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Analysis of the clients' satisfaction in the accredited laboratory

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ABSTRACT

Purpose: of the presented paper aimed at motivating the necessity of the accreditation of testing and calibration laboratories and usage of analysis of the clients' satisfaction as factors deciding about the competitive advantage of those organisations on the European Union market and guaranteeing their participation in the European conformity estimation system.
Design/methodology/approach: used for the research has covered the analyses of level of the clients' satisfaction conducted in the main activity ranges of Polish accredited laboratory.
Findings: of the carried out research are as follows: analysis of the clients' satisfaction is the most important form of verification of degree of the clients' requirements realisation and, making a ranking of the best and the worst categories of activities of laboratory, can be treated as a reliable source of information needed for their improvement.
Practical implications: refers to any organisation with the quality management system implemented as well as to any accredited laboratory using estimation of the clients' satisfaction as an element of continuous improvement and treating the results of the analysis as an supporting element of the investigated area.
Originality/value: of the presented paper covers the methodology taking advantage of the analysis of the clients' satisfaction as a tool for assuring the conformity in the management system in testing and calibration laboratories.
Keywords: Accreditation body; Accredited laboratory; Testing and calibration laboratory; Clients' satisfaction

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1. Introduction

Quality of the delivered services is the most important factor, which decides about the competitive advantage of the research laboratories on the market and influences directly on the success of these organisations [1-4].

Swiftly increasing requirements and rivalry, in the area of technical competences, lead to implementation of mastered managerial policy by laboratories, which in return allows verifying the quality of supplied services [5-8].

However, there is a need of proof in scope of both: competence and credibility of the undertaken studies, which must be delivered even by the highly experienced laboratories [9-11].

The mentioned demands can be fulfill by the accreditation of the laboratory, which means implementation of the quality management system based on PN-EN ISO/IEC 17025 standard guidelines [12].

Main benefits connected with the laboratory accreditation are [13]:

- ensuring that the laboratory performs their work in accordance with the international standard,
- minimizing the risk of unreliable results,
- minimizing the chances of retesting and reducing chances of additional financial burden and time delays,
- ensuring international acceptability of test results,
- raising the efficiency and effectiveness of laboratory functioning.

Above all, laboratory accreditation enhances the customer confidence and satisfaction.

2. Laboratory testing connected with commercial activity

In the area of commercial activity the testing laboratories look for the chances for entering, both Polish and Union market. It is connected with fulfilling the requirements of the procedure of launching the goods on the Union market (voluntary area) and national regulations (obligatory area) [13].

In the first case system of the compatibility estimation guarantees the admittance to trading on the homogenous market of the European Union exclusively for the goods fulfilling the demands of the European Union directives [13-16].

The system is based on the Act on the system of the compatibility estimation, according to which, each manufacturer before launching the good on the market is obliged to conduct the estimation of the products' compatibility. Such estimation should be carried out independently by the third side, it means - by the accredited laboratory [13-16].

Fulfilling the requirements of national acts and decrees is in determined cases the obligatory area and it concerns situations, where submitting the results of research from the accredited laboratories is necessary [17-21].

Units functioning in the area of the laboratory services one can classify accordingly to the following criterions [12,22-24]:

- organisational and legal status; laboratories can be the independent units or be a part of bigger organisation; the second situation is so popular on the market, that the demands included in the PN-EN ISO/IEC 17025 standard take into consideration such a capability,
- status of the services; the PN-EN ISO/IEC 17025 standard specifies laboratories of first, second and third side,
- entity of research; the ISO/IEC Guide 25 and the PN-EN ISO/IEC 17025 standard specifies testing and calibration laboratories; testing laboratories accordingly to point 3.2 of the ISO/IEC Guide 25 are "laboratories making tests", and testing accordingly to the PN-EN ISO/IEC 17000 standard is "determination of one or more characteristics of an object of conformity assessment, according to a procedure"; calibration laboratory accordingly to point 3.3 of the ISO/IEC Guide 25 is "laboratory making calibration" and calibration accordingly to the PN-EN ISO/IEC 17000 standard is "set of activities defining, in the particular conditions, dependences among the values pointed by the measuring tool, or the system of measuring tools, or represented by the material measurement or material of reference, and proper values of amount, realised by the standard of the reference",
- legal status of the research results; the classification of the laboratories is presented in the Act on the system of the compatibility estimation which, accordingly to which one can distinguish accredited, authorised and notificated laboratories,
- range of the research; general classification of the research laboratories has been made by Polish Accreditation Centre; due to the range of research laboratories classified as: electrics, chemistry, physical and mechanical properties, microbiology, radiation and many others.

