

## Perspectives

# Management of standardised public services: a comprehensive approach to quality assessment

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### Keywords

Public sector, Service, Quality management, Performance measurement, Water industry

### Abstract

Proposes a comprehensive approach to support the activities of companies that provide public services. This approach consists of several steps. Defines an appropriate set of performance indicators, and the choice of an appropriate evaluation technique and its application to the services involved. Enables managers of organisations operating in public services to derive operational frameworks based on: an analysis of the information flows among different stakeholders involved in service processes; and the identification of a set of indicators allowing evaluation of the performance level in order to develop quality control systems. Presents an application of the approach to the case of the water supply service in Italy.

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## 1. Service quality: a new challenge for public sector management

Control of public service quality is a recent trend in the context of public management. Most services in the public sector were originally conceived in response to the failure of the commercial or private sector to deliver adequate quality in key areas for the well-being of society as a whole. Since then, quality in the public sector domain has traditionally been a response to failure. The attention of public sector organisations has more recently been concerned with ensuring that their services are not merely responsive, but are as consistent and fair as possible in meeting public needs (Donnelly, 1999).

For more than a decade, there has been significant public sector reform at all levels of government. Such reform has been stimulated by increasing difficulties in public sector financing, coupled with pressure caused by the globalisation of most aspects of social and economic life. Most public sector organisations have a variety of customers paying directly or indirectly for services. Other customers make little or no financial contribution towards the provision of services, and yet another type of customer might pay for a particular public service, but not experience its benefits through direct use (Donnelly *et al.*, 1995).

Although there has been an assumption in the past that reaching people and delivering services constituted "effectiveness", in times of limited resources there is an increasing demand on public agencies to demonstrate their value to society (Navaratnam and Harris, 1995). There is also an increasing demand for customer service initiatives, and these often have to be funded on a shoestring budget, or resourced through budget reallocation away from other activities (Donnelly *et al.*, 1995). Modern communications, with the wide dissemination of information to the general public, also produces increasing expectations and demands. A natural response to all these factors has been the development of new methods for improving performance.

At the heart of most public sector reform initiatives has been the philosophy that value

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for money can best be achieved by a separation of roles between those who set the policy and those who deliver the service. This shift to a more contract-based system gives public service managers freedom to manage the operational delivery of services – within the policy and resources framework established by political authorities. Within this framework, however, managers should have incentives to use their freedom to improve the efficiency and effectiveness of their organisation. In the private sector, this incentive is supplied by the competitive nature of the market (that is, low-quality organisations go out of business). Most public sector services, by contrast, do not operate in a competitive environment, and therefore do not experience this pressure to improve. A significant stimulus to improve performance has been the creation of alternative means of replicating the sort of competitive pressure that exists in the private sector. These alternative means have included a requirement by central government for local authorities to put certain activities out to competitive tender, and a requirement for all public services to consider areas of work that might be transferred to the private sector (Cowper and Samuels, 1997). The underlying assumptions have been that the private sector is more efficient than the public sector, and that by applying commercial models of management and quality improvement, standards of services can be increased without any increase in public spending. Quality management has become one of the main methods of meeting the challenges posed by the increasing economic pressure on public expenditure. Quality initiatives have been linked to the commercialisation of public services, and to the needs and demands of sovereign customers in the market place. The quality of outputs has become a focus of attention, rather than a mere examination of the value of inputs. Quality management has come to be viewed as the answer to the main criticisms of public services – inefficiency, wastefulness, and remoteness from those whom they serve (Erridge *et al.*, 1998). Quality has come to be defined in terms of fixed standards (representing fitness for use) and now allows for external models of evaluation (such as quality audits). This approach has ensured that clear standards have been set up, and that resources have been used as efficiently as

possible to meet these standards (Kirkpatrick and Lucio, 1995).

During the 1990s, public service quality initiatives have been launched in numerous countries at various levels of government. These initiatives have involved:

- professional standard setting;
- service excellence based on users' perception of quality;
- government-granted rights and choice for consumers; and
- involvement of consumer movements.

Some public sector organisations have tended to follow a strategy for quality improvement that is somewhat fragmented in that it commences with one particular aspect of quality improvement, without having an overall or integrated plan (Navaratnam and Harris, 1995).

