Cross Cutting Issues- Session 4:

ICT Demand Side: An Analysis of Some Statistical Sources for Italy

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Abstract:

The paper deals with some aspects of the demand side for Italian information industries as defined at OECD level. Not only a definition of ICT sector is taken into account but the broader one of information economy.
A list of Italian statistical sources with reference to variables defined in the "Compendium for Information society " of European Community will be produced. Three "specific" projects and other "non specific" statistical sources will be closely analysed. Other "non specific" statistical sources do not aim at analysing exclusively the sectors related to information and communication technologies, such as the survey on small and medium size enterprises, the multipurpose survey on households. Moreover, the project carried out by AIPA (National Authority for Information Technology in the Government) will be analysed. Then the scarcity of statistical sources will be analysed and gaps will be identified, as well as methodological problems and problems connected with the use of current classifications. Lastly, strategies to develop statistics for these sectors and to fill existing gaps will be introduced along with questions to rise to the Group.

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1. Introduction and Some Definitions

This paper is related to a previous paper on statistics concerning the supply side of the ICT sector, information industries on the whole (which include content industries besides telecommunications and Information Technology) in Italy [2]. The definitions of the sector are those have been discussed at OECD level.
The analysis of these sectors has been always carried out on the supply side, while demand played only a marginal role.

The activities of these sectors are defined by the ISIC classification. NACE Rev.1 and ATECO91 are the corresponding classifications, respectively at European level and at national level. ATECO91 was introduced in Italy for the 1991 Census of manufacturing and services on enterprises and institutions. This means that the different classifications can be connected in a common framework (see appendix 1), thus it would be possible to define manufacturing and services activities which form ICT and "information industry". To analyse aspects related both to supply and demand other classifications can be used, such as: NAICS (US), CPC/CPA, PRODCOM, CN/HS/SITCRev.3, ISCO, ISCED, COICOP.

As it was discussed in the paper on supply, at national level there are less statistical sources available for demand than for supply (see appendix 2). The pilot studies carried out buy Istat mainly in 1996 on audio-visual services (covering NACE 9211-9220), on IT services (NACE 72) and on telecommunications (NACE 64.20) attempted to develop analysis for the demand side as well. There are other projects and surveys that do not aim at analysing exclusively the sectors related to information and communication technologies, in which it possible to find specific aspects of demand. These are the survey on small and medium enterprises with reference to the number of personal computers and modems, and the multipurpose survey on households with reference to the use of personal computers at home. Moreover the AIPA (National Authority for IT in Government) project which, resulting from the need to monitor the "state of art" of information technology in Government, is a source to find data about the use and penetration of IT in government.

In this paper, three "specific" projects and other "non specific" statistical sources will be closely analysed. Then scarcity of sources will be analysed with reference to variables defined in the "Compendium for Information society " of the European Community to identify gaps, as well as methodological problems and problems connecting with the use of current classifications. Lastly, strategies to develop statistics for these sectors and to fill existing gaps will be introduced along with questions to rise to the Group.

2. General Framework and Analytical Results from Some National Sources

2.1 General Framework

Consumption has been deeply affected by the introduction of new information and communication technologies. Consumers are offered a wider selection of products and services while being comfortably at home. Thus an in-depth knowledge of the new technologies is required. Owing to the **convergence** process, consumption is no longer easily differentiated. Audiovisuals services cannot be distinguished from telecommunications and information technology services, since computers, audiovisuals equipment and receiver devices (parabolic antennas and networking) should be integrated to consume the new products.

[2] L. Fenga, G. Perani, F. Riccardini, G. Trovato, "ICT supply side: An Analysis of Some Statistical Sources for Italy", paper presented at the 13th Voorburg Group Meeting, Roma September 1998.

Therefore the three sectors (telecommunications, information technology and audiovisuals) would be more and more mutually related in their development.
Ways and rhythm of living are changed by the development of the new information technologies: new types of work organisation are suggested and adopted, private life and relationship with other people are re-arranged. In the new social arrangement individuals would no longer move, rather information and services would reach individuals. Computers would be able to talk, television sets would be able to listen and understand messages, and telephones would be able to send pictures.

From National Accounts (where COICOP nomenclature is used) we can take data on households' consumption for categories.[3] The aggregation of the data indeed does not allow a more detailed level. Moreover, not all the services and goods of ICT definition and Information Industry are included in National Accounts. In Table 1 some categories of these sectors are showed from 1991 until 1996 for Italy. As we can see "communications" has deeply increased; also "shows and other recreational services " has increased. "Radio-TV sets and other recreational goods" showed a slight increase, while "books, newspapers and magazines" stayed at the same level for all the period.
In 1991 consumption of information industries represented 10.5 % of the total final consumption. While in 1996 this percentage grew to 11.2%.
Along with consumption it is useful to consider infrastructures at disposal of households. As we will see, new information and communication technologies penetration in households for Italy is still limited, even if consumption (from National Accounts data) increased during the period analysed.

Table 1. ***Households final consumption by some information industries categories*** (billions of 1990 lira)

CATEGORIES	1991	1992	1993	1994	1995	1996
Domestic appliances and equipment	9,174	8,676	8,363	8,719	8,612	8,190
Communications	10,048	10,801	11,430	12,165	13,359	14,544
Radio-TV sets and others recreational goods	34,902	35,514	33,894	35,801	36,544	36,768
Books, newspapers and magazines	13,404	13,838	13,544	13,625	13,505	13,557
Shows and other recreational services	19,943	19,977	20,667	20,542	21,901	22,231
TOTAL CONSUMPTION FOR INFORMATION INDUSTRIES	87,471	88,806	87,898	90,852	93,921	95,290
TOTAL FINAL DOMESTIC CONSUMTION	**829,642**	**838,324**	**817,890**	**829,433**	**844,334**	**850,665**

Source: National Accounts

The use of personal computers, analysed in the multipurpose survey on households, is still limited. Only the 22.5%of people have a personal computer at home.
As concern penetration of technologies related to telecommunications data show encouraging situation: mobile telephones raised at fast rate during the last years.
Diffusion of new technologies in enterprises is not much surveyed, as we will see. Some data on demand of IT services can be derived from the IT survey, in which customers of the producer enterprises are analysed by economic sectors.
Data on use and penetration of IT in Government, deeply analysed in AIPA project, show an encouraging situation.
New jobs related to ICT are being created as well as new ways of organising work, such as teleworking. Educational and vocational training are affected as well. No specific sources are utilised to analyse these aspects. Labour force survey, Education survey and surveys on enterprises can be consider as sources, as well as the vocational training survey on private enterprises.

[3] Consumption from businesses from could be derived by intermediate consumption as well as consumption by Government.

In the following paragraphs main statistical sources will be examined with reference to the demand side.

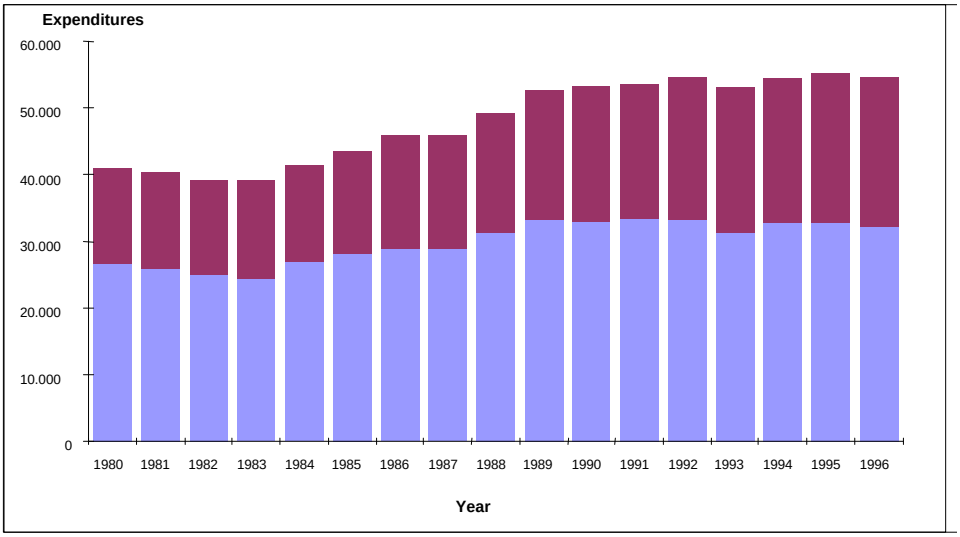
2.2. *The Audiovisuals Project*:

The presentation of the study on audio-visual services is deeply done in the paper on supply side[4]. Selected parts of that study on the demand side are presented here

2.2.1. Audiovisuals Consumption

In 1980 Italian households spent 40,975 billions of constant lira to buy audiovisuals. In 1996, 54.666 billions of lira were spent, the annual change rate in the period 1980-1996 is 2,1%.
Thus the analysis at current prices shows that in the observed period of time expenditure has grown by five times, whereas the analysis of aggregates at constant prices show a growth by 33%.

