the specific field of interest of the survey.

1. Recent developments in the service sector in Italy and Europe

Measurement of the main structural and economic variables for the service sector is already complex, due to the high level of fragmentation in offer and pronounced demographic trends characterising the enterprises concerned. These aspects are common to both Italy and other European countries. However, it is above all a certain degree of vagueness existing in the definition of the sector itself that gives rise to fundamental problems: defining its boundaries and identifying its economic role with sufficient clarity.

Initially services were identified in a residual manner - that is, activities not classified within either the primary or secondary sectors. Later, a more positive definition was adopted that identified services as having certain common, specific characteristics: their intangible nature, contemporariness of production and consumption, proximity of producer and consumer. Instead, a truly innovative definition was adopted in the new SNA[1] (ESA in Europe), whereby service activity was characterised by a change in state of occurring in one economic unit, deriving from another economic unit. The fundamental consequence of this is that it overcomes the distinction between market and non-market services - this new classification considers the economic unit's characteristics without regard to legal form, ownership or management of the enterprise providing the service.

There are two main implications as a result of this development. On the one hand, there is an increasing need for more detailed statistical analyses covering the sector. On the other, the difficulty of improving investigation into "traditional" branches of the service sector and analysing the more innovatory ones starting afresh, above all if the survey techniques employed are based on low levels of automation.

Thanks to EUROSTAT, considerable progress has been made towards improving international harmonisation of classification definitions and also survey and processing

techniques for statistical data. Today, sufficiently detailed and comparable historical series for EU member countries are available, giving an overall idea of developments concerning the phenomenon. A specific example is provided by data shown in two tables below that are based on gross domestic product at market prices.

Table 1.1 illustrates that in 1992 Italy ranked fourth when considering total "Market services" as a percentage of GDP. The highest share was in Holland (55.6%), followed by Belgium (54.4%), Luxembourg (52.7%) and then Italy (51.2%). However, in the cases of both Italy and Belgium the considerable importance of market services is still dependent on largely traditional activities, such as the wholesale-retail trade and transport. In Holland it is communications and Luxembourg, banking, that account for the high incidence.

Holland also shows one of the highest variances in absolute terms during the 1985-1992 period. The share of the Dutch GDP relative to market services rose by 6.1 points, second only to the United Kingdom (6.8 points) which, however, still has a share of less than 50%. Third is France - a 4.4 point increase - and then Italy with 4.2 points. Certain other countries showed only modest growth, such as Portugal (+0.8 points) and Spain (+0.6 points) and Luxembourg even saw a decline, although it still maintained a high level and did, in fact, begin to recover from 1990.

"Other market services" - which in this case also includes real estate activities and enterprises providing data processing services - can be termed the more innovatory branch. The relative incidence on GDP for Italy in 1992 concerning the latter branch represented 20.8% of the total compared to 17.2% in 1985. This share is only slightly less than the mean for Europe as a whole, namely 22.3%[2]. Only three other countries show a higher share: Holland with 28.3%, Germany (1991 data) with 24.5% and France, 24.1%. Belgium (21.3%) and Denmark (21.0%) have levels similar to that of Italy. Portugal is ranked last with a share for "Other market services" of only 8.2%, even though the entire market service sector accounts for 42.8% which is more than Ireland, 38.6%. It should also be noted that while "Producer services" in Ireland only accounted for 15.9% (1991 data), this is still higher than the United Kingdom with 12.8% and is at a similar level to other countries where the share is less than 20%, such as Luxembourg (14.9%) and Spain (15.0%).

Table 1.2 gives a breakdown of market services classified according to eight standard types. Data presented in this table is based on uniform classification criteria for services as opposed to the largely heterogeneous approaches followed by the various National Statistical Institutes. A fundamental consideration can be made when observing the table: during the period 1985-1992, growth in "Other market services" was the highest among all market service types examined (the series available ended in 1991 for Germany, Ireland, Luxembourg and Portugal, and in 1990 for Spain).

In fact, the relative weight of this branch with respect to total market services rose from the already high level of 39.3% in 1985 to 42.0% in 1992. Given the numerical importance and growth trend of this branch, efforts must be made to classify the wide variety of

services it comprises into meaningful categories. An initial breakdown that at least indicates "Business services" as opposed to "Household services" might be an adequate starting point.

When considering other branches, only "Lodging and catering" and "Auxiliary transport services" show slight relative increases, rising respectively from 5.2% to 5.4% and from 2.3% to 2.4%. "Communication services" remains steady at 4.2% while other branches show a decline which was more pronounced in the case of "Recovery - repair - trade services" with a reduction from 28.5% to 26.2%. In essence, there is a move from more "traditional" market services - retail-wholesale trade, transport, banking and insurance - toward activities which are generally more innovatory such as communications and business services (today presumably a significant but non-visible element within "Other market services"). Clearly this does not imply that innovation has not taken place in traditional services. In fact, the very expansion of external activities which are auxiliary to them facilitates their growth and competitiveness.

Growth in Italy was close to the mid-range for countries considered, increasing from 36.7% to 40.7%. A factor contributing to this trend was that the relative weight of retail-wholesale trade and catering, although in decline, still accounted for a higher than average proportion of service activity. France, the highest result and with a growth from 41.7% to 47.8%, can be used for comparison purposes to indicate the degree to which Italy lags behind in this area.

In the face of this empirical evidence, the degree of coverage offered by current statistical information on services has not, in part, kept pace with developments. Table 1.3 shows the degree of coverage for economic indicators only which, however, are the main short-medium term reference. Coverage refers to branches and the entire sector with regard to production of economic statistics (monthly or quarterly) on services by ISTAT and other public or private sources.

Overall the coverage reaches a mere 28% considering only monthly indicators and is just under 43% when also quarterly indicators are included. However, although there is the above-mentioned growing incidence on GDP for "Other market services", the monthly coverage is less than 4%. Only "Maritime and air transport services" have a 100% coverage for the branch.

On the whole there are shortcomings in Italy with reference to information concerning number of hours worked, investments and demographic distribution of enterprises. With regard to sectoral indicators, none are available for economic data regarding construction, revenues produced by lodging facilities, the entire road transport area (goods and passengers), most financial services and all other types of service, with the exception of real estate agents, legal services and leasing[4].

Table 1.1 - Percentage share of gross domestic product at market prices in European Union countries

COUNTRY	1985	1990	1992
BELGIUM			
Manufacturing industries	22.9	22.4	20.3
Market services	49.4	52.6	54.4
DENMARK			
Manufacturing industries	19.5	18.3	18.8
Market services	44.6	46.4	47.1
GERMANY (1)			
Manufacturing industries	29.8	29.7	27.8
Market services	44.1	46.1	48.0
SPAIN (1)			
Manufacturing industries	23.8	20.2	18.7
Market services	46.5	48.1	47.1
FRANCE			
Manufacturing industries	21.6	21.0	20.0
Market services	46.1	50.0	50.5
IRELAND (1)			
Manufacturing industries	27.3	29.5	29.4
Market services	35.0	40.3	38.6
ITALY			
Manufacturing industries	24.5	22.7	20.4
Market services	47.0	49.0	51.2
LUXEMBOURG			
Manufacturing industries	26.3	25.4	22.1
Market services	53.3	50.4	52.7
HOLLAND			
Manufacturing industries	17.4	18.8	17.7
Market services	49.5	54.2	55.6
PORTUGAL			
Manufacturing industries	27.9	27.0	26.5
Market services	43.0	43.5	43.8
UNITED KINGDOM			
Manufacturing industries	24.0	22.3	21.8
Market services	42.7	48.5	49.5
EUR 11 (2)			

Manufacturing industries	24.6	23.6	22.3
Market services	45.2	48.4	49.6

ITALY 1995: Industry 21.0 - Market services 52.2 (3)

Source: processing of EUROSTAT-4-5 data.
(1) 1990 was estimated for Germany, Ireland and Spain.
(2) Greece was excluded because of non-availability of data - 1992 data are partially estimated.
(3) Source: national accounts.

There is clearly a need to institute new surveys in order to investigate economic branches where coverage is either poor or non-existent. Efforts must also be intensified to reduce the time required for diffusion of data. This paper will attempt to show that this can only be achieved by greater recourse to modern techniques when conducting surveys and transmitting information between enterprises and statistical institutes.

Table 1.2 - Percentage share of gross domestic product at market prices of market services in certain European Union countries

COUNTRIES	FRANCE			ITALY				EUR 9 (1)		
Branches/Years	**1985**	**1990**	**1992**	**1985**	**1990**	**1992**	**1995**	**1985**	**1990**	**1992**
1 Recovery-repair-trade services	28.2	26.1	25.5	34.6	31.9	30.2	29.6	28.5	26.8	26.2
2 Lodging and catering	5.3	5.7	5.9	6.6	6.3	6.0	6.1	5.2	5.5	5.4
3 Inland transport services	5.0	4.4	4.5	5.0	5.6	5.5	6.0	4.8	4.6	4.7
4 Maritime and air transport services	1.1	0.8	0.7	1.1	1.1	1.0	1.2	1.3	1.1	1.1
5 Auxiliary transport services	2.7	2.4	2.7	2.4	2.4	2.3	2.2	2.3	2.4	2.4
6 Communication services	5.2	4.2	4.5	3.0	2.8	3.1	3.6	4.2	4.1	4.2
7 Services of credit and insurance	10.9	10.6	8.5	10.5	10.4	11.2	11.7	14.3	14.3	14.1
8 Other market services	41.7	45.8	47.8	36.7	39.5	40.7	39.7	39.3	41.2	42.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: processing of EUROSTAT-4 data. Italy 1995: national accounts.
(1) Greece, Ireland and Luxembourg are excluded from the calculations.