3. Accreditation demands according to PN-EN ISO/IEC 17025 standard

Accreditation bodies recognising the competences of testing and calibration laboratories should use the PN-EN ISO/IEC 17025 standard as the basis of their accreditation [12].

Accreditation according to the terminological standard PN-EN ISO/IEC 17000 is "third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessments task". Attestation is "issue of a statement, based on a decision following review, that fulfilment of specified requirements has been demonstrated", conformity assessment body is "body that performs conformity assessment services" [22].

According to the Act on the system of the compatibility estimation - "accreditation should be understood as the recognition by the accreditation body of the competences of certificating unit, inspection unit as well as the laboratory carrying out particular activities" [16].

Estimation of the laboratory in the process of accreditation carried out in place and based on the estimation of the laboratory competences to realisation of the submitted by the laboratory activity. In the range of estimation the observation of laboratory activities are conducted in the real conditions [12,16].

A base for the estimation is the PN-EN ISO/IEC 17025 standard - The general demands concerning the abilities of the research and standardising laboratories. Solid foundation to obtain the certificate of accreditation is fulfilling the requirements stated in the above-mentioned standard [12].

The PN-EN ISO/IEC 17025 standard, accepted as a universal document, can be used in any laboratory regardless of its size and organisational structure, number of personnel, kind and character of services and methods of research and standardising and it is appropriate for the laboratories that develop quality management system not only in administrative but also technical operations [12].

The standard specifies requirements connected with competence of the laboratories to carry out tests and calibration, including sampling [12].

Advantage of the PN-EN ISO/IEC 17025 standard is similarity to the structure and requirements of the PN-EN ISO 9001 standard,

that's why point 1.6 of the PN-EN ISO/IEC 17025 standard includes the statement: "If testing and calibration laboratories comply with the requirements of this International Standard they will operate a management system for their testing and calibration activities that also meets the principles of ISO 9001" [12, 25].

That is why, requirements included in the PN-EN ISO/IEC 17025 standard have been classified into two groups (Table 1) [12]:

- connected with the management system,
- technical, which makes the standard clear and readable.

The most important technical factors are [12]: human factors, accommodation and environmental conditions, tests and calibration methods and method validation, equipment, measurement traceability, sampling and handling of test and calibration items, determining the reliability of tests and calibration.

First part of the standard, including point 4, is strongly connected with appropriate laboratory management and includes the requirements analogous to requirements of the PN-EN ISO 9001:2001 standard. Differences in the PN-EN ISO/IEC 17025 in the references to the PN-EN ISO 9001:2001 standard result above all from specific character of the laboratory and kind of services, which are offered to the clients [12, 25].

This point defines main requirements connected with organisation of the laboratory. Every laboratory complying with requirements of the PN-EN ISO/IEC 17025 standard must have its management system adjusted to the requirements referred to the performed tasks, and its organisational structure defined in the way explicitly determined the place in organisation. Laboratory should bear responsibility for its processes and should guarantee safety of the client's rights and property [12].

Additionally both management and technical personnel should have proper qualifications, competences and experience, and - what the most important - should be impartial and independent on all of the internal and external pressures [12, 25]. Requirement connected with point 4.2 of the standard (quality management) clearly underlines, that laboratory should have implemented the quality management system consistent with the standard and system documentation (quality policy, procedures, and instructions). Documentation should be comprehensible and available for the chosen workers. System should be systematically, verified, monitored and - when it's necessary - corrected, what leads in the effect to the continuous improvement [12].