Chart 1 - *Money spent on audiovisuals by Italians. 1980-1996 (at 1990 constant lira)*



Legenda

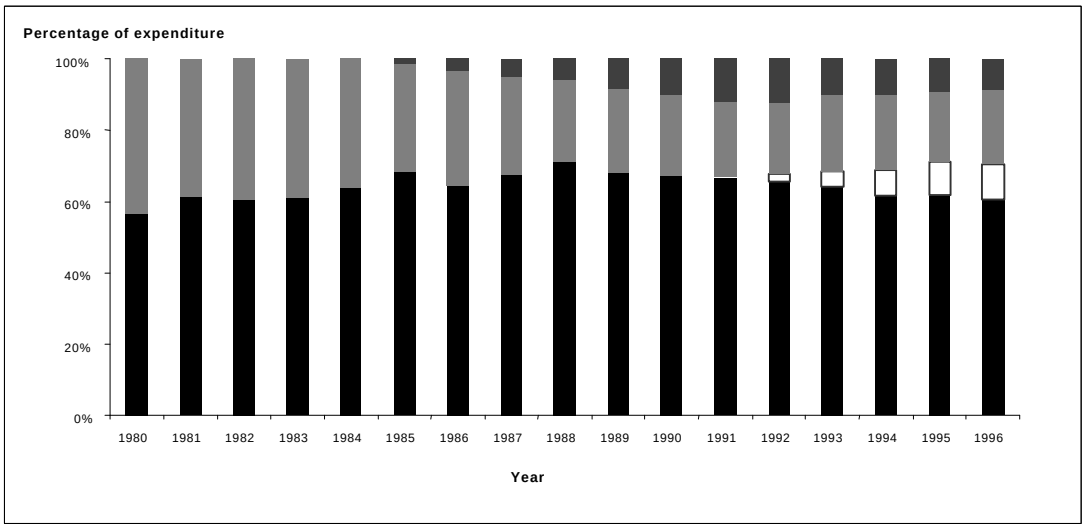
Expenditure for performances and other entertainment and educational services
Expenditure for radios, television sets and other entertainment equipment

Households consumption for audio-visual equipment, cultural and entertainment services can be divided into spending on radio, television sets, records, tapes, CDs, films and other fittings for pastimes and in expenses for performances and other entertainment and cultural services.
In 1980 expenditure at constant prices for audio-visual equipment was 26,659 billions of lira and represented 65% of the total, whereas in 1996, despite its growth up to 3,169 billions of lira, it was only 59% of the total. Expenditure for performances and other educational end entertainment services were 14,316 billions of lira in 1980, and represented 35% of the total, in 1996 it was 22,497 billions of lira that is 41% of the total amount.
Generally speaking Italians spent an almost stable quota (3,9%) of their income (measured from GDP) to buy audio-visual equipment as well as entertainment and educational services. Moreover the behaviour of Italian households shows that a constant quota of consumption is used for audiovisuals (6.3%).
A quota for actual audio-visual services is included in the expenditure for performances and other cultural and entertainment services. Specific items represent this quota, namely: Rai (Italian Public

[4] ibidem

Television Company) subscription, pay-tv subscription, cinema tickets and home-video purchases and rentals.

Chart 2 - *Expenditure of Italians for audiovisuals by sub-categories. 1980-1996 (percentage)*



Legenda:

- Home video
- Cinema tickets
- Pay-tv subscription
- Rai subscription

As far as the analysis at 1990 lira, expenditure for Rai subscription shows a growing trend during the observed period except for 1996, when it paused. Time series trend for cinema tickets shows a decreasing trend. Only recently there is a certain growth in this sector, partly due to promotional campaigns, to reduced ticket price for afternoon performance and in one working day and partly owing to government policies.

Home video expenditure includes purchase and rental of videotapes, while sales with newspapers and magazines are not included. Even if in the first half of the ’80s the first videotape recorders were already sold, it is only in the second half that they and videotapes are widespread and expenditure for home videos remarkably increases. The amount spent for this part of audiovisuals grows until 1992 and cinema is negatively affected. From 1992 to 1996 expenditure for home-videos decreases by 27% (average yearly rate 6.6%). A number of factors may account for such a decrease: price reduction, and the fact that 1995 and 1996 data do not include sales of videotapes with newspapers and magazines, which is rather important.

Pay-Tv was established in Italy since 1991. Expenditure for this type of service, even if growing, is still limited in comparison with expenditure for cinema and subscriptions.

On the whole, expenditure for audiovisuals increased by 600 billions of constant lira from 1980 to 1996, however its weight slightly decreased from 17.6% to 13.8% with reference to total of consumption for performance and other entertainment and cultural services

2.2.2. Diffusion of Information and Communication Technologies in Households

The introduction of new information and communication technology changes the way households uses audiovisuals. Multimedia enters homes. The diffusion of new technologies in families reflects this phenomenon.

Available data show that new technologies are scarcely diffused among households *(table 2).* In 1997, only 17% of households owned a personal computer and only 2.3% had subscribed an Internet access.

Table 2 - *Diffusion of technologies in Italian households*

% of household with telephone (1994)	96.8
% of households mobile phone subscribers (1996)	11.2
% of households with television set(1996)	97.1
% of households with videotape recorder (1996)	52.0
% of households subscribing a Pay-Tv (1996)	3.5
% of households with a personal computer (1997)	17.0
% of households subscribing an Internet Provider(1997)	2.3
% of wired building units (1995)	7.1
% of parabolic antennas as proportion of total building units (August1997)	18.7

Source: *Istat estimate*

89% of households use the Internet to access data-bases, 50% to get trade information and to access on-line publications, 44% to communicate and only 39% for entertainment *(table 3)*[5]. In 1996, households subscribing pay-Tv, were 3.5%. In 1995 wired building units were 7.1% of total, and parabolic antennas represented 18.7% of total building units in August 1997.

Table 3 - *Type of Internet Services used by Italian households. Year 1996*

TYPES	% of households
Database	89
Communication	44
Trade information	50
On-line publications	50
Entertainment	39
Access to public services	17
Shopping	3

Source: *Sda-Bocconi marketing estimate*

However, new technologies are still rather expensive. The average household cannot afford buying the telecommunication device for the new media. Moreover, networks that are still being implemented do not offer yet such a widespread diffusion (wiring of building units) as in many other countries.

2.3. *IT project*

The presentation of the study on IT services activities is deeply done in the paper on supply side[6] Relevant parts of that study on the demand side, in particular from the IT survey 1995 are presented here

2.3.1. Main Customers of Information Technology Services

It is necessary to analyse behaviours within the macro-categories into which information technology demand can be divided: big size, medium and small enterprises, households and Government.