Performance information can help to meet the challenge of new methods in programming and in quality service delivery. The investment in time, effort, and resources is considerable, but it is an investment that has to be made – because performance information is critical in the overall management of programs, organisations, and operational units (Barrett, 1998). Moreover, in the case of public services that operate as monopolies, dissatisfied users who wish to improve service performance have no means of doing so – other than by giving voice to their dissatisfaction (Andreassen, 1994). Such protest can be practically applied only when institutional authorities regulating the provision of the service have sufficient information to check the level of service quality. Economic theory has analysed the behaviour of monopolistic markets in terms of offered quality. These analyses indicate that improved quality means greater cost. However, they fail to consider how different approaches to the management of quality have potential to eliminate waste and non-value-added activities from the business processes (Dewhurst *et al.*, 1999). In this, the benchmarking approach is becoming more suitable in the public service sector, particularly when the lack of competitive motivation has to be replaced by performance control by regulatory authorities (Keehley and MacBride, 1997).

The continuous need for improving both efficiency and effectiveness in a situation of scarce resources and rising public

expectations in the public sector (that is, civil services, health management, and so on) is one of the major challenges faced by managers in the public sector all over the world. Public managers need to update their role by redesigning objectives and work positions, and by taking into account legal constraints and innovations. In such a modified situation, it is not sufficient to re-engineer established operative systems. It is also necessary to assign a key role to quality management.

Many pressures on the public sector now make quality management appear much more attractive. However, such quality management can be perceived merely as a fashionable management practice, unless distinctive systems for quality management in public services are developed, avoiding uncritical adoption of private sector practices (Redman *et al.*, 1995).

This paper contributes to these needs of public sector management by indicating how concepts of quality control and management can be developed and applied in the improvement and evaluation of quality in the sector of standardised public services (SPSs), particularly with reference to network services. Therefore, after discussing the main issues in SPSs, this paper presents a comprehensive approach for quality control in SPSs, and an application to water supply service in particular. The last part of the paper provides suggestions to managers on how to apply the proposed approach in improving efficiency and effectiveness in their organisations.

## 2. Standardised public service management

SPSs have a strong tangible component – the supply is on request with formalised relationships, the supply is based on technical facilities, and supply and transaction are both made at long distances. Changes at both technical and organisational levels are due mainly to changes in the legal framework, especially in Italy. Examples of SPSs are services for providing water, electricity, gas, and so on.

In the past decade, there has been a rapid growth in the international literature on SPS management. In particular, quality management has been increasingly analysed,

while taking into account the social aspects of these services, and the effects on consumers. With some services (for example, electricity, gas, and water), technological choices affect both service quality and the environment, and such services therefore have to be provided taking into account environmental and social needs as well as technical efficiency (Mele, 1993; Sanderson, 1996). The definition of these needs for public organisation is a political question, whereas the way in which they are satisfied is the responsibility of the SPS itself (Dewhurst *et al.*, 1999).

Quality management needs to be particularised to the characteristics of the different types of public service. For example, the driver for the professional services (such as health and education) should be the capacity to provide a customised service, whereas, in the standardised services, productivity or fixed standards tend to prevail (Bonetti and Furnari, 1996).

Relevant dimensions in defining public service quality should then take into account three main aspects (Van der Steen, 1996):

- (1) Is the service useful?
- (2) Is the service appropriate and effective in attaining its own objectives?
- (3) Is the service efficient from the technical and economic points of view?

Therefore, the total quality concept in the public sector should be comprehensive – not only in consistency of service and in meeting customers' expectations (useful, effective, appropriate), but also in the efficiency of technical and organisational processes. Such aspects strongly influence value generation for customers (with regard to efficiency, effectiveness, and appropriateness) (Sanderson, 1996; Curry and Herbert, 1998; Erridge *et al.*, 1998; Boland and Fowler, 2000).

The increased complexity in the relationships between users and providers of public services makes the finding of a compromise between efficiency and effectiveness all the more critical. Generally, such a compromise has been modelled between the needs of productivity and the needs of customer satisfaction. Following this approach, from both managerial and organisational points of view, efficiency and effectiveness became the contemporaneous objectives of the whole business process (Cercola and Bonetti, 1999; Gilbert and Parhizgari, 2000). This is a complex process

in the standardised services due to the number of interconnected processes carried out, and to the number of subjects involved in the provision of the services (both private and public). Moreover, the level of complexity is increasing – due to the low degree of an innovative managerial culture inside the firms.