Table 1.3 - Present coverage by short-term indicators from ISTAT and other sources relative to the market services sector

	Monthly indicators		Quarterly indicators	
Branch	**Branch coverage**	**Sector coverage**	**Branch coverage**	**Sector coverage**
1 Recovery-repair-trade services	51.60	14.40		
2 Lodging and catering	44.72	2.81		
3 Inland transport services	76.72	6.33		

4 Maritime and air transport services	100.00	1.08		
5 Auxiliary transport services	22.50	0.53		
6 Communication services	74.66	2.38	53.70	1.71
7 Services of credit and insurance			79.95	7.39
8 Other market services	3.62	0.42	69.23	2.65
Total		27.95		17.05
Total indicators: monthly + quarterly				42.62

Source: D'Alessandro-Pisani (1996).

The aim of section 2 is to highlight the main methodological advantages obtained by applying modern survey techniques. Section 3 discusses certain aspects concerning interconnections between market development and the computerisation of procedures in enterprises, particularly with regard to the wholesale-retail trade. Major fields of interest where modern survey techniques have been introduced by ISTAT are described in section 4, including projects in which the Services Unit is currently involved. Finally, in section 5, the implications regarding both the quality and organisation of statistical activities will be examined.

2. Advantages of using modern survey techniques

Currently, the survey structures within ISTAT do not yet utilise highly computerised data-capturing techniques to any significant degree. While processing and listing of results are almost entirely automated, this is not the case during the contact stage with the unit providing the required input data. Focusing on the latter aspect, a simple model can be established to analyse possible errors arising during the data-capturing stage. The model is the following:

$$\mathbf{Z = Hs + u}$$

where **Z** is the vector of the n values observed, **s** is the value of the n *true* values, **H** is an nxn matrix whereby $\sum_{j=1}^{n} h_{ij} = 1$ and $h_{ij} \geq 0, h_{ij} \in \mathrm{H}$, while **u** is a vector of errors.

Using the previous correlation it can be stated that:

$$(Z_i S_i) = (h_{ii} 1) S_i + \sum_{i \neq j}^{n} h_{ij} S_j + u_i$$

namely:

(TOTAL ERROR) = (INTRINSIC ERROR) + (MEASUREMENT ERROR)

where the total error is broken down into an intrinsic error, characteristic of the survey technique used, and a measurement error falling within the term u_i.

In the case of censuses and administrative data, **H = I** inasmuch as the values will be captured correctly and assigned and there is no intrinsic error inherent in the data-capturing techniques used. Furthermore, for **u** it can reasonably be assumed that $u \approx N(m,D)$ where **u** is the vector of the means and $D = [\, d_{ij} \,]$ the diagonal matrix that incorporates the possibility of heteroschedastic errors, for example, proportional to the *size* of the reference unit. The size of measurement error can be significant, as a result of the voluntary omission of responses due to non-availability or refusal, errors in the responses, computer transcription or input errors regarding the data, etc.

Again in the case of sample surveys **H = I,** however, $u \approx N(m,V)$ where **u** is the systematic error and **V** slightly non-diagonal owing to assignment errors at the boundaries. In fact, when the single units are not classified correctly in the areas, this produces spatial correlation.

In the case of computerised data-capturing, again **H = I**, however, $u \approx N(m,V)$. While the intrinsic error may possibly still persist, the measurement error should, in general, be zero as the transition stages between capturing the data and their transcription, input and statistical treatment are reduced to the minimum. For instance, in the case of telesurveying the intrinsic error is in practice a position error due to relative uncertainty regarding which pixel a certain observation of the earth's surface must refer to. This will depend both on limits imposed by the measuring instruments (due to refraction effect) and to the continuity properties of the *true* surface.

In reality, the reduction in measurement error could be such that it would immediately make sense to adopt highly computerised data-capturing techniques as opposed to traditional ones. An example of the improvement in efficiency for estimates is provided by the use of surface area sampling techniques, different from traditional ones and based on telesurveying. In 1990 an experiment was carried out with reference to 1981 census data concerning 649 census sections in the Commune of Bologna. Digitised boundaries were established based on a software package provided by ESRI- Italia Telespazio. It was assumed that the variable "rate of economic activity" was to be measured. The experiment consisted in the extraction of a certain number of area samples using two different techniques: telesurveying and simple random extraction. Estimates of the distribution obtained using the two methods were compared in terms of relative mean quadratic error. On average the improvement in efficiency for estimates was 15% in favour of the technique based on telesurveying. Also an estimator of the activity rate was adopted that took into account the spatial self-correlation between contiguous territorial units. In other words, if telesurveying techniques can be used to generate random samples which, however, avoid - or at least make it unlikely - that contiguous territorial units are extracted, this would improve the accuracy of estimates. Also this result would be achieved using a lesser number of sampling units than would normally be planned for a conventional sampling plan.

It should be mentioned, however, that certain studies carried out in the past by ISTAT re

the feasibility of area samples formed on the basis of census sections came to a negative conclusion. As with all innovatory techniques, it is possible that such tests are part of the normal learning curve to be expected when new technology is initially applied.

A second aspect suggesting the preference of modern techniques concerns the time required for capturing and statistical processing of data. For instance, a short-term economic survey carried out by ISTAT requires between 45 to 90 days from capturing the micro-data up to publishing meta-data. Almost 50% of the intervening time period is taken up by data capturing, preliminary checking, third-party data input, analysis of returns and second revision, listing and transfer of the meta-data to departments responsible for their publication. It is clear that an increase in efficiency resulting from automation of at least some of these steps would affect the real, practical utility of certain statistics. Otherwise such statistics risk only being useful for after-the-fact, technical evaluation.

A third aspect concerns the cost to produce statistics. A small-scale postal survey involving the monthly interviewing of 2,000 enterprises located throughout the country requires at least 5 people. A conservative estimate of the monthly cost per person is 3 million lire or a total annual personnel cost of 180 million. To this, at least another 20 million must be added to cover miscellaneous expenses (mailing, telephone contact, printing of forms) - a total annual survey cost of 200 million. If the sample considered remains constant over time, it would appear reasonable to assume that, apart from initial costs required for updating software and hardware in enterprises and the institute, the costs for data capturing would be considerably less than those indicated above. Furthermore, conventional methods do not always ensure that the information received is correct.

Other aspects must be investigated. For instance, the measurability of improvements as a result of using highly computerised data-capturing techniques. Also whether such techniques can, in fact, be applied to all types of survey. An example of a widely used data-capturing technique that involves neither mailing nor face-to-face interviews is the CATI (Computer Assisted Telephone Interviewing) method. In this case the interviewer operates under the guidance of a computer, a method which offers many advantages. Efficient management of the interview, the possibility to self-correct errors, immediate data input and storage. Such systems have been widely used for a number of years, particularly by private-sector research companies. The limitation of telephone surveys is the degree of sample coverage they afford: structural differences exist between households with telephones - certainly in the majority - and those without. And also enterprises willing to respond in the case of a telephone interview, above all in the service sector, can represent a sub-universe that is qualitatively on a higher level than those that are not willing.

However, capturing data using the telephone gives rise to a number of problems. What is the effective response rate by comparison to mailing or direct contact methods? What effort will be required to furnish exhaustive instructions and training as to the correct use of the proposed instrument. Will the new method introduce more bias into the survey when compared to conventional methods? The latter could certainly take more time but may also lead to more complete, less biased results.

The following table 2.1 offers an overview of the degree to which certain service enterprises have developed the use of innovative technologies and computer equipment, based on the results of the last census.

Table 2.1 - Technology and computer hardware in certain service sectors % of enterprises equipped 1991 (*)

SECTORS	Motor vehicle trade	Wholesale trade	Retail trade	Hotels and restaurants	Total
Type of technology					
CAD - Computer Aided Design	1.3	4.0	1.5	0.6	2.0
Telematic link between production phases-sales	4.1	6.4	4.5	0.7	4.3
Automated booking systems	2.5	1.7	1.7	3.2	2.1
Automated client presence systems	2.2	3.0	2.7	3.5	2.9
Automated management systems	24.1	35.4	13.7	6.9	20.0
Electronic mail	1.8	2.8	1.7	0.3	1.8
Access systems to data banks	0.6	1.1	0.7	0.4	0.7
MEAN	**5.2**	**7.8**	**3.8**	**2.2**	**4.8**
Computer hardware					
Mainframe computers	0.1	0.3	0.1	0.0	0.1
Minicomputers	3.3	6.0	2.0	0.7	3.1
Personal computers	49.1	67.9	40.0	17.2	44.9
Terminals	4.0	8.0	2.7	3.9	4.6
Optical readers	1.1	3.8	12.1	1.0	6.2
MEAN	**11.5**	**17.2**	**11.4**	**4.6**	**11.8**

Source: 7th General Census of Industry and Services.
(*) Data refer to enterprises with at least 6 employees.

It is evident that to date Italian enterprises do not make wide use of innovative technologies - they still tend to use the more conventional applications. In 1991 less than 5% of medium-large enterprises (with at least 6 employees) in the services sector used innovative technologies, even though they accounted for more than a third of the gross domestic product. Only the wholesale trade seems quick to introduce innovation while hotels and restaurants still lag behind in this area. Distribution of computer-related equipment exhibits a similar trend, even though average use runs at higher levels. It is important to note in this regard that only 12.1% of all retail outlets were equipped with optical readers.