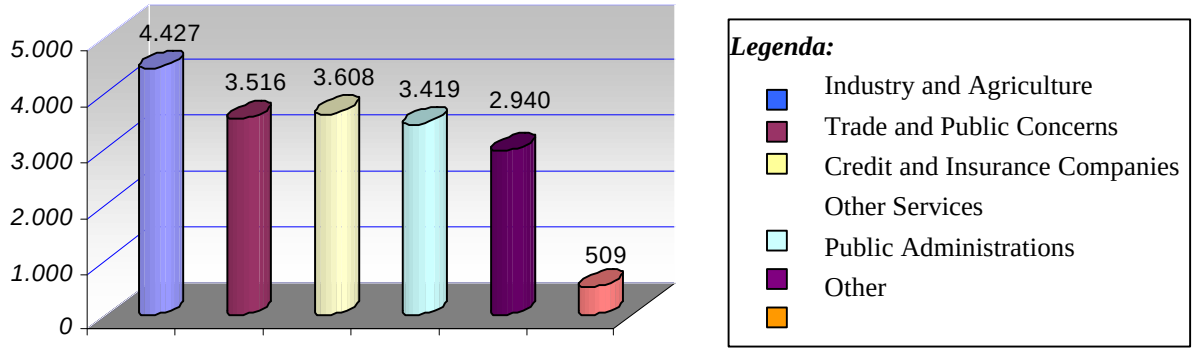
[5] Data from Sda-Bocconi survey
[6] ibidem

In big **enterprises**, the need for Information Technology is strictly related to the continuous change in internal business processes and external relationships between customers and suppliers. This means a rise in the demand of special cross-services such as integrated logistics, customer service, security, etc…
The most important on-going processes are:
a) a strong trend towards customised software packages;
b) the increase of the demand for services in order to direct resources towards the core business.
Moreover the dynamics of medium size firm demand is becoming more and more similar to big size firm demand. Fewer investments may depend on a structural weakness on the supply side.
It is clear that the most advanced solutions, specifically implemented for big firms cannot be fully exploited owing to different firms' size. Moreover high costs represent another obstacle.
Information Technology applications for professionals are often very similar to Information Technology applications for small firms, (they often coincide). The main characterising elements are - the demand of hardware (personal computer) and software, (office automation) aiming at improving individual productivity and of services related to hardware servicing.
Information Technology selection is often the result of informal procedures such as experiences of colleagues, suggestions from advisors (e.g. business consultants) and other.
An exam of **household** demand shows that it is composed by people using micro products to carry out activities not aiming at getting an income. In fact they are more oriented towards education and entertainment.
In the '*utility*' sector of **Government**, the most recent provisions require that public bodies should operate as firms, and service user rights should be guaranteed.
This means that the scenario is changing, from a resource concentration (management/organisation) to a gradual decentralisation of specific concerns, to meet the growing need of citizens.
Less available financial resources may have affected municipalities and local authorities in a number of ways. Management processes have been rationalised, cost growth was reduced, and information technology services were adopted to pursue institutional goals (for example, using the Internet).

An analysis of the demand for information technology services come from the supply side data of the IT survey. In fact 19.1% of turnover was represented by Trade and Public Concerns (liberalisation of trade was about to be introduced, deep changes in hotels and similar establishments to meet the new need of a more and more demanding market), 19.6% of turnover was represented by Credit Institutions and Insurance companies, where a sort of revolutionary change of production processes and means is taking place. Even their role in society is being changed owing to the following factors: liberalisation of banking, single currency introduction, the "millennium bug" and the necessary adjustment of software and hardware to meet these challenges.
In the Government information technology increased (16% of turnover). The following factors are to be pointed out: a greater and more specific demand from users who want to exploit Information Technology advantages even in their daily life to save time and money (the following are some examples: telecommunications networks implemented by a number of municipalities, the possibility of exchanging electronic mail and the Internet for a fast and cheap exchange data and information).
A remarkable demand for information services is recorded even in "Other services" sector (18,6 %). However despite being considered an important share of total demand, it is not possible to detail it, as the sector itself is too heterogeneous.
Manufacturing is one of the most interesting economic sectors as far as the demand side is concerned. The need for Information Technology was favoured by a re-launch of this sector. Information Technology is mainly required to improve business management, for customer service, to plan and control those activities, which will become more and more independent and decentralised. Therefore Information Technology is meant as sale and servicing support.
Banking and insurance companies are other examples. In these sectors there was a change from a

sort of trade monopoly to a highly competitive market.
In this sector, teller's personnel will increasingly carry out other activities such as financial consulting and sale of products; therefore new user-friendly informational systems should be available. These systems should provide a number of real-time services: outline the customer profile (demographic data, financial products, purchases, available income, etc.,) and select the best investment solution in the portfolio of products.
Customer-oriented activities seem to be the most important aspect for future development.
The distributive sector is characterised by new types of highly competitive distribution, such as hard-discount, new large commercial centres and other elements, which led to a profit decrease in the whole sector.
There are three main strategies:
a) cost reduction and improvement in effectiveness;
b) strengthening of relations with well-known brands;
c) creation of "constant customers" through suitable marketing initiative.
To implement above strategies it is necessary to invest in logistics and on order processing. Processes should be rationalised and new technologies, alternative to traditional technologies should be used (on-line trade, telemarketing, mail orders, etc....).
Hotels and similar establishments (they would be economically important) should be given particular attention, as they are particularly interested in *Information Technology* both as number of devices and quality of services.
Globalisation and international policies are the most important market aspects affecting strategic choices of this sector.
Hotels and similar establishments need on one side to be fitted with competitive infrastructures, using the Internet and 'on-line' links; and on the other side management standards are to be very high. Therefore Quality Informational Technology should be applied to all activities.
This creates a qualified demand for information services (2.3% of the total shown in the chart 3), which is met by Information Technology.
The adjustment of existing application procedures is one of the main obstacles that firms have to overcome in adopting new technologies.
This process has already started for banking and insurance companies, since they carry out long-term business. For all the other sectors this new process is probably connected to the year 2,000.

Chart.3 - Sales of provided services by origin demand sector



Source: *Istat, 1995 sample survey*

2.4 Telecommunications Project

The presentation of the study on telecommunication services is deeply done in the paper on supply side[7] Selected parts of that study on the demand side are presented here

2.4.1. Diffusion of technologies

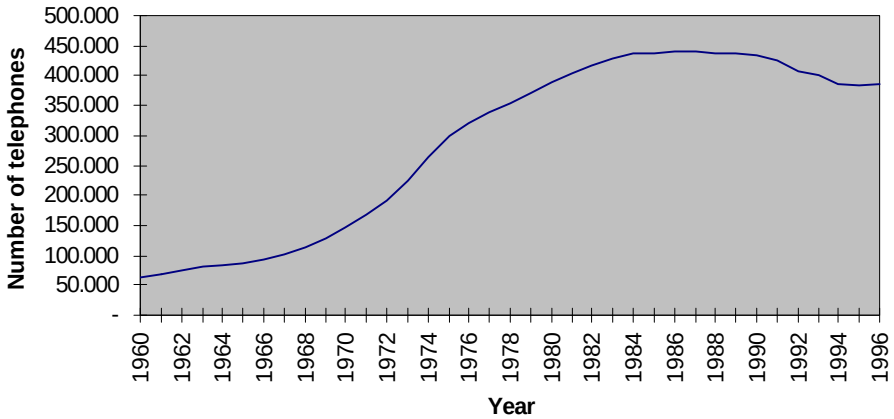
This sector and enterprise operating in it are to be further studied and analysed owing to the great changes brought by new complex phenomena, such as multimedia, convergence, liberalisation and competition. The analysis should aim to understand structural changes in enterprises (reference markets, structure of employment etc.) as well as to overcome the difficulties in classification. As traditional technological differences were cancelled (data, audio and video transmission) it is necessary to define new and more suitable reference classifications.
1995 data provided by ITU (International Telecommunications Union), confirm that Italy has at a higher position or is in line with European average (as for home lines) as shown in the table below:

Table 4 - *Diffusion of Technologies. Year 1995.*

	Italy	**Europe**
Penetration of main telephone lines per 100 people	43.45	32.95
Digital lines per main telephone lines	75.6 %	65.2
Home lines per main telephone lines	77.6	77.9
Teleaccessibility (number of home lines per 100 households)	91.1	69.4
Number of public telephones per 1000 people	6.7	2.4