Table 1.
Structure of requirements included in PN-EN ISO/IEC 17025 standard [12]

	REQUIREMENTS CONNECTED WITH MANAGEMENT		TECHNICAL REQUIREMENTS
4.1	Organisation	5.1	General
4.2	Management system	5.2	Personnel
4.3	Document control: document approval and issue, document changes	5.3	Accommodation and environmental conditions
4.4	Review of requests, tenders and contracts	5.4	Tests and calibration methods and method validation: selection of methods, laboratory-developed methods, non-standard methods, validation of methods, estimation of uncertainty of measurement, control of data
4.5	Subcontracting of tests and calibrations	5.5	Equipment
4.6	Purchasing services and supplies	5.6	Measurement traceability; specific requirements (calibration, testing), reference standards and reference materials,
4.7	Service to the customer	5.7	Sampling
4.8	Complaints	5.8	Handling of test and calibration items
4.9	Control of nonconforming testing and/or calibration work	5.9	Assuring the quality of test and calibration results
4.10	Improvement	5.10	Reporting the results: test reports and calibration certificates, tests reports, calibration certificates, opinions and interpretations, testing and calibration results obtained from subcontractors, electronic transmission of results
4.11	Corrective action: cause analysis, selection and implementation of corrective actions, monitoring of corrective actions, additional audits		
4.12	Preventive action		
4.13	Control of records: technical records		
4.14	Internal audits		
4.15	Management reviews		

Point 4.3 of the standard (document control), analogically to the PN-EN ISO 9001 standard contains one of the main requirements connected with the laboratory management - necessity of supervision over all of the used documents (standards and other normative documents, methods of investigation, instructions). The required supervision causes [12,25]:

- easier control of documents; also proper marking of documents, what makes the identification clearer,
- more efficient verification of documents and - as needed - easier amendment and cancellation of the documents,
- supervision over availability of the documents to the personnel.

Decision connected with the attainment of accreditation is dependent on general needs of every laboratory and the clients', decision organs' and interested sides' expectations, which, for their own aims, need official confirmation connected with either proper technical competence of the laboratory or only the compatibility with quality management systems. Research laboratory, making decision about accreditation, should analyse the legitimacy of the decision in several main areas (Fig. 1) [26,27].

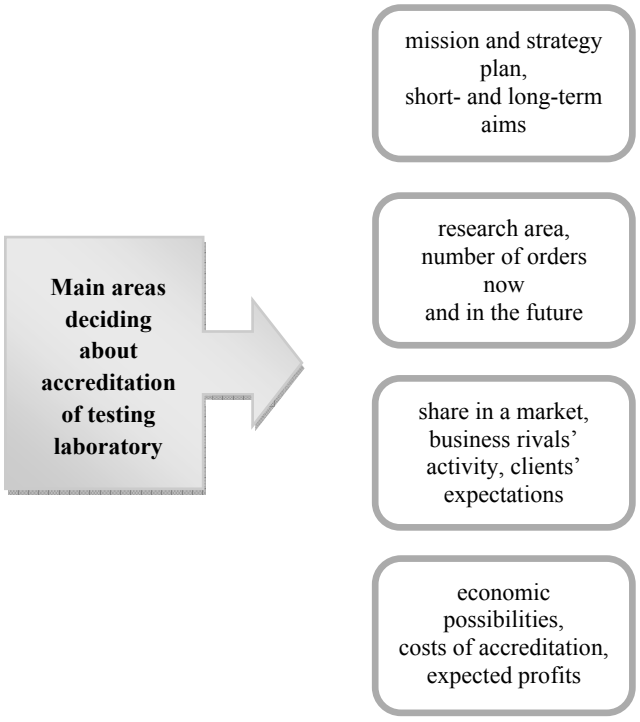

Fig. 1. Scheme of main areas deciding abort accreditation of research laboratory [26,27]

Regardless of the range and area of the research and size of the laboratory, process of preparation of the research laboratory for accreditation can progress according to the repeatable scheme, usually used in every laboratory, which consist of [26,27]:

- filing the application for accreditation,
- application review,
- appointment of estimation group,
- documentation review,
- conducting the estimation on the spot,
- corrective activities estimation,
- summarising the estimation,
- decision on accreditation granting,
- planning the monitoring and estimation.

4. Clients' expectations and requirements towards the standard

Creation and development of organisation depends on ability of reconnaissance of the potential clients' requirements and supplying them exactly as they wish and even more - fulfilling so called uninformed requirements - and abilities to maintain the clients and win the new ones.

Fulfilling those expectations is possible when management system takes advantage of pro-quality approach in all areas of the organisational activities and the priority are assessment of the external clients' satisfaction. That's why the most important is to take care of all of the operations directly and indirectly affecting the clients [28].

Client, who is satisfied, takes advantage of the firm's offer again and usually informs about the satisfaction another potential clients, which can increase the group of customers. [28,29].