Little is known about the use of computer systems in marketing. In this field their use is particularly important in order to perceive and satisfy new service consumer needs as they arise. Furthermore, the introduction of innovation creates more opportunities for interconnections between networks of enterprises and among forms of association, facilitating the management of common services. With reference to the trade category, it should be noted that the only law enacted specifically to encourage the introduction and diffusion of innovative technology in distribution - Law No. 121, 1987 - ceased to be operative from October 25 1991. This date became the deadline for presentation of

requests as the relative funds established for this purpose were running out.

3. Effects of computerisation in surveys on enterprises: the domestic trade case.

In these times of rapid development in management innovation due to computerisation, the fact that Italy's wholesale-retail trade system lags behind is mainly the result of well-known territorial and unit-size fragmentation in the distribution system. This is particularly true with regard to the retail trade. As can be seen in table 3.1 a further considerable reduction is expected in the number of retail outlets when compared to 1993 levels. However, Italy will still be marked by a particularly vast universe of retail outlets. Mean numbers outlets per inhabitant and the area dedicated to large-scale concerns are respectively greater and less than the European Union mean. Outlets in the food distribution field should continue to represent almost one third of the total retail outlets, in line with a development model that foresees the coexistence of large-scale, organised distribution and small "convenience" shops. This will inevitably cause delays in the modernisation of the sector.

Table 3.1 - Structural developments in the retail trade in Italy (No. of sales outlets)

Type of outlet	1983	1988	1993	1996 (estimate)
Food outlets	341,100	315,800	287,900	266,300
Non-food outlets	512,700	546,600	572,600	552,000
Total outlets	853,800	862,400	860,000	818,800

Source: Ministry of Industry, Trade and Crafts and NIELSEN.

Up until a few years ago almost all efforts to innovate concentrated on improving service product characteristics. Such innovation cannot be patented and, therefore, cannot be introduced with the same efficiency by the effect of simple territorial imitation whereby the less follow the more developed areas of the market. Also this form of innovation is induced by changes in consumer tastes and buying power, aspects that are less easy to plan and tend to be largely conditioned by external forces. Strong progress in the area of process innovation is a more recent trend; this is an area that is easier to plan and which is directly connected with the diffusion of valid computerised management tools. To give an example, according to IFOR in 1991 the incidence of computerisation expenditure on revenues for Italian distribution was 0.64%: the comparable level is 0.89% in the United Kingdom and 1% in France. On the other hand, trends in computer-related investment are greater in distribution (+23.3% in 1990 with respect to 1989) when compared to the mean for all other sectors (+10.6%).

More recent sources (see table 3.2) - related, however, more specifically to technological innovation - indicated that there was an estimated 0.53% mean European expenditure in relation to revenue during 1994 with reference to large-scale distribution. It can be noted that the field of variance was rather wide and mean expenditure per employee was little more than 2 million lire.

Table 3.2 - Presence of information technology in trade - Europe and Italy in 1994

Country	EUROPE - FOOD		ITALY - FOOD			ITALY - NON-FOOD				
Variables	**Mean**	**R.v.**	**G.D.**	**D.O.**	**Indep.**	**1**	**2**	**3**	**4**	**5**
Expenditure for technological innovation (IT) as a % of revenue	0.53	0.33-0.66	0.12	0.71	0.31	1.14	3.50	0.22	0.80	0.49
Incidence of telecommunications (TLC) on total IT expenditure	n.a.	n.a.	n.a.	25.5	0.61	20.80	n.a.	20.00	20.41	9.00
Mean expenditure for IT per employee (expressed in millions of lire)	2.08	0.92-5.55	2.69	3.97	0.60	3.10	n.a.	0.50	2.90	3.90

Source: Lugli (1994).
Key to non-food sectors: 1=Perfumery; 2=Pharmacy; 3=Textiles-Clothing; 4=Electrical appliances-furniture; 5=Motor vehicles.

R.v. = Range or Variation - G.D. = Large-scale Distribution - D.O. = Organised Distribution.

The corresponding Italian situation is very heterogeneous, with a variance that is sensitive to both the form of distribution and type of service involved. The mean share of technological innovation expense with respect to revenue for organised distribution (0.71%) is higher than the European mean. On the contrary, both independent (0.31%) and large-scale distribution (0.12%) remain at rather modest levels. A positive note is that both organised and large-scale distribution have levels of expenditure per employee that are higher than the European mean. In the non-food segment, perfumeries and pharmacies stand out from other activities with a share of expenditure with respect to revenue of 1.14% and 3.50% respectively.

Computer-based technology, particularly the newer forms based on the diffusion of sophisticated telecommunications systems, is becoming a fundamental tool in support of transformation underway in the distribution sector.

New computer-based technologies can allow enterprises to effect organisation cost reductions. They improve management performance; they lead more rapidly and effectively to a system for making strategic decisions (pricing, product and brand policy). All of this generally means greater productivity per sales area unit without affecting the quality of products sold. From this point of view it is a different type of innovation when compared to that introduced with the advent of supermarkets. In the latter case there was a preliminary selection of products to be sold based on economies of scale due to the size of purchasing power - this can, at least in part, affect quality standards.

Clearly there are increases in mean productivity per employee as economies are achieved in

the use of personnel time. This is reduced and in certain cases reaches zero. An example is the use of optical reading scanners at checkout counters in organised retail outlets. These eliminate the need to price up products; they reduce the time required for recording and physical counting, evening closing operations and decrease inventory differences due to manual errors and possible substitution of price tags by customers. Effects on mean hourly productivity, estimated based on the use of POS scanners in several European countries, indicate a reduction of 10% in the time required to perform the functions involved. Certain of these aspects will be examined later in depth and links established with regard to interchanges of statistical data.

Cost economies achieved by time reduction potentially influence price competitiveness. However, it would also be necessary to carry out an after-the-fact evaluation, at the end of the innovation cycle, also to take into account any new additional costs that might have arisen. For instance, it may have been necessary to resort to specialised, internal personnel for technical-computer management in the larger distribution structures. On this issue, one of the first aspects to be investigated should aim to define management limits beyond which the development of sophisticated, computer-based systems within sales outlets would necessitate high costs for professional assistance. This could be provided by either external specialists or internal personnel dedicated to this activity (in this case it would seem correct to speak of *trade sector system specialists*). Currently in Italy, NIELSEN bases the majority of its price surveys on the use of scanners which allow mean weekly weighted prices to be calculated together with daily quantities sold.

A second aspect consequent to the above regards composition of the employment factor, namely, the possible decrease in employment per sales outlet and/or the change in composition of professional categories operating within enterprises. An increase for permanently-employed specialists in the retail or wholesale trade could lead to a downturn in the number of the self-employed. The current proportion for the latter category in Italy is very high when compared to the mean in European Union countries. Furthermore, an increase in productivity would only be possible under the hypothesis that the downturn in number of employees did not also lead to a more than proportional increase in mean labour cost. In any event the effects must be highlighted with regard to the quality of employment in trade induced, on the one hand, by greater inter-functional integration and, on the other, by increasing *entrepreneurship* in peripheral units (franchised sales outlets are a case in point).

A third aspect that should be examined is the possibility to measure effects on both the efficiency of enterprises and the quality of service offered to clients, as a result of computer-based technology in distribution activities. In a very rough, approximate manner these effects can be evaluated with reference to demand for hardware and software by enterprises. Even though a logic assigning a proportional effect based on expenditure sustained for such items would appear to be an oversimplification. In reality, the simple adoption of computer-based technology alone does not lead to the desired results. It is also necessary to develop organisation structures and procedures that integrate the information obtained into decision processes.

In other words, achieving economies as a result of computer-based information may not constitute a stable competitive advantage as, in the first stage, it would bring about effects that all enterprises could rapidly achieve simply by purchasing technology. In the second stage induced effects will emerge (and should be measured), obtainable only by those enterprises that manage to exploit the information potential of the new technology. For instance, the recording of sales by reference can simply be viewed as being a closed activity. But it can instead become an integral part of the information used in the decision process: levels of efficiency can be achieved that give the enterprise a stable competitive advantage. Such results could be obtained by:

- development of electronic display promotion within retail outlets;
- monitoring the effectiveness of marketing actions;
- development of electronic money - smart cards and similar techniques;
- computerised management of display space;
- automatic control of product rotation.

Independent of the quality and specific, unique characteristics of each enterprise, computerisation of certain management functions would mean a real-time monitoring of qualitative and quantitative trends in demand as expressed by customers. The demand mix can be appropriately evaluated according to price, quantity and brand of the single reference over time and space (in more than one sales outlet) - also in association with other types of demand towards which the sales target can be directed.

Furthermore, among the advanced telecommunications services that could be of interest to trade distribution, given their relative novelty value, are video catalogues, telematic sales, electronic supermarkets and kiosks.

Up to this point mention has been made of the need for process innovation that is internal to the management structure of a trading enterprise. However, external motivation for innovation exists and could be a determining factor. Motivation, that is, induced by the frequent territorial input-output ramification of trading enterprises. The existence of many sales outlets throughout the territory requires high levels of information interchange. Similarly, trading enterprises maintain relations with many industrial enterprises which again means interchange of information of varying nature. Growth in the number of points to be linked gives rise to the need for the creation of an information network. Of particular interest are networks between enterprises, linked to a central broker providing information. Availability of specialised telecommunications services means that economies of scale can be achieved. There is no need to define transmission standards and the number of communication links can be reduced exponentially since each enterprise only contacts the clearing centre. The information broker service is not just an electronic postman. It is, in fact, a provider of value-added services inasmuch as it contributes to creating:

- storage of information in order to respond to various requirements regarding transmission and reception hours;

- transmission of non-standardised information - structured (invoices) or otherwise (price lists);
- use of transmission protocols that in the case of error allow for recovery of the transmission from the point of interruption;
- introduction of procedures that guarantee receipt of messages;
- guarantee of privacy for specified information;
- processing of statistics and electronic data processing.