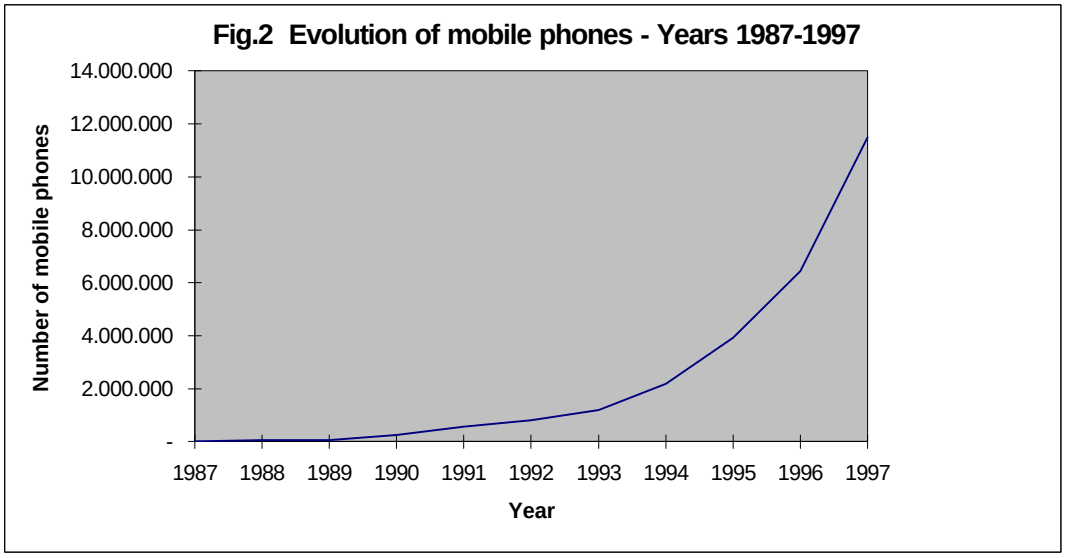
A remarkable growth is shown by the most recent data (1996): for example in the penetration of main telephone lines per 100 people (up to 44.1%) and digital lines per main telephone lines (up to 85.1 %).
Mobile telephony is a very good example of the positive effects resulting from liberalisation and ensuing competition. The establishment of a second mobile telephony Provider deeply affected service (number of users, type of services offered, reduction of telephone fees). Mobile phones is a fast growing sector: 11,490,000 subscribers were recorded in December 1997 corresponding to a more than 190% variation from 1995 to 1997.
The existing services, such as public telephones were deeply influenced by such a "boom"; figure 1 and 2 clearly show that public telephones are increasingly being replaced by mobile phones, which are more diffused and accessible.

Figure 1 - *Evolution of public telephones from 1960 to 1996*



Source: SIP - TELECOM

[7] ibidem



2.4.2 IP Survey

The survey on Internet providers allows catching some features of the demand side, even though it focuses on providing enterprises as statistical units. In fact in the questionnaire we find questions on:

- characteristics of Internet subscribers;
- quantitative data;
- number of sent and received e-mail messages;
- turnover by kind of connection.

In a second stage the survey should be addressed directly to Internet subscribers, in order to spot and define those aspects which are peculiar to the demand side.

2.5. Survey on Small and Medium Size Enterprises

The sampling survey on small and medium size enterprises is conducted on about 3,200,000 of enterprises to gather information on profit and loss account and balance sheet. From 1992 this survey covers all economic activities and from 1995 the structure of the survey allow to gather representative data at 4 digits level.

2.5.1. Diffusion of New Technologies in Small and Medium Size Enterprises

Some questions were added in the questionnaire of 1995 survey. Questions concerned the number of personal computers and modems in small and medium size enterprises.
1995 processed data shown in table 5 indicate that 49.6% of enterprises has a personal computer and those economic sectors where the use of personal computers is more widespread are: the insurance and financial sector (ATECO J) with 80.5% of enterprises, the “services to businesses” sector (ATECO K) with 62.3%, the trade sector (ATECO G) with 54.5%. All other sectors show percentages less than 50%. As a matter of course, enterprises falling into bigger dimensional classes are characterised by a more intensive use of personal computer, with the highest percentage in the insurance and financial sector, where the firms using personal computer reach up to 100%.

Table 5 - *Diffusion of personal computer in small and medium size Italian enterprises. Year 1995.*

Economic activity	CLASS OF EMPLOYED								
	1-4 Employed		5-9 Employed		10-19 Employed		Total 1-19		
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*Total*
C- mining and quarrying	23.6	76.4	59.2	40.8	84.0	16.0	49.0	51.0	100
D- manufacturing	27.9	72.1	68.3	31.7	82.7	17.3	46.9	53.1	100
E- electricity, gas	36.0	64.0	77.6	22.4	85.7	14.3	44.7	55.3	100
F- construction	15.7	84.3	59.3	40.7	79.4	20.6	28.5	71.5	100
G- retail sale and retail trade…	40.0	60.0	87.3	12.7	92.8	7.2	54.5	45.5	100
H- hotels and restaurants	19.8	80.2	39.7	60.3	63.6	36.4	30.3	69.7	100
I- transport, storage and communic.	33.8	66.2	70.8	29.2	75.3	24.7	48.0	52.0	100
J- financial intermediation	74.5	25.5	98.1	1.9	100	0	80.5	19.5	100
K- real-estate, renting, business serv	56.5	43.5	84.4	15.6	86.7	13.3	62.3	37.7	100
M- education	44.8	55.2	48.5	51.5	65.5	34.5	48.7	51.3	100
N- health and social work	37.3	62.7	75.4	24.6	72.4	27.6	45.9	54.1	100
O- other com. services and personal	36.2	63.8	66.5	33.5	85.3	14.7	45.8	54.2	100
TOTAL	**36.4**	**63.6**	**72.7**	**27.3**	**83.4**	**16.6**	**49.6**	**50.4**	100

(1) = only one personal computer
(2) = no personal computer

Yet the presence of a modem in the firms with less than 20 persons employed (see table 6) is still poor, as pointed out by the percentages in the different sectors of economic activities. As small and medium enterprises are concerned, the share of those which use a modem for the transmission of data (this is the question asked in the survey questionnaire) amount to 12.4%. However it must be noted that this figure could be biased by the kind of question, that is it was asked whether firms are equipped with a modem for the transmission of data but not if they use a modem for other purposes (a modem for example, can be used for surfing the net).

Table 6 - *Diffusion of modems for data transmission in small and medium size Italian enterprises. Year 1995.*

Economic activity	CLASS OF EMPLOYED								
	1-4 Employees		5-9 Employees		10-19 Employees		Total 1-19		
	(1)	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*(1)*	*(2)*	*Total*
C- mining and quarrying	2.0	98.0	4.2	95.8	14.3	95.8	6.0	94.0	100
D- manufacturing	4.5	95.5	12.6	87.4	24.1	75.9	10.2	89.8	100
E- electricity, gas	8.8	91.2	25.8	74.2	37.1	62.9	12.9	87.1	100
F- construction	1.4	98.6	7.0	93.0	14.1	85.9	3.5	96.5	100
G- retail sale and retail trade…	7.5	92.5	31.5	68.5	44.5	85.9	16.0	84.0	100
H- hotels and restaurants	3.2	96.8	3.4	96.6	18.0	82.0	5.2	94.8	100
I- transport, storage and communic.	8.2	91.8	27.7	72.3	33.2	66.8	16.1	83.9	100
J- financial intermediation	28.4	71.6	74.0	28.0	84.2	15.8	40.4	59.6	100
K- real-estate, renting, business serv	12.9	87.1	34.2	65.8	36.2	63.8	17.4	82.6	100
M- education	7.2	92.8	9.9	90.1	16.7	83.3	9.2	90.8	100
N- health and social work	4.5	95.5	9.6	90.4	12.3	87.7	6.0	94.0	100
O- other com. services and personal	6.7	93.3	17.1	82.9	21.8	78.2	9.8	90.2	100
TOTAL	**7.1**	**92.9**	**20.2**	**79.8**	**27.7**	**72.3**	**12.4**	**87.6**	100

(1) = one modem for data transmission
(2) = no modem for data transmission

It is clear that the two questions put in the PMI survey questionnaire catch only a particular feature of the spread of information and communication technologies and of their use. The enlargement of the scope of the PMI survey questionnaire by including more and different questions represents an opportunity of paramount importance.

There is no availability of data for big enterprises, therefore the SCI survey on the balance-sheets of firms with more than 20 persons employed is another source to take advantage of in order to investigate on the use and spread of ICT.

2.6. AIPA Project

AIPA is a National Authority for Information Technology in the Government whose task is monitoring the project of diffusion of IT in the Government. To this aim the Authority yearly prepares a statement on the project carried out.