The contrary results are caused by the unsatisfied client, who usually not only stops taking advantage of the services offered by the organisation but also discourages the others to do this [28,29].

Experience of organisations indicates, that firm has to bear the cost connected with advertising, promotion, publishing etc. for winning new client, however costs of holding clients, already won, are 4-5 times smallest.

The meaning of "satisfied client" term is relative and organisation can spare no effort to increase the clients' satisfaction and prevent the client's leaving [28].

That is why the PN-EN ISO/IEC 17025 standard gives the guidelines for functioning of the laboratories - directives assuring the fulfilling clients' expectations [12].

Requirement being indispensable in management system in laboratory are procedures concerning the review of questions, offers and agreements. The main aim of those procedures is to assure of [12]:

- fulfilling all of the client's expectations, also taking into consideration an investigative method,
- possibilities of the laboratory in the aspect of fulfilling the client's expectations,
- correctness of choice of the investigative method, and - accidentally when necessity of usage of unformalised investigative methods will come into being - validation of those methods.

The PN-EN ISO/IEC 17025 standard takes into consideration the possibility of usage of sub-executives' services. Requirements included in the standard distinctly underline, that work can be checked, and what is the most important - responsible partners. Laboratory is responsible towards the client for all of the defects conversant partners' work exception to the case, when conversant

partners have been chosen by the client (Handling of test and calibration items) [12].

According to the requirement concerning the client's service, laboratory should owe internal procedures guaranteeing proper cooperation not only in the aspect of fulfilling their requirements but also - in the aspect of capability to monitor the research commissioned to the laboratory. Laboratory is also obliged to estimate the clients' satisfaction; any positive as well as negative information from the clients should be analyzed by laboratory to prevent repeating the same incompatibilities in the future and - what is the most important - to improve the system and services offered by the laboratory (Service to the customer) [12].

Simultaneously, it is obliged to establish the procedure concerning proceeding in the case when complaints of the clients will affect the laboratory (Complaints) [12].

Requirement included in the point "Control of nonconforming testing and/or calibration work" of the PN-EN ISO/IEC 17025 standard is consistent with the structure of the PN-EN ISO 9001 standard and it concerns the procedures, when a part of functioning the laboratory or results of carried research have not been conducted according to the laboratory procedures or according to the clients' expectations [12,25].

In those procedures on should take into account [12,25]:

- methods of conduction in case of occurrence of such situation,
- principles of taking up correcting and preventive actions to prevent a repetition of such situation,
- principles of communication to the clients of information about incompatibilities in the work of laboratory.

5. Own research

The research has been conducted in one of the Polish accredited research laboratories. The Laboratory is a part of research and development unit and therefore - the national unit having legal personality, classified to the sector of public finances and having organisational status.

In order to guarantee equal procedure during the measurement of degree of the client's satisfaction in the Laboratory special procedure has been established and implemented. In the procedure called "Research of degree of the client's satisfaction" principles of conducted research and persons responsible for individual actions have been determined.

Once a year, in the form of postal questionnaire, a degree of the client's satisfaction is analysed; both in reference to all of the processes realised by the Laboratory, and only in the aspect of research conducted in the Laboratory.

Results of estimation are analysed and presented on yearly management reviews and are the basis of improvement operations having as the aim constant bringing client's satisfaction up.

In the year 2006 to the question „how do you estimate general level of satisfaction connected with services provided by the Laboratory (Fig. 2):

- 41% of questionnaired has answered that they are very satisfied,
- 53% of questionnaired - satisfied,
- 6% of questionnaired - moderately satisfied.

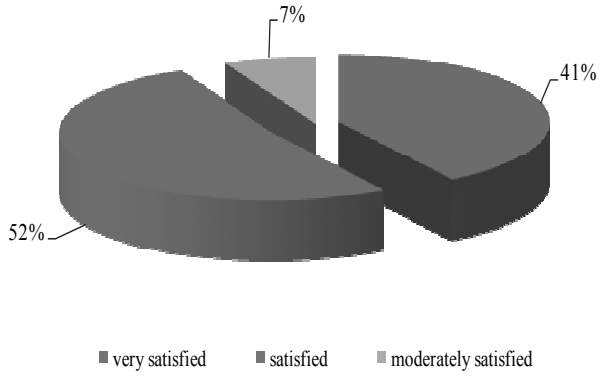

Fig. 2. General level of the clients' satisfaction in the Laboratory

Within the confines of the detailed questions the analysis of degree of clients' satisfaction has been carried for individual periods of service realisation: first contact and beginning of cooperation, fundamental realisation of service, period of final cooperation.