Analyses available highlight that Italy lags behind other major countries in Western Europe in terms of the incidence of expenditure for such value-added information services with respect to total expenditure for telecommunications.
As can be clearly seen in table 3.3, the penetration of information technology in the Italian trade sector is at the moment limited to the use of personal computers and switched lines. There is only minimal use made of the ITAPAC or other networks and dedicated lines, even though a significant increase is forecast for these by 1998.

Table 3.3 - Presence of information technology in trade - Italy 1994

Variables	SALES		PRICES		ORDERS	
Technology	**1994**	**1998**	**1994**	**1998**	**1994**	**1998**
Floppy disk	21	0	29	0	0	0
Switched line	53	50	43	63	85	79
Floppy disk and switched line	2	14	24	6	15	7
ITAPAC	0	21	0	19	0	7
Direct circuits	5	7	5	6	0	0
Other	0	7	0	6	0	7

Source: Lugli (1994).
Data only refer to large-scale distribution and are expressed as a % of total respondents.
More than one reply for each respondent was possible. 1998 data are estimated.

In effect, factors exist that affect telecommunications demand both in the wholesale and retail trade. Both are affected negatively by a lack of know-how and the relatively low importance of large logistical systems in the trade sector. Above all, in the food segment link ups with outlets is often limited to the matter of daily reorders, sales data or price changes and promotional offers.

The territorial diffusion and size of retail outlets does not facilitate the adoption of country-wide data transmission networks. Leaving aside large-scale distribution, both organised distribution and cooperatives are of a regional size and are very often characterised by having their headquarters and central warehouse in the same location. In the field of franchising, the small size of outlets do not justify information interchanges of more than a daily or weekly contact over switched lines.

The following are some of the factors affecting telecommunications demand in the wholesale trade:

- insufficient knowledge of telematics;
- uncertainty in the area of cost-benefit analysis;
- insignificant use of existing computer equipment for marketing-related applications and other management areas;
- reduced size of the enterprise, often operating on a local level and based around a single warehouse;
- low level of forms of association for the category and, where they exist, a low presence of adequate technical infrastructure;
- regarding relations with suppliers, frequent non-compatibility between systems and transmission modes;
- regarding relations with sales outlets, the low degree of integration between wholesalers and a heterogeneous group of retail customers;
- regarding relations with the network of agents, low number of agents and the reduced range of action for single enterprises.

Recovery in the future in the above area would necessarily mean an increase in the concentration of enterprises, centralised decision making, increase in suppliers' investments for logistical systems linking sales outlets directly to the warehouse. Therefore, developments in telematics contribute to shifting competitiveness in industry and distribution to the fringe of the enterprise; namely in relations with customers and suppliers. Enterprises can be stimulated to seek greater efficiency also as a result of contacts outside of their organisation, by accepting new forms of cooperation.

Within this general, highly volatile framework, the process of integration between the distribution sector and that of banking should be underlined. The factor linking them are forms of electronic money - shopping cards that is seen as being complementary to the conventional credit card. The latter is a pure financial tool, the issue of which is preceded by a screening of the requester. Shopping cards are also seen as offering marketing leverage and are simply distributed to those requesting them after they furnish their personal details. The clear difference between these two forms does not mean that they cannot coexist, owing to at least two features they have in common. Both are an incentive to customers inasmuch as they facilitate spending: the technique for using them is the same given the fact that terminals installed in outlets can read both types of card. With the use of electronic money and tools like POS scanners the distributor would know what to sell and to whom - as a consequence it would be possible to carry policies of targeted marketing.

Expressed briefly, development of links between distribution, on the one hand, and telecommunications plus sophisticated computer-based tools, on the other, should almost certainly produce productivity improvements in the trade sector. This, because the lack of advanced technologies is at the heart of low capital and labour substitution and, therefore, is the cause of rigidity at lower levels of per capita productivity. Furthermore, the influence of barriers preventing access to advanced technology present in the trade sector need to be studied. In the early stages the impact of technology should bring about an acceleration in the process of concentration, therefore, increasing the effect of such barriers. This effect

would continue to increase unless costs for introduction of technological innovations and the relative technical know-how were to decrease to a point that they became affordable to the majority of operators. A second and more dangerous effect could be a progressive reduction in the trend towards improved efficiency. This, because the elimination of potential competitors and assurance of a minimum guaranteed market share could undermine the incentive for future innovation and generate a productivity reduction over the long term.

Lastly, the developments in telecommunications directly influences the quality and completeness of information regarding the number of retail and wholesale outlets. The objectives of SIREDI (Information system on the Italian distribution network) are, in fact, the creation and updating of two files known respectively as the basic file and the flow file. With the help of chambers of commerce, communes and regions, a basic file has been created that keeps an account of the number of authorisations issued to operate retail-wholesale outlets and also catering establishments. The flow file contains data covering the starting and closing down of enterprises and is used to update the basic file. The lack of computer facilities in certain peripheral structures involved in the project is an obstacle to the completeness of data capture. Also no data are captured on employment, in spite of efforts made in this regard.

3.1 Bar-codes and statistical surveys on prices and sales

The bar-code was invented in the '70s. However, there is not just one type: the most widely used is the EAN (European Article Numbering) which is used in 72 countries. In Italy, approximately 17,500 enterprises code their products; this represents only 0.53% of total Italian producer enterprises, a percentage which is lower than the EU mean. The code comprises 13 digits: each one of these corresponds to a combination of light or heavy-printed bars of varying dimensions. This special alphabet can be read using a scanner. Starting from the left the first two digits indicate the producer's country[5]. The following five digits indicate the producer while the next five identify the product. The final digit on the right is a check digit that is obtained using an algorithm based on the preceding digits. Prices are stored in the sales outlet computer: when a product is identified the price is printed on the sales receipt. Using this system a single producer can code up to one hundred thousand products.

A different coding system is used for certain types of product. For instance, the first three digits for newspapers and magazines indicate the type of publication (daily, weekly, book, etc.), the next seven indicate the name of the publication, the following two are used to indicate special products (for example supplements), the last is again a check digit. There can also be other digits that represent the publication's progressive number and year of issue. A special eight-digit code is used for products where packaging is small (for example, certain cosmetics) or for mineral waters. Furthermore, certain enterprises use the American UPC coding system which is based on 12 digits.

The body responsible for assigning codes in Italy (as far as the identity of the producer is

concerned) is INDICOD.

The introduction of scanning technology generally passes through three phases as indicated below. The rapidity and flexibility in progress is directly correlated with the speed of and qualitative improvement in data interchange systems.

The *initial phase* is marked by:
a) no interest on the part of company management; b) scanners used to increase productivity in checkout operations; c) disorganised in-store procedures (pricing up and scanning - manual price input instead of by scanner/bar-code; d) no analysis of sell-out data.
The *development phase* is marked by:
a) data capture and analysis performed discontinuously; b) data scanners initially used in short-term operating activities (shelf space management); c) growing attention placed on in-store procedural discipline; interest in marking packaging.
The *mature phase* marked by:
a) sell-out data utilised also in planning activities (effectiveness of promotional offers); b) use during basic and routine operating activities (permanent inventory, product requesting); c) integration of scanner data with data from other sources (fidelity card, demographic details, etc.).

The future of bar-codes is intimately linked with that of telematics. With the development of EDI (Electronic Data Interchange) systems it will be possible for even a small branch outlet of a large-scale distribution chain to be in real-time communication with supplier warehouses to reorder certain products, saving a great deal of time. Furthermore, experiments are underway for systems that associate customer personal details with the sales receipt (this is already possible where payment is made by credit cards or bank cash cards) so that sales can be analysed using the bar-codes and as a result customers can be reminded to repurchase products that they have not bought for a certain time. The implication of these developments would lead to possible improvements in current household consumption surveys.

In 1996 ISTAT established a number of contacts with large-scale, organised distribution, an initial step towards the objective of automating at least part of current surveys on prices and retail sales. The former survey is to date coordinated by ISTAT but in practice managed by chambers of commerce and covers about two hundred thousand basic prices per month. The survey is carried out by survey personnel and results are transmitted using a partly conventional transmission system (floppy disc, less frequently on paper). The second survey is based entirely on conventional methods using the postal service. In reality, there is already a proposal to improve the consumer price survey which will involve partially automated data capturing, however, not based on bar-codes. The system can be termed "an updated conventional system" inasmuch as the network of survey personnel in the various communes will have a portable, fast data-capturing instrument[6]. In this field attention is focused on the "modern" system, that is possible innovations regarding data

transmission systems from large-scale organised distribution. Modernisation of transmission system would, among other aspects, allow for greater integration and comparability between the two surveys. The final objective, to be achieved over the next few years, is the automated data capturing of both the value of retail sales and the relative mean prices from *the same sample of retail outlets* - a circumstance that only rarely occurs at the present time. This new approach will be largely based on large-scale organised distribution: about ten large distribution groups which account

for around 70% of total revenues for large-scale distribution total. Currently the following problems exist.