The report on automation of Central Government and of non-economic institutions was composed on the basis of reports from 57 administrations, of which 33 were State central government and 24 were National non-economic units.

The1996 reports data on: Data Processing Centres, organisation structure, personnel, training, funds for new technologies, projects, activities implemented by administrations with the aim to provide an exhaustive state-of-the-art picture of processes to diffuse information technologies in government.

The complete sets of variables on automation process in Government for which data are elaborated are reported in the appendix 3. From that data the use of IT can be derived.

Year after year data become more complete and it is possible to have a detailed analysis of ICT use in Government.

Moreover, several indicators are elaborated from the data coming from the single registers. Some of them are summarised below:

Technological indicators:

- storage capacity per workstation,
- application software per employee,
- size of data-basis per employee,
- ratio of application software 1996-1995,
- ratio of terminals to workstations

Organisation indicators

- decentralised processing,
- decentralised information,
- ratio of IT employees 1996-1995,
- central workstation for O.U. employees,
- peripheral workstations for O.U. employees 1996,
- ratio of centralised O.U. workstations to total workstations 1996,
- ratio of centralised O.U. storage capacity to total storage capacity,
- training days per student

Expenditure indicators

- per workstation,
- per power processing unit,
- per storage device,
- per employee,
- ratio of 1996-1995 expenditure,
- ratio of expenditure for innovation projects 1996-1995,
- ratio of expenditure for servicing and management 1996-1995

Actual coverage indicators

- ratio of workstations to employees

Logging indicators

- workstations logged to a local area network as a proportion of total workstations,
- workstations logged to a wide area network as proportion of total workstations

In 1996 for the first time an analysis of data quality was carried out on a sample from an important database of State administrations. Problems arising from data quality were discovered in a limited analysis of registers.
Interventions are required to improve the quality of data stored in the computing system. Interventions are to be made both on data and processes generating concerned data. Interventions should be "healing" that is improve data quality after the process, and "preventive", to avoid, as much as possible, the processing of faulty, incomplete or inconsistent data.
Selected topics from that report are presented here.

2.6.1. Penetration and Use of Information Technology in Government

From the 1996 report it can be derived that there are marked trends towards an evolution of computing in Government. This evolution is oriented to a better use of information technologies. Positive aspects are recorded for expenditure and for the enhancement of user/system interface, whereas there are still problems concerning a full and convinced adoption (from a technological and organisational standpoint) of the co-operation architecture of the unified network. Tables 7,8,9 are been elaborated from the 1996 report.
As concern technological resources in table 7 we can see the equipment spread in term of mainframe and personal computers.
The computing power of operating mainframes (in Mips) grew by 10% from 1995. Storage capacity rose by 19%, growth was partly due the natural increase of registers. Personal computers grew by 30% from 1995. However, this sharp increase is not only the result of purchases of new equipment (such as the Ministry of Finance, Carabinieri, and Social Security) but it is also due to more accurate inventories of equipment, (for example Ministry of Industry and the Ministry of Foreign Affairs). Some administrations have made remarkable efforts to increase basic automation (Carabinieri) or to re-organise the structure aiming at a real decentralisation (Social Security and INPDAP).

Table 7– *Technological Resources*

Administration	Computing power (Mips)		Storage space on disk (Gbyte)		Personal computer		Terminals	
	1996	**1995**	**1996**	**1995**	**1996**	**1995**	**1996**	**1995**
Total central government (28)	2,113	1,872	5,834	5,025	97,048	72,743	37,781	20,764
Total Public bodies (18)	1,791	1,688	8,022	6,626	45,964	36,976	6,687	9,200
TOTAL	**3,904**	**3,560**	**13,855**	**11,651**	**143,012**	**109,719**	**44,468**	**29,964**

Source: AIPA

Human resources devoted to IT are still limited as we can see in table 8. Only 4.0% of the total employees in Government are employed in IT activities and 4.6% on the total employees in public bodies.

Table 8 – *Human Resources*

Administration	Number of employees			Number of persons employed in IT	Num. of persons employed for planning and co-ordination
	Central	**Not central**	**Total**		
Total central government (28)	42,489	439,423	481,912	19,442	192
Total Public bodies	18,856	51,220	70,076	3,220	76

(18)					
TOTAL	**61,345**	**490,643**	**551,988**	**22,762**	**268**

Source: AIPA

As concern expenditure in 1996 decreased compared with 1995, as in table 9. This could mean more effective investments in IT.

Table 9 - *Total Expenditure for Information Technology in 1996 and for only those administrations included in 1995 and 1996 (in millions of lira)*

Admin.	**1996**			**1996***			**1995**		
	Develop.	**Servic., manage.**	**Total**	**Develop.**	**Servic., manage.**	**Total**	**Develop.**	**Servic., manage.**	**Total**
Tot. central government (28)	742,430	1,234,313	1,976,743	715,948	1,196,835	1,912,783	885,382	1,357,431	2,242,813
Tot. Public bodies (18)	246,542	427,313	673,855	243,496	422,063	665,559	131,359	486,874	618,233
TOTAL	**988,972**	**1,661,626**	**2,650,598**	**959,444**	**1,618,898**	**2,578,342**	**1,016,741**	**1,844,305**	**2,861,046**
* Data from the administrations which sent their reports for the two years									

Source: AIPA

The complexity and difficulty of actions still to be performed is acknowledged. Nevertheless the results achieved and the projects started should be considered positive, namely: base automation, the Unified Net of Government and the related intersector projects, the implementation of more and more up-to-data devices

Not only represent the achieved results the evidence of a more prudent management of financial results and of a better-planned technological enhancement, but also of an increasing citizen orientation of services. For this latter aspect, it is necessari that Administration change its way of thinking to overcome the cultural gap created by the adoption of the Unified Net. Besides it must learn and apply the innovations brought by distributed and co-operative computing.

Therefore great attention is to be paid to the management of change, taking care of all those aspects related to organisation and personnel training. In fact new technologies do not solve problems, but are the required condition to lead the services provided by our Administrations to the levels prevailing in the other Member States.

2.7 Multipurpose Survey

Selected parts of the ISTAT survey for the part of “spare time and cultural activities” published in 1997 are presented here. The survey collect data related to the use of personal computer, television, radio, cinema and other entertainment activities. In particular we will analyse the use of personal computer.

2.7.1. Description of the Survey:

From 1993, a new type of sampling has been adopted for the multipurpose survey. Resident population in Italy is the reference population of the survey, people permanently living in communities are not included. It is a yearly survey and all the members of sampled households are directly interviewed. Information are gathered during one week in November and refer to the twelve months preceding the survey data.

The survey provides estimates referred to:

1. the whole country;

2. the five geographical areas (North-East Italy, North-West Italy, Central Italy, South Italy, Islands);
3. regions (Trentino Alto Adige is not included, estimates are separately processed for the provinces of Trento e Bolzano);
4. six areas based on municipalities' socio-demographic type.

59,916 people were interviewed in 1995.
Cluster sampling was adopted. Sampling strategy defines sample numerousness by subsequent approximations. At national level the household sample cannot exceed 24,000 households. This size was essentially determined according to cost and operational criteria.
Survey estimates are calculated using a tied weighting estimator, which is the standard estimate method for the majority of ISTAT surveys on enterprises and households.
The main characteristics related to personal computer processed in the survey are listed here:
Presence of one computer at home and its use:

- people aged 6 and over by presence one computer at home and its use, by sex and age class,
- …"…, by region, geographical area and type of municipality
- people aged 14 and over by presence one computer at home and its use, by condition, position held in the job,

Frequency of use of home computers:

- people aged 6 and over by age class, frequency of use of computer at home by type of activity carried out and sex;
- …"… by region, geographical area, type of municipality,
- people aged 14 and over by condition, position held in the job, qualifications, frequency of use of computer at home

2.7.2. Penetration and Use of Personal Computers in Italian Households

The mass diffusion of computers is a fast growing phenomenon, different aspects of daily life are concerned, such as spare time. Therefore, in the survey there should be a section to get more details on the diffusion and use of new technologies. In the questionnaire, people aged 6 and over were asked whether a computer was present at home, if it was used, and if so, for which kind of activity. It should be underlined that the survey gathered data not only on personal computers but also on any type of computing equipment. Thus estimates include, besides personal computers, also other equipment such as videogame playstation, audio computing equipment and any other type of computing equipment.
Using this broad meaning of the term "computer", the survey showed that 22.5 % people have a computer at home, that is about 12 million people (6 million and a half men, 5 million and a half women). The fact that there is a computer at home does not imply that all household members use it. In fact, taking into account the total population, the percentage of people using a computer at home is about 12.3% (even in this case there are more men, 16.9%, while women are 8%) whereas if the number of users is related to the number of owners, the figures of men and women using the computer are respectively 67.1% and 40%, thus users are 54.6% of computer owners (tables 10 and 11).