The major problem in SPS management seems to be in the definition of a methodology for analysing the quality level of the service that they provide. A comprehensive evaluation approach for such quality analysis is presented below.

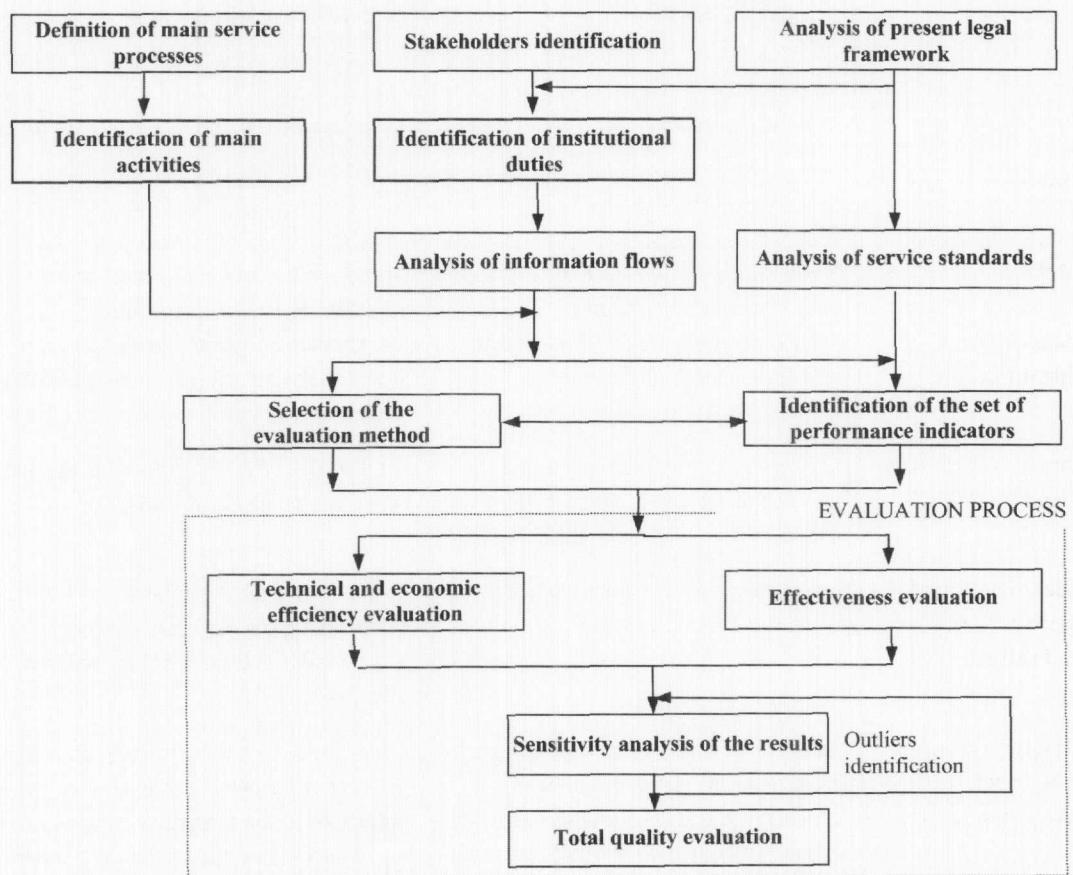
### 3. A comprehensive approach for evaluating quality level

The approach proposed in the present paper for analysing firms that provide standardised public services has been developed to constitute a basic step for a regulatory authority in defining an incentive system that aims to enhance efficiency and effectiveness (quality) in the sector. The methodological approach is shown in Figure 1.

The proposed approach consists of different steps (Ancarani *et al.*, 2000). The first step is the identification of main processes and main activities that characterise the service provided. The second step is the identification of the stakeholders and the definition of the information flows among them. The third step is the analysis of present normative statements and service standards. All of these steps should be considered before the evaluation process itself.