- There is no overall authority charged with assigning EAN codes identifying a certain product that follows unified logical criteria. This means, for example, that the same code used by two enterprises can identify different products. In theory each enterprise can establish its own internal coding system for products, leading to different codes for having the same essential characteristics depending on the source. Therefore, if ISTAT were to introduce transmission of data concerning prices or sales values according to EAN code, one of two solutions would have to be agreed. Solution number one is that enterprises would have to agree to all adopt the same uniform coding system that would be supplied to them by ISTAT itself. This hypothesis is impractical because of the excessive costs that it would involve for the enterprises concerned. Solution number two would be to re-code data received from enterprises. This, however, would cause a slowdown in making information available that, particularly with regard to prices and would represent not just a statistical problem but, even more so, a strategic and political one. Furthermore, the effort required by ISTAT would be extremely onerous since about six thousand new EAN codes are introduced each month with the consequent need for a continual updating of the code converter programme. Further "interpretation" and management problems would arise when creating new codes: they are created not only the result of qualitative changes in the product but also refer to changes in quantity, type of packaging, combination with some form of give-away, introduction of a flash highlighting the price and/or content. In essence, changing the EAN code does not automatically indicate a new reference, namely a new product that completes or integrates the range.
- Secondly, the logic currently followed by enterprises when assigning bar-codes is very client-oriented. As a result, these codes would not only be heterogeneous by virtue of the various types of enterprise involved but could also be troublesome to link to national statistical classifications (ATECO '91) and the international ones (NACE Rev.1 and CPA). This, because these classifications were devised primarily based on the type of sales service offered as opposed to the physical and intrinsic characteristics of the goods sold (for example, the distinction between "hard" and "soft" packaged products).
- While the two preceding problems refer to both surveys, there are at least two further issues that are directly related to the price survey only. First, the frequent lack of separate codes for products offered in other than standard formats - cases such as 3x2

or 4x2 promotional offers. An opposite case is where the product changes only in terms of the size of its packaging while the quantity and quality remain unchanged. The first issue means that it is only possible to calculate the "mean price" for a certain unit of a product as opposed to the "exact" price for the same; the second issue introduces a further complication during re-coding operations.

- To resolve the second issue would require that substantial changes be made to the existing data-capturing approach. Currently the six most-sold references for each type of product - established by ISTAT - are included in the survey. The top three are utilised for calculating the consumer price index whereas the remaining three are held "in reserve". The latter are necessary to cover cases where one of the first three is no longer on the market or was not

found in a certain sales outlet. The selection of sales outlets to be surveyed is made by chambers of commerce in order to ensure that there is a sufficient degree of presence for such reference items in the sample areas. Using an automated data-capturing approach would imply that ISTAT would receive information regarding six most-sold reference items (assuming it were possible to identify this quantity) that the outlet itself identified for the type of product. This would give rise to problems of subsequent discrimination among and aggregation of the items. How would it be possible to assign a weight afterwards - in terms of overall final consumption - to prices of the most-sold reference items in each sales outlet? Also bearing in mind that, theoretically, reference items can on each occasion be different. One possible solution could be to resort to NIELSEN ITALIA which develops specific weighting matrices that link the type of product with the quantity consumed. However, the problem of interacting with a private entity would arise, in spite of the fact that NIELSEN is considered an authority in this field.

- For both surveys, taking the best case, but particularly that covering sales, a conventional-type system is used given the low current penetration level of modern technology in traditional small sales outlets which still account for 90% of the total number in Italy.

4. Innovative techniques in ISTAT surveys

4.1 The recent past

ISTAT currently carries out more than 200 surveys, however, among these there are only 12 cases that use data transmission techniques based on lines or teleprocessing. These cases fall into two main survey area departments: the first is Statistics on Education and Cultural Affairs (Kindergartens, Primary schools, Kindergartens and primary schools - summary data, Junior secondary school, Junior secondary school - summary data, Senior secondary school, Senior secondary school - summary data); the second is Statistics on Agriculture (Survey on the structure of agricultural enterprises, Survey on the potential production of the main agricultural forestry crops, Sample survey on numbers of cattle and buffalo, Sample survey on number of pig-rearing units).

Within the context of the 13th General Census of the Population, Industry and Services,

emphasis was placed on the planning stage and the creation of a database in numerical form giving cartographic indications relative to communal boundaries, populated areas and census sections, consistent with the aims of the CENSUS Project. Particular attention was dedicated to the checking of communal boundaries and limits of populated areas already identified by means of satellite surveying. The following aspects were covered:

- planning of an Integrated Territorial System in collaboration with the Telespazio Group to which cartographic documents covering the 1,628 communes and 92,000 census sections had already been provided in 1992;
- start of experiments for the recording of *street arcs*, in cooperation with an organisation specialised in this field, where the aim is to construct a computerised national street directory.

Availability of boundaries for census micro-areas in a computerised form will pave the way toward new opportunities of analysis. This will mean that a GIS (Geographical Information System) can be created, namely a file offering the possibility to capture information regarding units localised throughout the territory and that is capable of managing spatial relationships. In this manner it will be possible to localise immediately data available throughout the territory. The creation of telematic maps would seem an obvious application, however, up to now it has been used in very few instances, all within limited territorial areas. Calculation of surface areas using GIS will make possible to provide the classic indicator of geographic density for all identifiable territorial aggregates.

On this subject, in 1988 using similar techniques ISTAT produced the Italian Geographical Atlas, a successful publication from both the technical and commercial standpoint.

Certain regional and communal administrations have started projects to digitise territorial maps and have made their Geographical Information Systems operative. In certain cases administrative information - like, for instance, building permits - have been included in the GIS.

The territorialization of a registry office by means of a GIS will provide accurate management of individual information: each individual registered will be referenced to a geo-differentiated point.

A product derived from the 1991 census was a computer-based national street directory. By linking each street name and house number to the census section code it would be possible to territorialize statistical information after it has been captured, for instance, in the case of non-sample. administrative surveys.

Lastly, telesurveyed images can be used to measure the degree of coverage in the census on agriculture. In fact, information regarding the 5 surface-area types are available for each commune: these are 1) urban and industrial areas including infrastructures; 2) forestry areas; 3) areas covered by surface water; 4) cultivated areas; 5) other areas. The degree of coverage is checked by comparing data for agricultural surface area utilised as reported by the census with data on cultivated areas indicated by satellite images. An evaluation of the

5 area-types listed will be obtained that provides an estimated breakdown of territorial utilisation.

Currently no tested information systems exist covering the wholesale-retail trade that capture data using telematics. It should be emphasised, however, that the Prices Section already gathers price data from certain communes over communication lines and together with the Retail Sales Section is developing a single information system. This will enable the coordinated selection of the sales outlet sample with reference to which both mean prices and sales volumes can be surveyed. The 1996-1998 period should see the launch of an integrated survey system and, at the same time, the gradual abandoning of conventional survey techniques.

A further determining factor towards possible greater computerisation of data-capturing techniques would be an in-depth knowledge of current technology, in a very broad sense, available in manufacturing enterprises with at least 20 employees and also in certain service enterprises. The new Statistical Survey on Technological Innovation covering 1990-1992 carried out by ISTAT provides information on the present technological structure within enterprises, including levels of investment allocated to technological innovation.

Almost one third of all industrial enterprises (33.1%) introduced technological innovations during the above period. Generally, as the size of the enterprise increases there is a greater propensity toward innovation, given the fact that only 26% of the enterprises in the 20-49 employee bracket stated that they had introduced innovation compared to 78% for those with over 500 employees. It must be emphasised that several branches, normally characterised by production which is mainly for final consumption, innovate to a much lesser degree. More than 63% of the innovating enterprises renewed both product and process; 20% renewed only process and 17%, only product.

Expenditure for technological innovation in 1992 represented 4.4% of overall revenues. Of the total, 52.8% was expenditure which preceded the true production process phase (for research and development, purchase of intangible goods such as patents and licences, engineering and pilot production, marketing). The remaining 47.2% was for purchase of new, technologically more advanced plant

Taking only innovation expenditure not directly related to the process or product, there is a very clear and foreseeable heterogeneity at the territorial level. The North accounted for 79.0% of such expenditure compared to 14.3% for the Centre and 6.7% in the South.

4.2 The present and future

This paragraph will summarise the salient characteristics of certain projects in which Italy is actively participating and investing a considerable amount of both technical and human resources. The projects illustrated by no means exhaust the entire range of European activities focusing on electronic data interchange - there are currently 19 projects

underway. It also does not cover all ISTAT activities related to modernisation of data capturing procedures, a number of which were already mentioned in section 2. However, the projects illustrated certainly offer much food for thought.

4.2.1. TELER Project[7]

The aim of the TELER Project is to demonstrate the feasibility of a common model and relative standards for data interchange between enterprises and statistical institutes. It is based on using EDI techniques with reference to the currently existing European telematic structure. Benefits would be evident for both parties inasmuch as:

- several statistical surveys could be unified by means of using one, all-comprehensive questionnaire;
- common standards would be defined, independent of the country, accounting practices and size of the enterprise's activity sector;
- use of advanced technologies would enable recovery of much of the economic information directly from the software utilised by enterprises, allowing for re-coding according to international classifications and facilitating automatic transmission;
- enterprises would benefit by a reduction in effort required to complete questionnaires and would receive return information from statistical institutes within a shorter time frame;
- an overall gain in terms of quality and timeliness would be achieved;
- other organisations not directly involved in the information interchange would benefit: EUROSTAT (concepts would be more harmonised) and software consulting companies, which could see the opening up of a new market for development of software for statistical data interchange;

To reach these objectives also implies the harmonisation of all studies conducted previously in Europe concerning use of EDI techniques for gathering statistical data from enterprises. For this reason, TELER will construct data classification systems, interfaces and other software that is valid for all countries within the EU. It will then develop and test these databases (BISE) and the applications concerned (SISE) in six organisations covering five countries. Three types of information interchange will be tested:

1. interchange between enterprise and National Statistical Institute (four cases: Germany, Holland, Italy and Sweden);
2. multiple interchange between enterprise, accountant or accounting services and National Statistical Institute (one case only, in France);
3. multiple interchange between enterprise, national professional association and National Statistical Institute (one case only, in France).