Table 10 - *People aged 6 and over by sex and presence of a computer at home - 1995*
(data in thousands and per 100 people of the same sex)

	Males	**Females**	**Males and females**	**Males**	**Females**	**Males and females**
COMPUTER AT HOME						

Yes	6,512	5,550	12,061	25.1	20.1	22.5
Not	19,330	21,946	41,275	74.5	79.4	77.0

Table 11 - *People aged 6 and over by computer use at home and sex - 1995*
(data in thousands and per 100 people of the same sex)

	USE OF COMPUTER AT HOME			
	yes	not	yes (*)	yes (**)
MALES	4,372	2,134	67.1	16.9
FEMALES	2,220	3,315	40.0	8.0
MALES AND FEMALES	6,591	5,449	54.6	12.3

(*) per 100 people with personal computer at home
(**) per 100 people aged 6 and over

With reference to professional status and position held in the job, it is important to point out that computers can be mainly found in the homes of students, (47% boys and 32% girls) of manager, entrepreneurs and professionals (men 44%, women 41%).
Use percentage show that students use computers very intensively (boys 88.8%and girls 76%) as well as managers, entrepreneurs professionals, clerks, senior and executive cadres (with use percentage from 43% to 73%).
It is interesting to point out that male-managers have a lower percentage use (69.4%) than clerks (73.5%) whereas female managers use more the computer at home (55.2%) than female clerks (43.3%) (table 12).

Table 12 - *People aged 14 and over by presence of computer and use at home, professional status and sex - 1995* (per 100 people with the same characteristics)

	Computer at home	**Computer used at home**	**Computer at home**	**Computer used at home (*)**	**Computer used at home (**)**
MALES					
Employed	3,492	2,167	26.6	62.0	16.5
Managers, entrepreneurs, professionals	*632*	*438*	*44.2*	*69.4*	*30.7*
senior executives, executive cadres, clerks	*1,376*	*1,011*	*35.1*	*73.5*	*25.8*
Workers	*812*	*408*	*16.3*	*50.3*	*8.2*
self-employed and assistants	*672*	*309*	*24.1*	*45.9*	*11.1*
looking for a job	120	61	16.0	50.8	8.1
seeking first employment	204	164	22.1	80.1	17.7
Students	1,200	1,066	47.4	88.8	42.1
Retired	543	132	9.8	24.4	2.4
FEMALES					
Employed	2,045	764	27.8	37.4	10.4
Managers, entrepreneurs, professionals	*153*	*84*	*41.5*	*55.2*	*22.9*
senior executives, executive cadres, clerks	*1,159*	*501*	*32.6*	*43.3*	*14.1*
Workers	*382*	*88*	*17.4*	*23.0*	*4.0*
self-employed and assistants	*351*	*91*	*28.5*	*25.8*	*7.4*
looking for a job	75	28	14.1	37.5	5.3
seeking first employment	208	144	22.1	69.1	15.3
Housewives	1,364	199	16.2	14.6	2.4
Students	825	627	32.0	76.0	24.3
Retired	383	29	7.9	7.6	0.6

(*) Per 100 people with a computer at home
(**) Per 100 aged 14 and over

As far as the use of computers is concerned, it should be underlined that among users 31% play with it, 22.6% use it to study and 60.2% to work. Across different jobs, there are great differences in computer use. Managers, professionals and entrepreneurs mainly use it to work (the same pattern can be found for senior executives, executive cadres, clerks and self-employed), whereas 48% of workers use it to play.
Play (61.3%) and study (54%) are rather common among students, whereas play and work are the main uses of computers by housewives (table 13).

Table 13 - *People aged 14 and over with a computer at home by type of computer use (at least once a week) and professional status- 1995* ***(per 100 people of the same status)***

STATUS	Play(*)	Play(**)	Study(*)	Study(**)	Work(*)	Work(**)
Employed	31.0	4.4	22.6	3.2	60.2	8.6
managers, entrepreneurs, professionals	*18.8*	*5.5*	*20.3*	*5.9*	*84.3*	*24.5*
senior executives, executive cadres, clerks	*29.7*	*6.0*	*27.0*	*5.5*	*59.9*	*12.1*
Workers	*48.4*	*3.3*	*16.5*	*1.1*	*25.8*	*1.8*
self-employed and assistants	*30.5*	*3.0*	*16.3*	*1.6*	*72.3*	*7.2*
Looking for a job	44.9	3.1	23.6	1.6	29.2	2.0
Seeking first employment	50.5	8.3	47.9	7.9	26.1	4.3
Housewives	32.2	0.8	12.6	0.3	27.6	0.7
Students	61.3	20.3	54.0	17.9	7.4	2.5
Retired	27.8	0.4	27.2	0.4	43.8	0.7

(*) per 100 with a computer at home and using it

(**) per 100 people of the same status

3. Gaps, Methodological problems, use of nomenclatures: conclusions and open questions

In the previous sections the analysis of processes created by the introduction of the new Information and Communication Technologies as well as the analysis of the related innovative processes showed the urgent need for a suitable "statistical scenario" and for a system of indicators harmonised at international level to cover the following areas:

- infrastructures
- new applications and services
- use
- consumption
- employment
- education.

As other Statistical Institutes, ISTAT have started recently the development of its statistical systems to analyse information society above all from the supply side, in particular the production and distribution of products and services related to these sectors. Aspects related to demand are not sufficiently analysed. There is a growing demand of information from Government and social parties concerning the diffusion and use of these technologies and the impact on employment. Thus statistics should be developed for the demand side, mainly because demand seems to be the determining item to develop the sectors of ICT and of economy on the whole.

1. The basic notions of enterprise and household should be revised according to the current socio-economic system. In post-tertiary economy the difference between household and enterprise disappear. There is an increase of the "green" area of non-profit voluntary organisations and the division between public and private is less net. The introduction of the new technologies, in particular of telematics, arises the problem of revising the notion of **statistical unit** used so far and of the current nomenclatures.

The traditional statistical units used for the demand, namely enterprise, household, government are not sufficient to develop surveys aimed at analysing the use of ICT and the diffusion of technologies connected to these sectors.

2. The analysis of National statistical sources showed the following **gaps** for a complete study of on-going processes:

- the ICT sector is not completely covered, at least not from specific sources; in fact manufacturing is completely "neglected".
- Useful information to analyse innovations resulting from the use of information and communication technologies in all productive sectors is provided by surveys on innovation, and research and development; however a specific "fine tuning" is required.
- As we have seen, consumption reflects the convergence process, which is involving telecommunications, information technology and content industries. Convergence becomes a paramount topic from the standpoint of global service: in fact, in a short time, multimedia services should meet a number of challenging requirements: diffusion, comprehensiveness, usability, cheapness typical of these type of services. Consumption in the ICT sectors is not easily defined using current classifications. Consumption of multimedia is not monitored The sectors of ICT and information industries are not included on the whole in the national accounting system. Thus it is recommended that satellite accounts should be established for these sectors.
- To analyse employment and education current surveys are to be more specifically adjusted as their level of data aggregation does not always allow a more accurate analysis. Surveys are needed to study the new work organisation created by ICT, es teleworking. Some information gaps would be filled by the Italian intermediate census of enterprises.
- Prices applied in these sectors are not adequately surveyed, for example consumer price indexes are available only for the following categories: 1. Electric household appliances and other household appliances; 2. Fittings, repairs; 3. Communications; 4. Entertainment services, even less goods and services are available for producer price index, where only the item for the economic activity of information industries is available.
- ICT use in not surveyed enough, especially ICT in enterprises. Only IT survey and SME survey collects a few data. The Internet and Intranet diffusion is to be further analysed, as well as the use of software, hardware and EDI, to analyse their impact of a number of factors: productive processes, business organisation and innovation processes.