During the period of first contact and beginning of cooperation, clients of the Laboratory highly have estimated "easiness of communication", category "promptness of response to the offer question" has received the lowest marks (Fig. 3).

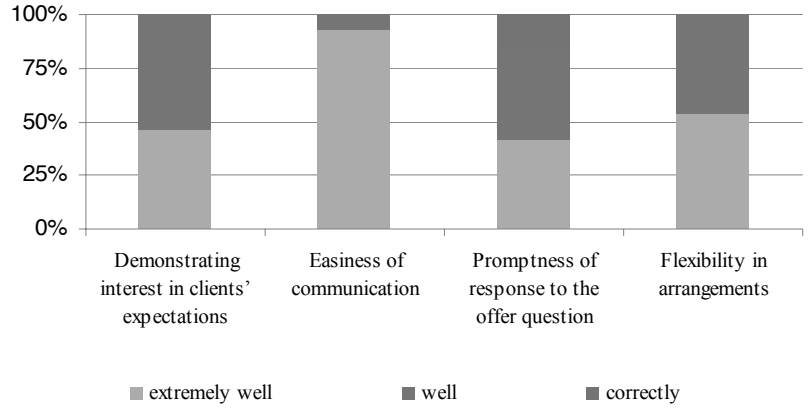

Fig. 3. Specification of the survey's results connected with the first contact of the client with the Laboratory and the beginning of cooperation

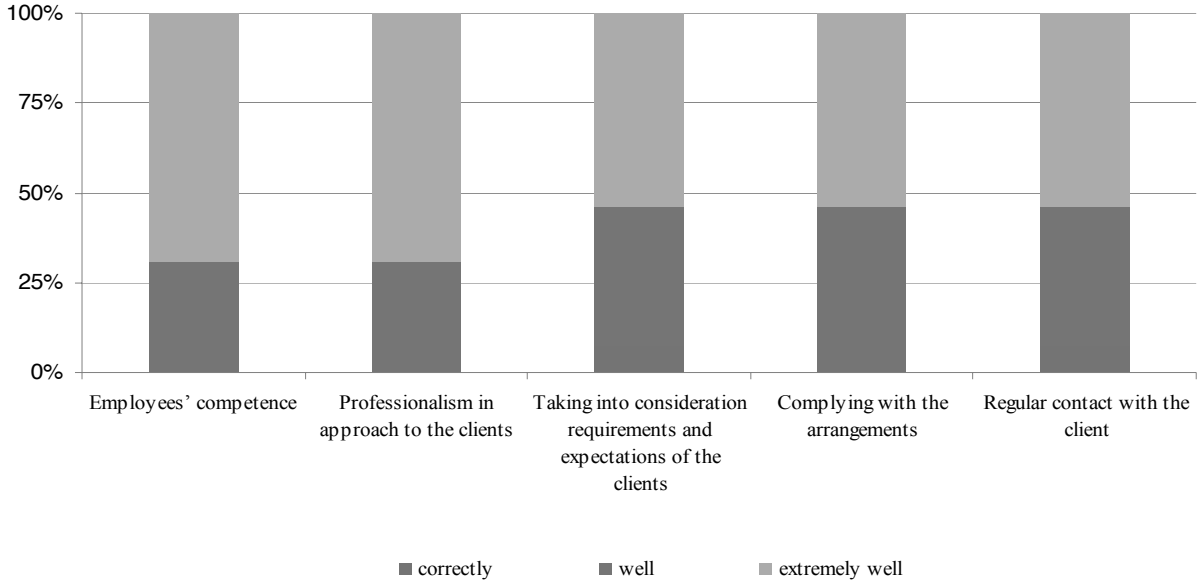

Fig. 4. Specification of the survey's results connected with the period of fundamental realisation of the service