ISTAT has recently completed the preparation of a questionnaire, the purpose of which is to gather information from a sample of large enterprises that will be useful in the project realisation phase. The questions concern: 1) the unit where data relative to management of the enterprise are available; 2) the presence or otherwise of automated techniques for the

handling of accounts; 3) if a computer is used, the type of hardware and operating system; 4) presence of a modem and access to Isdn, Itapac or Internet services; 5) experience with telematic data transmission; 6) willingness to send statistical data using telematics and, if yes, the time frame within which the enterprise would be willing to do so.

No further details of the project will be given at this point since it is still in the planning phase and also because several collateral actions are underway which will be described later. It should be mentioned, however, that the field of application for TELER will in the initial stage be limited to large enterprises, following the same logic as that given in section 2 regarding large-scale organised distribution.

4.2.2. MEDITERRANEO (DATAMED) Project

This project concerns the labour market, analysis of which is always problematic for southern European countries for mainly structural reasons. Participants in the project are Greece, Italy, Portugal and Spain. The starting point is the recognition that a technological gap exists in the participating countries which affects efficiency levels throughout the entire statistical survey system. Future availability and diffusion of new technologies could worsen this gap. An in-depth understanding of the strong connections existing between the above technological gap and the socio-economic gap. It is, therefore, absolutely necessary to rationalise existing surveys on the labour market and to utilise innovatory information sources. Also the creation of new software tools within the context of information interchange between statistical institutes and information providers could offer a number of benefits. For instance, it can at the same time improve efficiency for the former while reducing resources required for the latter; furthermore, it could create a new area of demand for software services. In particular, service needs could be found with regard to administrative bodies responsible for maintaining records and in private organisations that often provide services to small- and medium-sized enterprises. The centrality of labour market statistics as an area for experiment and the validation of new ADC technologies require that the project be divided into three parts:

1. on the supply side, the introduction of innovations in labour force surveys using ADC techniques that enable cost savings while bringing improvements to information quality;
2. on the demand side, greater recourse to administrative-type statistical sources and those already developed for non-statistical purposes by enterprises themselves, above all to better evaluate those enterprises that tend to lack formal structure (very small, family-run businesses, activities carried out in the home, etc.);
3. joint use of the above two information sources in order to define parameters and methods for a more complete, in-depth analysis of employment trends in southern European countries.

In particular, the first point would seem to lend itself to the use of CAPI (Computer Aided Personnel Interview) and/or CATI techniques throughout the entire production cycle for household surveys in general. Initially this will concentrate on the labour force survey

which in Italy would seem to be afflicted mainly by three problems. Constraints in selecting the sample imposed by the incompleteness of local registers; the overall unsatisfactory quality level, above all due to delays in making data available; lack of flexibility and incompleteness in the questionnaire as far as questions concerning employment position are concerned. The project is based on software organised in modules, some of which are not available on the market, a factor which in itself will stimulate the private sector. In particular, there is a technological gap in the area concerning management of files where software could be created and sold to local authorities.

Regarding point 2 above, mention has already been made of problems concerning surveys in Italy stemming from the unreliability of many files and the fact that hardware and software are rarely available, particularly at the level of small-size respondents as already mentioned in section 2. This problem is even more complex given the very turbulent demographic trend which is characteristic, above all, of the services sector. Furthermore, accounting systems used by small and medium-size enterprises are generally different from those used by larger enterprises. The former are frequently not suitable sources for statistical purposes and this is perhaps the main obstacle to use of ADC techniques. Also in family-run businesses it is often difficult to distinguish "family" from "business" economic aspects of the enterprise.

In summary, these are the steps that will be followed in Italy. With reference to household surveys: a) standardisation of input; b) alignment to definitions used by respondents; c) standardisation of classifications; d) flexibility in the production process. With reference to enterprise surveys: a) standardisation of input and classifications (registers); b) harmonisation of accounting definitions; c) use of new sources of information, both by means of CATI and ADC techniques involving "information brokers" covering very small enterprises. Overall, this is in line with the TELER Project where the intention is to include the category "non-corporate business" in the sample.

The distinctive nature of production and social structure found in the Mediterranean basin countries significantly impacts strategy for gathering statistical data. Existence of an enormous number of very small businesses and low-level development of computer-based networks are factors suggesting that caution needs be used in the area of modern survey techniques. More to the point, the gap existing in the Mediterranean area is first and foremost of a conceptual type; in addition there are also gaps of a technological or institutional nature. First of all it must be borne in mind that each enterprise already has its own information system enabling both operational and strategic decisions to be made. Therefore, each enterprise already collects a certain set of information for its own purposes or for other organisations, excluding requirements of the statistical institute. This dictates that every new data-capturing project must not enter into conflict with the system already in existence. Furthermore, when modernising the data-capturing process, it is fundamental that the INS make every effort to harmonise statistical classifications with concepts and definitions in every-day use. This will reduce the effort required by those responding and avoid the serious error of considering information as being non-existent when, in reality, it

exists but in a form that is different from the standard one requested. For these reasons the development of appropriate software, possibly with assistance from the private sector, can guarantee the necessary flexibility and contribute to the successful outcome of the project.

Under the assumption that the main objective of a data-capturing system is to increase the quantity and quality of the information gathered, then the meaning of these terms first needs to be qualified within the context of optimising results. In many cases greater quantity refers to covering new areas of interest which are particularly difficult to investigate (for instance, the hidden economy, nomadism, excursions for leisure purposes, etc.). Greater quality mainly concerns accuracy, timeliness and coverage level with respect to the total universe. Among the various aspects contributing to quality (see section 5), these are the ones that can be immediately improved through the use of modern data-capturing systems.

Input system rationalisation, which includes avoiding duplication, implies that the national statistical programme be conceived in a certain manner. It must be able to accept data-capturing and other statistical activities that are not only carried out by ISTAT but also by other public and private bodies involved in the data-capturing process.
In summary[8], it must be admitted that the network of informal relations between individuals and enterprises are important and should also be used for capturing statistical data. The strategic actions can be summarised in the following manner:

- Creation of a new data-capturing system is only practicable if it remains in step with the pace of new technical and market-related strategic developments in enterprises. It is particularly important to facilitate integration with existing files and other statistical sources, possibly with proposals for new types of file.
- Statistical offices must cooperate closely with local bodies. In this regard ISTAT promoted a project in conjunction with ANCI (National Association of Italian Communes) toward automating the capturing of demographic data from registry office records. ANCI and the Ministry of the Interior are jointly developing a telematic system to link all Italian communes. They have formed a private company for this purpose (ANCITEL) with the participation of other public bodies (TELECOM, FINSIEL). ISTAT is represented on the ANCITEL board of directors.
- The private sector must also be involved. Joint ventures in the research and development field must be promoted and set up, also because generally the INS in Mediterranean countries do not have internal resources readily available for software development. Software will mainly have to be produced externally. The latter aspect should be seen as positive inasmuch as the introduction of free-market forces will provide a stimulus, accelerating the pace of development and related technological changes.
- Systems of links between households and enterprises must be identified and defined more clearly in order to facilitate information interchange concerning housework, arts and craft-type activities, second jobs, the hidden economy, etc.

Modern data-capturing techniques, appropriate for use in more technologically evolved

countries, must be evaluated very carefully and critically before they are adopted. Reference is made to CATI, where shortcomings in the telecommunications infrastructure poses serious limits on its development; CAPI, where the interviewers skill is closely correlated with the quality of information gathered; and CASI (Computer Aided Self Interview), where there is clearly the problem represented by self-evaluation of respondents in terms of individual ability to use computer-based tools

4.2.3. SERT-TOURISM Project[9]

The purpose of the project is to develop, evaluate and implement an EDI (Electronic Data Interchange) strategy concerning the capture of statistical data by public-sector national tourist authorities in the light of the new European directive on this subject. General objectives are the reduction of costs incurred by enterprises replying, the improvement in quality and timeliness of data - also to encourage the development of synergy between the public administration and the private sector. In specific terms this means:

- encourage the introduction of computer-based techniques for data capture and dissemination, limiting the expansion of "closed" EDI systems, namely those incompatible with other systems;
- promote the creation of EDI systems that meet the requirements of users and stimulate recourse to common standards such as EDIFACT.

The European Union is financing the project, in which Greece and Italy are participating on an experimental basis. Objectives at this stage are: a) to address only small and medium-size enterprises with the intent of increasing efficiency, competitiveness and reduce discriminating factors and costs to access information; b) to extend the results obtained by the participating countries to all of those in the Mediterranean area (France, Portugal, Spain) in view of the homogeneity in terms of their relative tourist flows.

Italy is organising a wide base of participants, including both national and local bodies, coordinated ISTAT as represented by SISTAN[10]. The bodies involved are ENIT (Italian National Tourist Authority), the Department of Tourism, local Tourism Promotion Boards, Provincial Tourism Boards and Regional Administrations, coordinated by ISTAT and based on a specifically created task force (CISIS).

The project covers both enterprises and households. With regard to the former the intention is to use automated data capture and information will be gathered concerning software currently in use, certain structural characteristics (capacity, facilities available) and tourist flows (arrivals and monthly overnights by nationality). Regarding households, interviews will be conducted to gather information concerning tourist profiles (sex, age), reason for trip, characteristics of trip (means of transport, type of accommodation, etc.) and expenditure for tourism. Further objectives are to estimate inter-regional tourism and gather information on interchange of data with other EU countries.