3. The methodological problem of **integrating different statistical sources** is still to be solved. In fact statistical sources are based on different methods and cover different areas. Sometimes the variables are defined in different ways. However this seems to be the path to follow, developing adequate integration methods the burden of statistics can be reduced (for respondents) exploiting information already include in some existing register. The integration of different sources implies **accuracy** problems, that is precision in representing observed phenomena, **completeness** (coverage in representing the observed phenomenon), **consistency** (coherency with same information recorded in other archives), **timeliness** in updating; Faulty, incomplete or inconsistent data should be avoided by adopting suitable techniques.

4. Using nomenclatures organised by economic activity, as ISIC-NACE implies that single firms are to be considered as a set of similar economic activities, thus with similar production processes and similar productive units (a number of concepts of national accounting are based on above assumption). Current classifications are not suitable to reflect the integration processes that have taken place in the examined sectors, multimedia is a fit example. Some experiments have been carried out at international level, the US NAICS classification is an example. However experiments of different Countries are still being performed. The CPC/CPA nomenclature has to be developed in order to analysed properly the ICT sector.
Classifications adopted in the processing of consumption (COICOP) do not reflect the current convergence processes and many items related to information economy are neglected.
The new professions that were created in the field of Information and Communication Technologies are not included in the ISCO classification, as well as in the analysis of education carried out using ISCED.

5. ISTAT, which only recently has started to analyse these sectors, added to its scheduled programmes the implementation of a project to study statistical sources useful to analyse the Information Society and to develop a report for the Compendium at Community level. The result of this study should be a more clear orientation towards the analysis of on-going phenomena and statistical sources development. A great number of new surveys should be avoided and the burden on respondents should be limited. To this aim present different statistical sources should be integrated, both statistical and administrative. Existing surveys are a wealth of data, which should be more deeply exploited, trying to achieve a greater level of details to process data.

Questions:

1. Is the reference framework concerning aspects of the demand connected to information technology industries sufficiently developed? How should be the problems of "integrated" consumption solved? In this regard it is essential to have international forums to discuss this aspect (OECD, EUROSTAT, Voorburg Group).

2. Should other Countries adopt existing surveys on households, enterprises and Government to develop demand side data? Is it necessary to define other statistical units (non-profit organisations)? Do these surveys cover all the needs for analysing these sectors?

3. Is it possible to develop nomenclatures reflecting the new products and services connected to information industries, since these processes develop at a very fast pace?

4. Should methodological experiments concerning data collection through information and communication technologies be promoted?

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Appendix 1

ICT sectors			
ISIC REV_3		**NACERev.1 - *ATECO91***	
Manufacturing industry		***Manufacturing industry***	
3000	Manufacture of office, accounting and computing machinery	30.00	Manufacture of office, accounting and computing machinery
3130	Manufacture of insulated wire and cable	31.30	Manufacture of insulated wire and cable
3210	Manufacture of electronic valves and tubes and other electronic components	32.10	Manufacture of electronic valves and tubes and other electronic components
3220	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	32.20	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
		32.20.1	*Manufacture and assembling of Radio-TV transmitters (videocams and audio electrical apparatus are included)*
		32.20.2	*Manufacture of electrical and electronic apparatus for telecommunications (Assembling is included)*
		32.20.3	*Repairing of radio-TV, acoustic amplification, electrical and electronic apparatus*
3230	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods	32.30	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
3312	Manufact. of instrum. and appliances for measuring, checking, testing and other purposes, exc. Industrial process control equip.	33.20	Manufacture of instrum. and appliances for measuring, checking, testing and other purposes, exc. industrial process control equipment
		33.20.1	*Manufacture of electrical and electronic instruments for measuring*
		33.20.2	*Manufacture of meters for gas, water and other liquids and of instruments for measuring, control and tuning*
		33.20.3	*Manufacture of instruments for navigation, hydrology, geophysics and meteorology*
		33.20.4	*Manufacture of instrum. For design,calculation, dimension and precision of precision and analytical balances, of instrum. for laboratory and for educational material*
		33.20.5	*Repairing of scientific and precision instruments*
3313	Manufacture of industrial process control equipment	33.30	Manufacture of industrial process control equipment
Services – good related		***Services - good related***	
5150	Wholesale of machinery, equipment and supplies **(1)**	51.43p	Wholesale of household appliance, audio apparatus, television
		51.43.2	*Wholesale of radio-television apparatus*
		51.43.3	*Wholesale of audio, video and computer supports (disc, tapes, other supports)*
		51.43.4	*Wholesale of radio-electric, telephonic and tv material*
		51.43.5	*Wholesale of apparatus for illumination and other electrical material*
		51.43.6	*Wholesale not specialised of household appliance, radio apparatus, television, radio-electric, telephonic and tv material, apparatus*

			for illumination and other electric material
		51.64	Wholesale of office equipment and machinery
		51.64.1	*Wholesale of typewriters and calculation equipment*
		51.64.2	*Wholesale of office equipment excl. Furniture*
		51.65	Wholesale of other machinery for industry, trade and navigation
7123	Renting of office machinery and equipment (including computers)	71.33	Renting of office machinery and equipment (including computers)
Services – intangible		***Services – intangible***	
6420	Telecommunications **(2)**	64.20	Telecommunications
		92.20	*Radio and television activities* **(2)**
7200	Computer and related activities	72.00	Computer and related activities
		72.10	Hardware consultancy
		72.20	Software consultancy and supply
		72.30	Data processing
		72.40	Database activities
		72.50	Maintenance and repair of office, accounting and computing machinery
		72.60	Other computer related activities
		72.60.1	*Services of telematics, robotics and eidomatics*
		72.60.2	*Other services related to informatics*

(1) Where available, countries should only include those subsectors of this industry that directly provide ICT wholesaling services. This will avoid the inclusion of extraneous wholesaling activity. For example, using the NACE nomenclature, only NACE categories 5143, 5164, 5165 should be included.

ISIC_Rev.3 class 5233 (Retail sale of household appliances, articles and equipment) was excluded because the classification was felt to be inaccurate for the purpose intended. The same argument applied to wholesale trade but it possible there to offer guidelines for more precise reporting using NACE (see note 1)

(2) In those instances where countries include telecommunication activities as part of radio and television activities (ISIC 9213), radio and television activities (9213) should be included in this definition. Otherwise, it should not be included.

Criteria for inclusion of manufacturing and service industries in the ICT sector should be as below:

Manufacturing: the products of a candidate industry must

- be intended to fulfil the function of information processing and communication including transmission and display

Or

- use electronic processing to detect, measure and/or record physical phenomena, or to control a physical process;

Components primarily intended for use in such products are also included

Services: the products of a candidate industry must

- be intended to enable the function of information processing and communication by electronic means

Industries related to content			
ISIC REV_3		**NACERev. 1 - *ATECO91***	
2211 [(a)]	Publishing of books, brochures, musical books and other publications	22.11	Publishing of books, brochures, musical books and other publications
2212 [(a)]	Publishing of newspapers, journals and periodicals	22.12	Publishing of newspapers
		22.13	Publishing of journals and periodicals
2213 [(b)]	Publishing of recorded media	22.14	Publishing of recorded media
2219 [(a)]	Other publishing	22.15	Other publishing
2230 [(b)]	Reproduction of recorded media	22.3	Reproduction of recorded media
		22.31	Reproduction of recorded audio media
		22.32	Reproduction of recorded video media
		22.33	Reproduction of recorded informatics media
9211 [(a)]	Motion picture and video production and distribution	92.11	Motion picture and video production
		92.12	Motion picture and video distribution
		92.13	Projection of video and motion picture
9213 [(b)]	Radio and television activities	92.20	Radio and television activities
9220 [(a)]	News agency activities	92.40	News agency activities
9231 [(a)]	Library and archives activities	92.51	Library and archives activities
(a)	***Not in ICT industry***		
(b)	***Partly relevant to ICT***		

Definition of *Information Content Industries*

Those businesses associated with the provision of information either directly to consumers or through some intermediary who transforms that information into some other medium. The set of industries is therefore made up of the traditional media businesses, such as newspapers and radio and television broadcasters along with elements of the cultural industries which provide the raw material input to the media for delivery; it also includes libraries.