The fourth step is the definition of the performance measurement method. Performances of the involved utilities should be analysed through suitable measurement systems to evaluate the rationality and results of the technical and economic choices (Mwita, 2000). If a quantitative approach to SPS quality management is considered sufficient, then the total quality level of the services can be evaluated by means of the efficiencies (both technical and economic) and the effectiveness attained by the firms in providing the analysed service. Then, by assuming the coincidence between the total quality concept and the efficiency and effectiveness concepts in providing SPSs

Figure 1 Scheme of the proposed framework for evaluating quality level in providing standardised public services





(Ancarani, 1999a), the econometric methods can be considered suitable for a comprehensive evaluation. The next step of the methodology, from the point of view of a regulatory authority, is the definition of the minimum set of indicators enabling the identification of the level of service provided by the different firms. It should be selected by taking into account the aim of the evaluation to be carried out, and the selected evaluation method. This definition is a critical aspect – due to the difficulties in collecting the information without an appropriate scheme of incentives to stimulate such a collection. In Table I, the main steps of the scheme are explained in terms of aim and methods of application.

In order to show how it is possible to apply the comprehensive approach to the case of a specific SPS, an application to a water supply service in Italy is reported below. The application is limited to the main steps described above.

#### 4. Application to water supply service in Italy

Because it is representative of SPSs (such as gas, electricity, and so on), a water supply service, a standardised public service provided under natural monopoly conditions, can be

considered as a suitable case study for the application of the proposed framework.

In the past 15 years or so, the management of a water supply service has changed radically. From the perspective of the users, evaluation of the service used to be assessed only in terms of the reliability of the supply and quality of the water. A growing awareness of water as a scarce resource to be preserved for future generations has driven water firms towards a more responsive, cost-effective, customer-oriented way of operating. All over the world, despite the fact that water utilities are among the most conservative organisations, many have stepped forward and have begun the climb towards a higher standard of performance (Ancarani, 1999b).

The public services in Italy have not escaped this general trend, but the re-engineering of water supply services has been limited (especially in the south of Italy) by structural and managerial deficiencies. The low quality of the products and services increases the need for an accurate analysis of inefficiencies, with a view to determining the remedial actions required. In particular, specific guidelines on guaranteed standards of water services have been issued by the Prime Minister Decree 47/96.

According to the comprehensive approach proposed earlier in this paper, once the main activities have been defined, the next step is the identification of stakeholders in terms of

Table I Main steps of the proposed framework

Work phase	Aim	Application
<b>Definition of main service processes</b>	Service characterisation and identification of the activities to be monitored	Analysis of the service processes and identification of main activities
<b>Stakeholders identification</b>	Identification of the role and relationships between the involved subjects	Identification of number, type and aims of stakeholders and analysis of the information flows among them
<b>Analysis of present legal framework</b>	Identification of legal constraints and definition of the role of the involved public authorities	Identification of the institutional duties and of the service standard required by law
<b>Identification of the performance indicators</b>	Synthetically represent the performances in the most significant activities	Definition of a set of indicators characterising the efficiency, effectiveness and economy in carrying out the selected activities
<b>Selection of the evaluation method</b>	Evaluation of firm's performance by taking into account the collected indicators	Comparison of econometric methods and selection of the most suitable one
<b>Evaluation process</b>	Calculation of efficiency, effectiveness, and economy level attained in service provision	Application of the evaluation method and comparison among the performance levels attained by the analysed firms

the roles of (and relationships between) the involved subjects. The results of such an identification are reported in Figure 2. The horizontal arrows on the left side of the scheme represent impacts and effects between the different elements, whereas, on the right side, the arrows represent impacts and requests. The vertical arrows represent flows of information required by law or necessary for an effective management of the service. The complexity of the relationships among the subjects, and the number of mutual impacts, is emphasised.