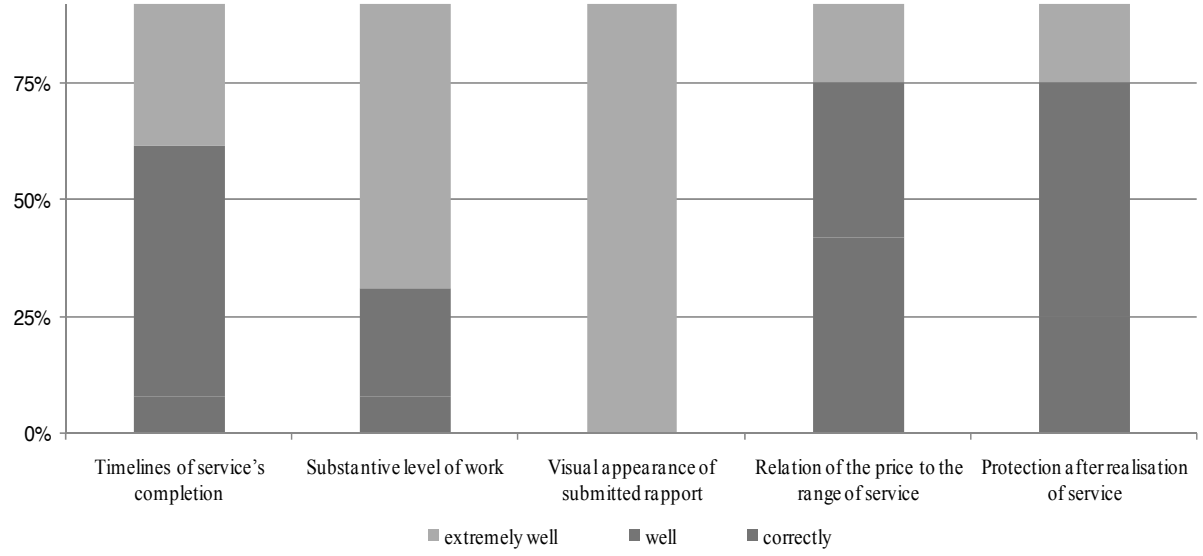

Fig. 5. Specification of the survey's results connected with the final cooperation between the Laboratory and the clients

During the period of fundamental realisation of the service, "professionalism in the approach to the clients" and "employees' competence" has been top-ranking. "Regular contact with the client" and "taking into consideration the requirements and expectations of the clients", there were the areas which clients have evaluated as the worst categories (Fig. 4).

During the last period - final cooperation - clients have highly estimated the category called "visual appearance of the submitted rapport", the worse score has been accompanied by "relation of the price to the range of service" (Fig. 5).

6. Summarising

Base for laboratory accreditation, guaranteeing its participation in the European conformity estimation system, is the implementation of the system based on PN-EN ISO/IEC 17025:2005 standard.

The main requirements of the PN-EN ISO 9001:2001 and PN-EN ISO/IEC 17025:2005 standards, as well as accreditation requirements of Polish Accreditation Center, are supervision, monitoring and continuous improvement of the implemented and functioning in the laboratory management system.

Analysis of the clients' satisfaction, used in the analysed Laboratory, is one of the forms of realisation of requirements of those standards. In the Laboratory measurement of clients' satisfaction is not only the estimation of services provided by the Laboratory, but also it is a measure of success of personnel activity.

Assessment of clients' satisfaction conducted every year lets the Laboratory to make a ranking of the best and the worst categories:

- demonstrating interest in clients' expectations, easiness of communication, promptness of response to the offer question, flexibility in arrangements - in the area of first contact between the client and the Laboratory together with the start of cooperation,
- employees' competence, professionalism in approach to the clients, taking into consideration requirements and expectations of the clients, complying with the arrangements, regular contact with the client - covering the period of fundamental realisation of service,
- timelines of service's completion, substantive level of work, visual appearance of submitted rapport, relation of the price to the range of service, protection after realisation of service - concerning final cooperation of the Laboratory with clients

Assessment of the clients' satisfaction, conducted every year in the chosen accredited Laboratory, allows monitoring the level of the provided by the Laboratory services. In the work the results of every year analysis of clients' satisfaction have been presented.

Analysis of the data generated in year 2007 has shown the categories, where the improvement activities were needed. These categories have been: promptness of response to the offer question and taking into consideration requirements and expectations of the clients. It's worth underling that the same analysis has pointed out employees' competence and substantive level of work as the best categories.

It can be said that in the year 2007 analysis once again have confirmed the maintenance of very high quality level of the provided services, also services connected with laboratory research and information about categories will be treated as a reliable source of information needed for improvement activities.

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