Appendix 2

ITALIAN STATISTICAL SOURCES for THE COMPENDIUM ON INFORMATION SOCIETY

	ISTAT Sources		Other National Sources	
VARIABLES	**Specific**	**Non Specific**	**Public**	**Private**
Introduction			AIPA	AIIP, ALCHERA, ANASIN, ANEE, ANIE, ANUIT, ASSINFORM, ASSINTEL, CSELT, FEDERINFORMATICA, FRT, FTI, IPO, SDA Bocconi
Value added		SME survey, SCI survey, Intermediate Census (1997) National Account (more aggregate industries)		
Employment	IT survey, Audiov. Survey	" and Labour force survey		
Trade (imports, exports)	Audiov survey	SME survey, SCI survey, Intermediate Census		
Consumption of ICT goods and services		Households consumption survey, National Accounts (more aggregate industries), Intermediate Census	AIPA	
Penetration of ICT goods and services	IT survey, IP survey, Audio-visual project	SME survey, Multipurpose survey Intermediate Census	AIPA	
Infrastructure	Audio-visual project, Telecom project			
Enterprises				
Number of enterprises	IT survey, IP survey, Audiov survey	Business Register, SME survey, SCI survey, Intermediate census		
Number of local unit		"		
Size classes	"	"		
Legal forms	"	"		
Affiliation		"		
Foreign ownership	IT survey	"		
Receipts and expenditures	IT survey, IP survey, Audiov survey	"		
Profitability		SME survey, SCI survey, Intermediate Census		
Value added	IT survey, Audiov survey	" and National account (more aggregate industries)		
GDP		National accounts (more aggregate industries)		
Taxes paid		SME survey, SCI survey, Intermediate Census		
Investments	IT survey, Audiov survey	"		
Employment (total worked hours)	"	"		
Production of ICT goods and services	IT survey, IP survey, Audiov survey	"		
Exports (origin and destination)	Audiov survey	"		
Imports (origin and destination)	Audiov survey	"		
Distributive trade in ICT goods and services				
Employment in information occupations				

Employees per occupation/per industry (2,3 digits)	IT survey	SME survey, SCI survey, Labour Force survey (2 digits), Intermediate Census		
Occupation in ICT sector		Labour Force survey (2 digits)		
Organisation of work				
New form of occupations				
Education				
Number of degrees		Education survey, Labour force survey		
Type of education by sector	IT survey	"		
Attainment level by sector				
Vocational and adult training		Vocational and Adult Training survey		
Technological change				
R&D in ICT sector:money		R&D survey, Innovation on manufacturing sector survey, Innovation on services sector survey		
R&D in ICT sector:labour		R&D survey		
Third party for R&D		"		
Number of patents				IPO
Royalties				
Pricing and wages				
Consumer prices:fixed, usage, peak hours, off peak hours		Consumer prices survey (not all goods and services of ICT)		
Producer prices				
National currencies (ECUs, PPP prices)		National accounts (more aggregate level)		
Wages		Labour cost survey		
Cost of internet access	IP survey			
Use of information technology and ICT products				
Use of ICT by households	IT survey	Multipurpose survey		
Use of ICT by individuals				
Use of ICT by enterprises	IT survey	SME survey, Intermediate Census		
Use of ICT by public sector	IT survey		AIPA	
Use of ICT by other organisations				
Use of ICT in the home		Multipurpose survey		
Use of ICT at work		"		
Use of ICT at leisure time		"		
Use by gender		"		
Use by region		"		
Use by age		"		
Purpose of the use of ICT				

LEGENDA	
SME Survey	*small and medium size enterprises (less then 20 employed)*
SCI Survey	*big size enterprises (ugual and more then 20 employed)*
IT Survey	*Information Technology survey (all size employed)*
Audio-visual Survey	*pilot survey for 1992 year (all size employed)*
IP Survey	*Internet Providers survey for 1997 year*
Multipurpose Survey	*(use of time) on households from 1995*
Telecommunication Project	*analysis of data from "specific" survey and other statistical sources*
Audio-visual Project	*analysis of data from "specific" survey and other statistical sources*
AIIP	*Italian Association of Internet Providers*
AIPA	*National Authority for Information Technology in the Government*
ALCHERA Strategic Vision	*Observatory - Hi Tech Monitor*
ANASIN	*National Association of Telematics and Computer Science Enterprises*
ANEE	*National Association of electronic editors*
ANIE	*Italian Federation of Electrotechnical and Electronics Industries*
ANUIT	*Italian Telecommunications Users Association*
ASSINFORM	*Italian Information Communication Technology Companies Association*
ASSINTEL	*Italian Association of Information Technology Companies*
CSELT	*Society of research and laboratories of telecommunication*

FEDERINFORMATICA	*Italian Federation of Organisations of Information and Communication Technology*
FRT	*Radio Televisions Federation*
FTI	*Forum on Information Technology*
IPO	*Italian Patent Office*
SDA Bocconi	*Observatory on Internet of Bocconi University*

Appendix 3

AIPA INDICATORS

Technology characteristics

1. Application software in Kloc (Cobol).
2. Data base by hardware platform
3. Data base by type of distribution
4. Data base distribution by subject in administrations and Data Processing Centres
5. DBMS data base
6. Dumb terminals in State central government
7. Mainframe: computing power and storage space on disk
8. Personal computer in State central government
9. Personal computers and terminals
10. Technological indicators (storage capacity per workstation, application software per employee, size of data-basis per employee, ratio of application software 1996-1995, ratio of terminals to workstations)

Labour and organisation

1. Activity and level of quality
2. Automated places of work in Central administration
3. Human resource used to manage Administration
4. Human resources
5. Organisation indicators (decentralised processing, decentralised information, ratio of IT employees 1996-1995, central workstation for O.U. employees, peripheral workstations for O.U. employees 1996, ratio of centralised O.U. workstations to total workstations 1996, ratio of centralised O.U. storage capacity to total storage capacity, training days per student)
6. Organisation maturity level of Data Processing Centres, by Administration
7. Training
8. Type of workload

Resources

1. Resources for computing in State central government: plan and balance data for 1996
2. Resources for computing in State central government: year 1996 (billions of lira)

Costs

1. Expenditure for Information Technology, years 1995 and 1996. Details of development items, details of servicing and management items (in millions of lira)
2. Expenditure indicators (per workstation, per power processing unit, per storage device, per employee, ratio of 1996-1995 expenditure, ratio of expenditure for innovation projects 1996-1995, ratio of expenditure for servicing and management 1996-1995)
3. Expenditure of the IT market IT (in billions of lira) and distribution in 1995-1996
4. Payments for heterogeneous budget items or for budget items specific for computing. State central government
5. Total Expenditure for Information Technology in 1996 and for only those administrations included in 1995 and 1996 (in millions of lira and percentage value)
6. Trend of expenditure to purchase IT goods and services. (appropriations in millions of lira)

Contracted services

1. Amount for consultants. State central government, Public bodies, year 1996 (millions of lira)
2. Appropriations and agreements. Year 1996
3. Appropriations, agreements and consultants (millions of lira). Year 1996
4. Main suppliers of Public Administration in 1996

Supply of services

1. Partial and total difficulties
2. Quality level and amount of activities carried out by Administration
3. Quality of services provided per each Data Processing Centre
4. Relation of monitoring to controls performed by internal or external controllers
5. Status of projects on 31.12.1996 in Public Bodies
6. Status of projects on 31.12.1996 in State central government
7. Types of services provided by Data Processing Centres (average figure by Administration)

Use of ICT

1. Actual coverage indicators (ratio of workstations to employees)
2. Level of computing power use during peaks
3. Logging indicators (workstations logged to a local area network as a proportion of total workstations, workstations logged to a wide area network as proportion of total workstations)
4. Sales and number of systems installed in Italy
5. Services market in the years 1995 -1996 (in billions of lira)
6. Size ad use of processing capabilities of public administrations
7. Size and use of processing capabilities of Data Processing Centres

8. Size and use of processing capabilities of public administrations per PdL
9. Software and services market in the years 1995 -1996 (in billions of lira)
10. Workload type of Data Processing Centres (average by Administration) during peaks