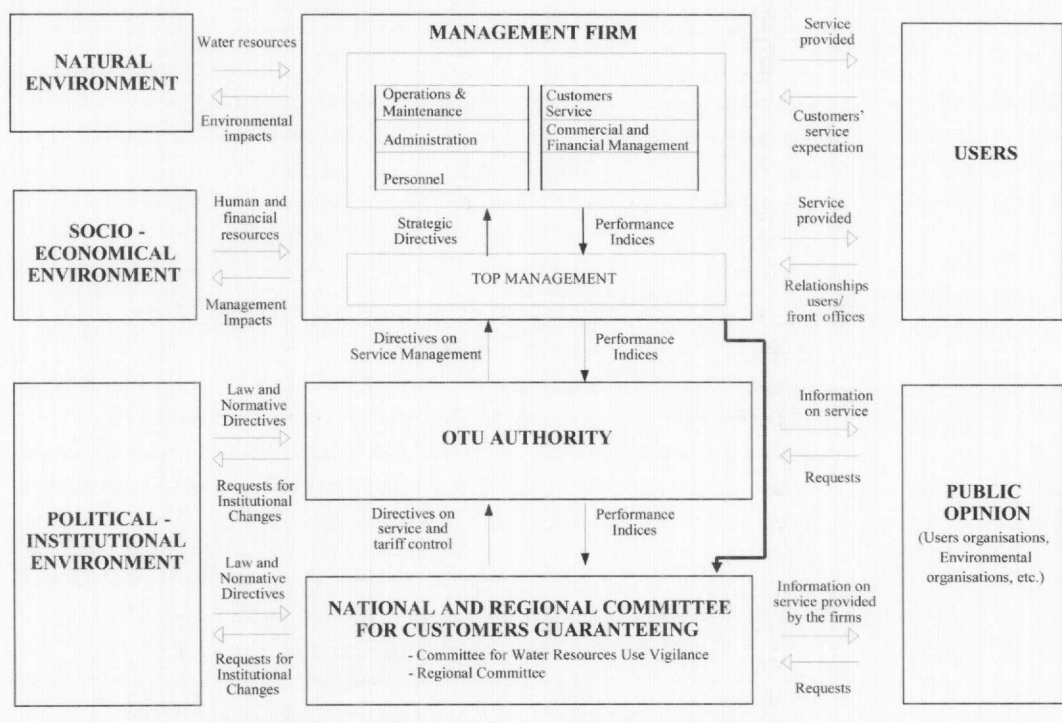
The next step is the analysis of legal constraints and service standards. In the Italian case, the requirement for efficient management in water services has been explicitly stated in recent laws (Law 36/94 and Law 252/99) that aim to organise the municipal water supply service on an efficient and effective management basis. Through horizontal integration, the laws also aim to supply service on a more adequate scale, and through vertical integration, they aim to exploit the scope economies made possible by common activities necessary for providing municipal water supply, sewage collection, and waste-water treatment services. Thus, with reference to the evaluation process, it remains to define the set of indices for determining the quality level of the firms that provide the water supply service.

In the literature, a number of performance indices has been proposed. These have different aims – according to the type and characteristics of the organisation proposing the indicators, and according to the available information in each country (Alegre *et al.*, 1997; Ancarani, 1999a). The most important proposals are reported in Table II.

With reference to Italy, Rossi *et al.* (1997) proposed a set of indices enabling public authorities to verify in respect of minimum service levels stated by Prime Minister Decree 47/96. This set of indices has been partially modified in Ancarani and Reitano (1998). Some other proposals have been presented by regional authorities (such as Lazio and Toscana), or by policy-making authorities in the “optimal territorial units” (OTUs) as a synthetic check of the level of service provided by the firms inside the OTU (Rossi *et al.*, 2000) as required by their appointment agreement.

However, once the indices have been calculated, there still remains the problem of evaluating the total level of service quality. In particular, if the indices values are below the standard legal level, they have to be considered unsatisfactory – thereby reducing the quality level. If the values are above the fixed level, it is not easy to compare water utilities with different enhancement, either in technical, financial, or personnel terms, or in

Figure 2 Scheme of the connections among the involved stakeholders



**Table II** Set of indices proposed in literature for water supply service performance evaluation

Organisation	Categories of indices
Portugeuse Association of Water Resources	Organisation Technical aspects Environment Economical aspects
American Water Works Association Research Foundation	Adequacy Reliability Efficiency
LNEC-Lisbon (Portugal)	Demography Technological aspects Efficiency Economical and financial aspects
Malaysian Water Association	Physical aspects Operations Financial aspects
International Water Association (IWA)	Natural resources Human resources Technological aspects Economical aspects Operations Quality of service
EWAG – Germany	Quality of service Technological aspects Operations Personnel, productivity Economical and financial aspects
Dutch Contact Club	General information Operations Economical aspects Personnel
World Bank	Operations Financial aspects Tariff
6 Cities Group (Scandinavia)	Customer satisfaction Quality of service Reliability Environmental sustainability Organisation, personnel Economical aspects
OFWAT (UK)	Water supply Water delivery Sewage service Customer service Environmental impacts
Ecole National du Genie Rural des Eaux et des Forêts (France)	Operations Quality of services Renovation, maintenance Financial aspects
Spain	Operations Water quality Customer service

terms of front-end management – although it is possible to identify the firms in each peer group.