In Italy the project commenced in June 1996 and is expected to terminate in April 1997.

The operating strategies that ISTAT intends to employ during the project have not yet been defined completely, however, a general outline of options being considered and implications of employing new technology is given below.

Interviews regarding tourism enterprises could be carried out using the following methods:

- the CATI method, involving the gathering of information by telephone which is recorded using specifically designed, self-checking software operating on a portable PC. The results stored can then be transmitted to the data collection points. Essential characteristics are that costs are minimised (compared to face-to-face interviews), however, it is important that the duration of the interview be kept as short as possible. Bad reception can affect the quality of the results. Use of the method implies recourse to a specialised organisation. For the hotel survey it will clearly be necessary to conduct the interview in off-peak hours. Furthermore, it implies that the hotel manager has collected all the information required previously; this should not be a problem as far as data on supply is concerned whereas the demand side will require considerable time to prepare. Given the time constraints for the interview this method would seem more suitable to gather information on the supply side only.
- the CAPI method is based on a personal interview. The information gathered is recorded and transmitted to the data collection points in a similar manner to that mentioned above, however, this method has a much higher cost than the CATI method. In this case the interview can have a longer duration and possibilities of misunderstanding are reduced considerably. However, demands on the hotel manager could be high and again the enterprise can only be contacted in certain hours. Overall, however, this method would seem to be preferable.

- Transfer via modem if the enterprise has one:
  a) ask the enterprise to simply transfer the original data-set originally used to store the information. In this case a data-entry programme will be required, using which the records can be transferred into the predetermined format.
  b) transmit a "home-made" questionnaire to the enterprise; that is to say ISTAT provides the enterprise with a programme which describes the questionnaire electronically and allows for verified data-entry followed by final transmission via modem using an ISTAT BBS pre-configured for this purpose.
  c) transmit an electronic questionnaire to the enterprise, prepared by adapting software available on the market for this purpose. In this case the building of the questionnaire is easier because the starting point is already existing software which, however, needs to be personalised. Following this, it will not only be necessary to provide the enterprise with the electronic questionnaire but also the runtime programme (that provided by the software package producer) which will enable the questionnaire itself to be produced. Problems can arise because of the use of a product purchased externally.

There is also the problem of confidentiality of statistical information transmitted by

modem.

- Transfer by electronic mail (Internet). This method would allow two modes of survey:
  a) the user to be interviewed receives an electronic questionnaire by FTP. This is completed and retransmitted to the data collection point (even in automatic mode).
  b) the user receives a request (by mail, radio, mass media) to reply to questions listed in a public area. Replies are sent automatically by E-mail or to another area of the collection centre. Although the use of Internet would be both rapid and economical, it does imply that the party interviewed has to have the necessary hardware, software and modem. Such a technique could only be applied for certain types of user at the present. Furthermore, it would require post-stratification of respondents that use Internet in order to determine their representativeness of the universe being observed.

The above methods could also be adapted and, within limits, used for other projects and current surveys conducted by ISTAT.

4.2.4. HORECA/TA Project - a telematic application

The objective of this EUROSTAT project is the design and implementation of a pilot survey aimed at defining elements to improve the quality of statistics surveyed concerning hotels and travel agencies. Furthermore, the intention is to reduce the effort required to complete the questionnaire and improve timeliness, in line with the strategy mentioned for the SERT Project. In reality these needs were identified based on results of a similar pilot survey conducted in EU countries, the outcome of which was not entirely satisfactory. The common elements are:

- inconsistency of statistical information covering certain types of indicator;
- excessive effort required for enterprises completing the questionnaire;
- inconsistency between the structure of the questionnaire and the accounting methods used in hotels and travel agencies;
- bias in the information captured concerning economic variables, due to incorrect specification of the questionnaire and a less than perfect correspondence of the variables, defined at the EUROSTAT level, with those effectively used in financial statements.

From an operations standpoint the project can be divided into two stages. First, carry out a survey covering a sample of hotels and travel agencies to gather a substantial amount of information regarding procedures followed in preparing financial statements and, in greater detail, investigate the composition of the single accounting line items. Secondly, design criteria, tools and procedures to achieve the telematic interchange of data between statistical units and institutions.

During the month of July, the design of a data-capture model was completed that requests

the following information. Legal form of enterprise, revenue bracket, type of accounting method (ordinary or simplified), number of employees, existence of accounting records where the main items in the income statement are broken down by the various company departments and/or possible branch offices, existence of a breakdown of revenue by type of client, the type of organisation keeping the accounts for the enterprise, type of personal computer and eventual use of particular operating systems and/or software, types of data bank that are normally consulted, availability of a modem. The survey should start in the autumn.

5. Quality and organisation of statistical activity

Considerable efforts have been made over the past few years by National Statistical Institutes both to gather more detailed and pertinent information concerning economic units and to improve the quality of such information. In certain cases - and ISTAT is a case in point - the latter objective was probably the predominate one. This is because there is a long-standing and still considerable lack of understanding on the part of the general public regarding the important role statistics plays in the field of scientific research and within the context of decision processes in both the demographic and economic field. Reminders are frequently needed to ensure receipt of data required and correction or integration of data received is often necessary. The result is additional costs - often very substantial - which, however, in no way ensure the quality of the final data. In fact the considerable delays that occur in making data available to users, with respect to the period it refers to, already in itself represents a loss of quality.

Given the above situation, it would seem vital that the national and international organisations concerned take action. A fundamental area would be to encourage a greater understanding of the function of statistics in general during the course of compulsory education. This would be particularly important in those countries, like Italy for example, where statistical surveying of a phenomenon arouses suspicion. It is seen as a burden, the sole purpose of which is as a tool for social control. Therefore, attempts to reduce the burden of responding should be pursued constantly.

In spite of the above, ISTAT's efforts have led to clear improvements within the space of a few years - at least with regard to the timeliness of information provided. Table 5.1 refers to data forwarded to EUROSTAT during the period 1992-1994.

The overall activity involved in providing this data for Italy was considerable. EUROSTAT requests account for 17.3% of total requests from international sources (the OECD is first with 20%). Based on a study carried out for the period 1992-1994, Italy received a total of 126 requests of which 48 were fulfilled by the established due date. The mean delay was 2.24 months, not a satisfactory result although only slightly higher than the mean for the Community as a whole. However, taking only 1994, 19 out of 36 requests were forwarded by the due date and the mean delay for all requests stood at 0.72 months, better than the Community mean (0.84).

Clearly a true in-depth analysis to evaluate the quality of statistics would be much more complicated as also the very ambiguity inherent in the concept of quality would have to be taken into account.

Table 5.1 - Delays in transmitting data to EUROSTAT for years 1992. 1993 and 1994

COUNTRIES	I	B	DK	D	GR	E	F	IRL	L	NL	P	UK
1992-1994 Period												
Number of requests	126	124	119	124	125	125	125	122	124	126	122	124
Mean delay	2.24	2.64	1.95	1.75	2.70	1.74	1.46	3.58	2.39	2.92	2.11	1.52
Delay of 0 months	48	40	44	59	38	47	54	31	34	44	39	79
Year 1994												
Number of requests	36	35	34	35	35	36	36	34	34	36	36	36
Mean delay	0.72	1.46	0.64	0.69	1.58	0.72	0.47	1.30	0.21	1.30	0.76	0.34
Delay of 0 months	19	16	16	20	12	18	23	12	12	19	16	25

Source: Garonna-2 (1996).

While this aspect cannot be examined in greater detail in this paper, it is worthwhile repeating the EUROSTAT[11] definition of quality that is "*...all characteristics of a product or service affecting its capability to satisfy explicit or implicit needs*". However, in practice, the approach used to evaluate overall production process quality normally entails the simple listing and measurement of certain characteristics of a product rather than the totality of processes that generated it. Among these characteristics are: pertinence (the match between information provided and the users needs), accuracy (estimate of the difference between estimated and true values), opportuneness (equivalent to timeliness), consistency (comparability with data from different sources referring to the same phenomena), dissemination (that must be in the form requested by users), cost (as low as possible, although few details are given on this aspect) and comparability (at an international level).

All of the areas mentioned in the above paragraph are aimed at improving certain qualitative aspects, above all in relation to data-capture techniques. However, at the moment this does not guarantee that other aspects will be improved contemporaneously, for instance accuracy and pertinence.

In reality an approach that aims to achieve global quality would seem preferable, based on which the quality of statistical data must be evaluated in a manner similar to that applied to other products - namely the *utility* end- users obtain in terms of the data being satisfactory for the purpose that originated the request for it. The *value* of statistics, in fact, corresponds to the advantages perceived by users. There could be the case of a

qualitatively excellent indicator evaluated according to standard precepts, but which is of little practical value - for instance, because it is made available too late - and vice versa.

An even more interesting definition would appear to be that which measures quality level in *technical-economic* terms, although this may be only a conceptual aspect inasmuch as the effective values cannot always be defined[12]. This measurement is defined as a function of two indicators: a) an indicator showing the adequacy of the result, namely the performance level with reference to the aims justifying it (satisfaction of user needs); b) an indicator of the economic burden or cost required to obtain it. A formula that can be proposed is the following:

$$Q = \frac{A(z)}{c(z)}$$

where:

- Q is the quality level of the result;
- $\mathbf{z}$ is the set of descriptive variables for the functional conditions of the production process, in theory, that can be divorced from the existence of a clear market cost;
- A indicates the monetary value, if necessary conventional, of the result;
- c indicates the economic burden for obtaining the result: this will be the production cost if evaluation of the result is within the production system, or purchase price if it comes from outside.