Focusing on the evaluation process, the firms' performances could be compared through the construction of the best-practice frontier. Among the econometric techniques available, a non-parametric technique known as the data envelopment analysis (DEA) (Charnes *et al.*, 1978; Banker *et al.*, 1984) has been selected. The technique, based on linear programming optimisation, allows categorisation of the firms' performance with reference to the firms attaining the best score (frontier), taking into account all the input and output variables influencing the service provision. The definition of the functional links between input and output is not required.

The verification of efficiency, effectiveness, and economy criteria has been split into three parts by assessing, separately, the criteria of technical efficiency, economy efficiency (as cost-minimisation), and effectiveness. Such a hypothesis (although, in some aspects, reducing the complexity of the analysed phenomena) can be considered acceptable due to the characteristics of water services.

The selected indices are reported in Tables III, IV, and V. They can be considered the most important drivers for the evaluation of the water supply service performance, whereas the effects of the other aspects can be considered marginal.

In applying DEA for the evaluation of technical efficiency, the water volume supplied per inhabitant has been considered the output, whereas the network length, the total losses, the electric power consumed (capital factor), and the number of employees (labour factor) have been considered as input of the service (Table III).

In the evaluation of economic efficiency, the operative costs have been considered as input, whereas the network length, the total losses, the electric power consumed (as capital factor proxies), and the number of inhabitants supplied by each employee (as labour-factor proxies) have been considered as output of the service (Table IV).

For the evaluation of effectiveness, the water volume supplied and the front-end indices have been considered as output of the service. In particular, the mean time for a new connection, the mean repair time, and the mean time for written answers have been



**Table III** Indices for technical efficiency evaluation in providing water supply service

Index	Measure	Units
1 Water volume supplied	Mean daily water volume supplied/population	l/inhabitant*d
2 Electric power consumed	Electric power consumed/population	10 <sup>3</sup> *kWh/year/inhabitant
3 Employees	Number of employees	Number
4 Total losses	(Abstracted – Supplied volume)/Abstracted volume	Percent
5 Distribution network length	Network length/population	km/inhabitant

**Table IV** Indices for economic efficiency evaluation in providing water supply service

Index	Measure	Units
1 Total unit costs	Operative costs/population	ITL*10 <sup>9</sup> /inhabitant
2 Water volume supplied	Water volume supplied/population	10 <sup>3</sup> m <sup>3</sup> /inhabitant
3 Distribution network length	Network length/employees	km/employee
4 Served inhabitants per employee	Population/employees	No. inhabitant/employee
5 Electric power consumed	Electric power consumed/population	kWh/year/inhabitant

**Table V** Indices for effectiveness evaluation in providing water supply service

Index	Measure	Units
1 Water volume supplied	Supplied volume/population	l/inhabitant*d
2 Quality of water	Number of analysis out of standard	Number
3 Mean repair time	$\Sigma$ (repairs time)/No. interruptions in at least 10 per cent of the network	Hours
4 Mean time for a new connection	Mean time for new connections from agreement sign	Days
5 Mean time for written answers	$\Sigma$ (time to written answers)/Number written complaints	Days
6 Alternatives for payment	No. of alternatives for fare payment	Number
7 Billing efficiency	No. corrected bills/No. issued bills	Percent
8 Total losses	(Abstracted – Supplied volume)/Abstracted volume	Percent
9 Electric power consumed	Electric power consumed/population	10 <sup>3</sup> kWh/year/inh.
10 Employees	Number employees/inhabitants*1,000	N/1,000 inhabitant

considered. Moreover, the quality of water supplied, the billing efficiency, and the number of alternatives available for bill payment have been considered as output. The water volume supplied, the total losses, the electric power consumed, and the number of employees have been considered as input of the service (Table V).

## 5. Testing of the evaluation method

To test the evaluation method and the selected indices, a sample of water firms was used as a case study. The firms were localised in the central and northern parts of Italy. The service quality level was evaluated in terms of efficiencies and effectiveness of the firms' performance, by applying data envelopment analysis (DEA).