The preceding formula highlights an essential aspect to be considered when setting up control models in general and which is an aspect that appears to fall outside of EUROSTAT definitions. Namely, the evaluation of a result cannot be limited to its "performance or technological value". A very positive evaluation in technological terms can be drastically reduced because a high economic burden[13]. In what is known as the total quality approach the notion "good level of quality" establishes the essential aims of the production system, pursued in an integrated manner by the majority of internal functional units that, therefore, bring about the total quality system.

In any event, pursuance of so-called total quality requires far-reaching organisational changes. As opposed to other strategies, according to the modern definition, quality improvement does not necessarily mean increasing the pace of production and workload - the latter objective may only lead to increases in productivity with respect to every single individual. It is more a matter of maximum involvement of each individual in the *entire* design, production and dissemination process. In fact, given that data quality does not depend only on production methods, it cannot be improved by simply revising basic routines and the procedures applied by each individual. Instead, it is of fundamental importance that each individual ensures that his actions are also consistent with requirements in other phases of the process, favouring self-correcting mechanisms for errors and a predispostion to face the unexpected.

In reality the predominant organisational model today, particularly in public organisations,

foresees a uni-directional and hierarchical communication system in which the only channel for backtracking foreseen is between end-users and those responsible for initial analysis. Therefore, fall off in quality apparent to end-users can, at best, bring about improvement by setting off a new phase of survey design. Apart from this case, the only way data quality can be improved in such an organisation is limited to increasing the efficiency of the single production phases. In the latter case, improvement made in any one phase can only benefit later phases but cannot change the quality of those preceding it.

Furthermore, in a very dynamic operating environment that is frequently subject to revision and subsequent adjustment - take the case of the introduction of innovatory survey systems and data processing - the traditional, hierarchical organisation model in no way guarantees improvement in data quality but can, on the contrary, be counterproductive. It must, therefore, be substituted by more flexible models that foresee direct interaction between those responsible for the various phases in the production cycle and use of the statistical data.

As suggested on other occasions[14], the traditional model must gradually give way to a more modern approach. In the new model, the individual responsible for each phase no longer receives and passively accepts a non-modifiable output from the preceding phase. It would also be possible to request personalised inputs, more suited to the individual's needs. As a result, a drop in quality can be perceived at any phase, not just by the end-user, and immediately give rise to backtracking to all preceding phases without observing the rigid *design-production* concept which dominates the traditional model.

In essence, the logical consequence for initiatives coordinated by international organisations and single countries should be an in-depth rethinking of the production process. This should be an incentive for greater recourse to new forms of information interchange. In the light of what has been said previously it would appear to be particularly important to focus on the following points.

- Each individual involved in the production process must gradually modify his attitude towards work performed, changing from an object-oriented to a system-oriented approach. According to the former approach an individual is only required to carry out a certain number of operations in a correct manner. The result, or *object* produced, is then quantitatively and qualitatively non-modifiable over the short term and constitutes a single piece in the production mosaic. Possibilities for interaction with operators responsible for the production of other objects are few and far between. In adopting the second approach the intention is to stimulate a more complete involvement in the production process. Each individual will have to be more pliable, capable of proposing improvements in other than their own production phases. Above all, each must progressively abandon the concept of the need to individually produce objects (tables, files, reports, procedural requirements, etc.) and replace this by an awareness of being able to actively participate in the entire production *system*.
- An immediate consequence, given the particularly innovatory nature of the new forms of communication, is the need to foster new working habits. Individuals will have to be

capable of modifying behaviour and updating their know-how, even over the short term. It also implies renouncing, in part, previously acquired positions of "authority" and prejudices against innovation. In other words, the previous point emphasised the importance of changing from a traditional to modern approach: this point highlights how, in the modern context, a number of phases follow on from one another extremely rapidly. This, thanks to the speed at which technological innovations can be taken up by enterprises, households and organisations charged with surveying social and economic phenomena.

- For obvious reasons the two preceding interactive processes in turn require that internal *communication* be developed in order to maintain contact with those responsible for other production phases. Medium and large-size enterprises have already invested in this aspect for some time now. Unfortunately public structures are often still in an archaic state. An important factor, in the first instance, would be to make available the results concerning all pilot projects involving new data-capturing systems. This needs to be done as quickly as possible and in a detailed manner. Following this, the aim would be to structure and maintain an information interchange system within each department. These tasks should not only involve managerial personnel but should, in fact, become part of normal working routine and be used by all personnel.

A word of warning, however, is necessary. Even given the most optimistic hypothesis - which can certainly be pursued - that all of the preceding points are introduced within a reasonable time frame, the overall quality of the production process could still remain at an unsatisfactory level. In effect two further considerations need to be made.

Firstly, aims to improve the production process must necessarily involve the identification and periodic calculation of appropriate indicators for quality itself. It is often a fact that application of more efficient procedures, for example those capable of reducing production times, is in no way linked to the design of adequate measures to eventually improve efficiency. Or, on the other hand, inappropriate indicators are defined and calculated which are either non-statistical or do not allow for isolation of that part of overall quality improvement that is effectively due to a greater all-round efficiency in the process (the system-oriented logic) as opposed to the result of greater mean individual output (the object-oriented logic).

Secondly, assuming that the three points illustrated above are introduced and that the problem of appropriate indicators were resolved successfully, a situation could in theory arise where n production processes were each structured internally in accordance with a modern, interactive approach, but may not be synchronised with one another. That is, communication would take place only at the expense of great effort, and so be an obstacle to the comparison of information that is intrinsically comparable (for example; household consumption and retail sales; days spent in hotels and length of holidays measured by interviewing households, etc.). In order to avoid this risk, what has previously been described in terms of a single process must be adapted to include a number of processes. These must be seen and designed from the standpoint of being a dynamic system where the

logic is to avoid duplication and ambiguity in the information provided. Statistical information, therefore, should not be designed on a single-survey basis but within a general framework of reference in terms of standardisation for concepts and definitions.

If changes take place in the near future regarding systems for data-capturing and its processing this will almost certainly bring with it a radical redefinition of the profile covering professional personnel within a statistical institute. At least from the formal standpoint, it could be useful to compare possible alternative models to reconfigure the production system in order to check beforehand that it can reach the objectives and remain manageable operationally.

6. Conclusions and outlook

Although the purpose of this paper was to offer food for thought as opposed to coming to categorical conclusions, three lines of strategic action do seem to emerge quite clearly.

1. Given that the diffusion of modern, computer-based technology in enterprises is closely interdependent with the process of entrepreneurial concentration, improvement in quality of statistical surveys will not only depend on technical strategies within Statistical Institutes but also, above all, on stimuli that coordinated actions of an economic, legislative and political nature can bring within markets. In this sense the collaboration between INS and administrative bodies takes on a central role that can no longer be considered an optional approach.
2. The concept of quality with regard to statistical information can under no circumstances be crystallised in univocal and unvarying definitions, nor can it be treated empirically by means of measurements based on the simple sum of attributes. Completeness and timeliness seem to be the most significant characteristics corresponding to user needs as the century draws to a close. It would be a grave error not to intervene critically for much longer with regard to a production process that, even though considered valid, could rapidly lose all or part of this characteristic.
3. Assuming equal resources and workload to be performed, a greater involvement of each employee in an INS within the context of the entire production cycle seems the only tool capable of maintaining motivation and increase productivity.

The rigidity of certain organisational schemes could in a short time lead to experiments, already carried out in the United States, regarding forms of "telematic-based" work. The approach would enable part of an individual's work to be performed at home (for instance, the mornings), with an afternoon session for meetings and group discussion. What was prepared during the morning could possibly be transmitted by Internet or modems to colleagues.

International organisations (EUROSTAT, OECD, ONU, or even the Voorburg Group) can make a significant contribution with regard to each of the preceding issues in terms of stimulating and providing incentives for the updating of definitions, analysis tools and

procedures.

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NOTES

[1] UN et al. (1993)

[2] Due to non-availability of information Greece was excluded from the calculation. It can be assumed that the true mean value for the EU will be less than that cited. In fact, according to certain estimates (EUROSTAT-4, 65), the 1988 incidence for Greece regarding "Business Services" with respect to the total economy (excluding property activities and renting) was 11.0% in terms of enterprises but only 3.9% for number of employees.

[3] Greece, Ireland and Luxembourg were excluded from the calculation because of non-availability of the complete series. As indicated at the foot of the table, estimates for 1992 were necessary in the case of certain countries.

[4] Certain simplifications have been made compared to information reported in OECD-2 (1996), the indicator relative to leasing was added based on information available from the association representing this category of activity.

[5] Number 80 to 83 have been assigned to Italy. In certain cases the digits representing the country can be three (Croatia, Hong Kong).

[6] Already used by NIELSEN. The system enables data-capturing and transmission to be speeded up, there is a reduction in non-sampling errors (based on real-time compatibility analysis) and visits to outlets can be programmed in an efficient manner. The data gathered would be sent to ISTAT via modem. After a further validation and calculation phase data would be sent back to chambers of commerce and would be later made available by ISTAT.

[7] M.R. Ceccarelli is thanked for providing information that was useful in preparation of both this and the following section.

[8] Garonna-1 (1995, 8-9)

[9] A.P. Mirto and C. Pappalardo are thanked for providing material useful in the preparation of this and the following section.

[10] SISTAN - SIstema STAtistico Nazionale (National Statistical System)

[11] EUROSTAT-3 (1996, 44)

[12] Istituto G. Tagliacarne (1995, 72-73)

[13] Said otherwise, comparison of the quality of two products only makes sense when their cost or price are equal.

[14] ISTAT-1 (1995, 16)