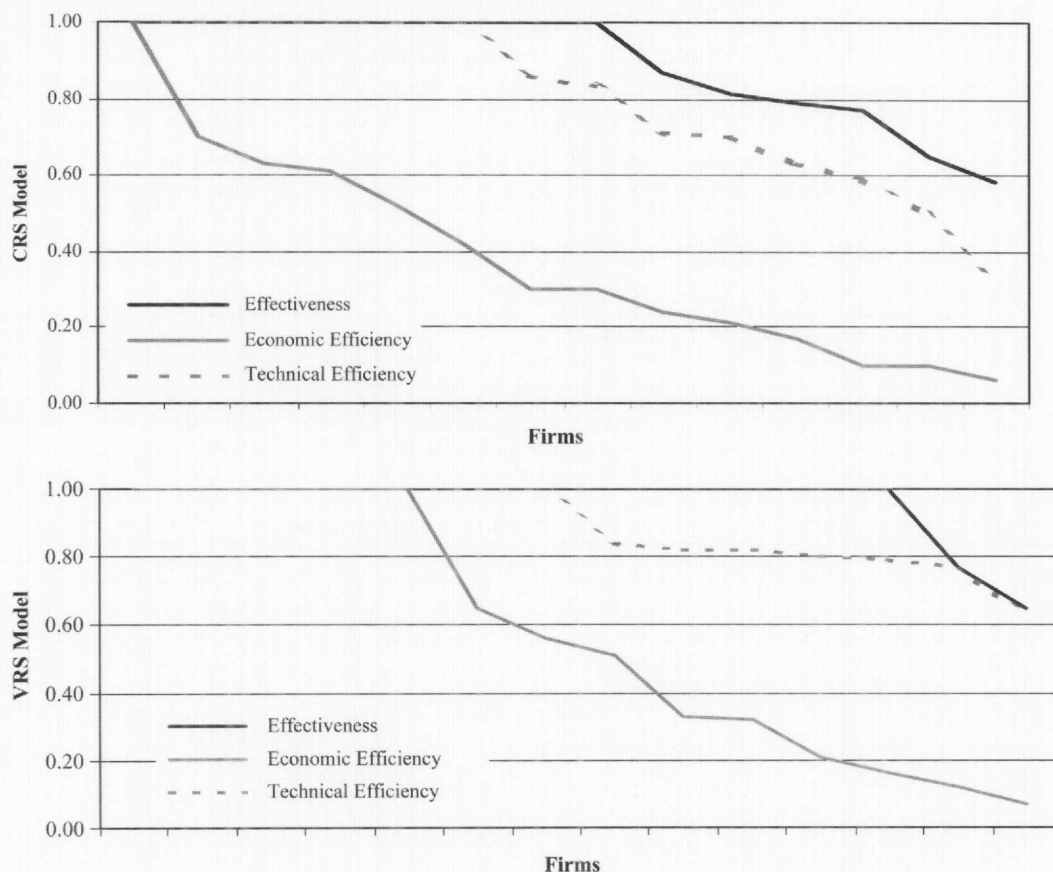
The sample was selected taking into account the different typologies of

organisations presently managing water supply service in Italy. Also taken into account were their size (in terms of mean water volume provided and service operating costs), and the availability of data related with front-end services to customers.

Of the 87 questionnaires sent to the Italian water firms, only 14 answered the questionnaire correctly (in particular, the section referring to the relationships between customers and firms). Data were then completed by interviewing technical and administrative managers.

The DEA was carried out using "OnFront" software (Fare and Grosskopf, 1998) applying both constant return-to-scale (CRS) and variable return-to-scale (VRS) models. Because, in water service, the maximisation of output is not adequate (due to the limited resources available), the input orientation was used for the DEA application (Figure 3). The ratio between the scores gained by each firm



**Figure 3** Efficiency and effectiveness scores attained with the CRS and VRS models

with the two models (CRS/VRS) represents the scale efficiency in service provision.

Most firms gained high scores in terms of technical efficiency and effectiveness, demonstrating the homogeneity and the high-quality level of the examined sample. In particular, with the CRS model, 60 per cent of the firms gained a score of more than 0.8 (with reference to the frontier) in technical efficiency, whereas more than 70 per cent gained more than 0.8 in effectiveness.

The economic efficiency scores were actually low. In fact, more than 60 per cent of the firms gained scores lower than 0.6, and only 7 per cent had scores equal or superior to 0.8 – indicating that significant improvements are required. The enlargement in the territorial scale of application should allow a significant reduction in costs.

Total efficiency scores can be determined by multiplying the technical efficiency score by the economic efficiency score. The mean value between such a total efficiency score and the effectiveness score should represent the total quality level attained by each firm (Figure 4).

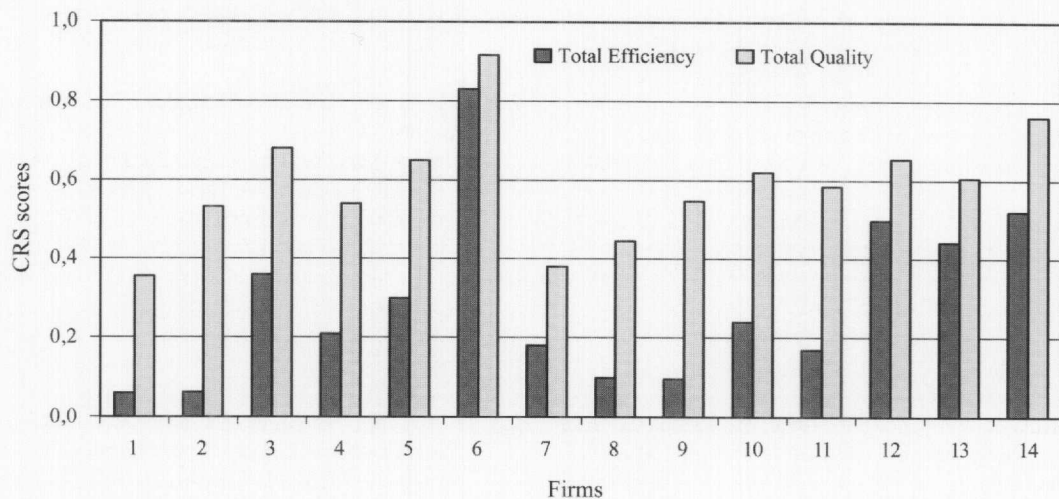
Total quality level seems to be actually high, as half the firms attained scores greater than 0.6. Such values are strongly influenced by effectiveness scores. In the analysed sample, the efficient use of the available resources emerges as the important factor in applying leverage to enhance the level of quality of water services in Italy.

## 6. Concluding remarks for managing standardised public services

A central theme in public sector management is the continuing need for improving both efficiency and effectiveness in a situation of scarce resources and rising public expectations, especially in service quality.

The increased complexity in the relationship between users and the firms that provide public services, has made more critical the need to find a compromise between a firm's efficiency and its effectiveness. Such a complexity of relationship between suppliers and users is emphasised in the standardised services due to the number of interconnected processes

Figure 4 Total efficiency and total quality scores



carried out, and to the number of subjects involved in providing the service. Moreover, the level of complexity is increasing, due to the low degree of innovative managerial culture inside the firms.

SPS managers need to update their role by redesigning objectives and work positions, taking into account legal constraints and innovations. In such a modified situation, it is not sufficient merely to re-engineer the operative systems of the firm (even if it is necessary to update, for example, the information system, the supply chain management system, the customer's service, and so on). It is also necessary to assign a key role to quality management. In other words, as the structure of a firm is reorganised – in accordance with updated legislative frameworks, and as required by transformation in the technical, economic, political, and social environments – quality management should be empowered.

The definition of how to analyse the level of quality in providing standardised public services seems to be among the major problems in such a reorganisation effort. This paper has presented a comprehensive approach for helping managers to evaluate and improve quality in the standardised public service sector. The approach consists of several steps starting with the identification of:

- the main activities carried out in the service provision;
- the main stakeholders of the service; and
- the major legal constraints.

Thereafter, the selection of an appropriate set of performance indicators is required,

followed by the choice of an evaluation technique as the final step to be carried out.

Using the proposed approach, managers operating in public service organisations can derive useful operational frameworks to develop quality control systems, based on the analysis of the information flows among different stakeholders involved in service processes, and on the identification of a set of indicators enabling the evaluation of attained performance.

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