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**TOTAL QUALITY MANAGEMENT  
AS AN IMPORTANT FACTOR OF IMPROVEMENT  
THE PERFORMANCES IN A PRODUCTION  
OF FINISHING MATERIALS FIELD**

**Speciality: 521.03 Economy and Management  
in the field of activity**

**ABSTRACT**  
of thesis of the doctor in economics

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The doctor's thesis and abstract of thesis can be consulted at the Scientific Library of the Academy of Economic Studies of Moldova and on the wep page ASEM.

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## I. CONCEPTUAL REFERENCES OF RESEARCH

**Actuality of the subject.** Globalization of markets and development of liberalization of the world trade, defined through signing of international agreements, lead to serious competition between the production branches of industrialized countries, as well as between the industries from developing countries and the ones with economy in transition. Currently, these industries face not only with export competitiveness, but also with the one on the domestic markets. In order to survive in such conditions of competition, economic agents focus their economic and managerial resources on structural factors that affect the performance of the TL management system, having different objectives but targeting common targets, based on such main pillars as: quality of goods and services, customer satisfaction as well as managerial team.

RM offers products and services at lower prices on the national and international market, but the obligation to demonstrate the capability to produce/deliver products according to the requirements for their quality represents an impediment to the conclusion of contracts on TL. Most buyers require suppliers not only a quality matching their needs, but also to ensure that this quality is kept on a TL. In order to provide such an assurance, suppliers are required to confirm that they work in internationally accepted quality management and quality assurance systems. Currently, the role and importance of quality assurance is acknowledged in the RM. In recent years, this process has intensified the interests of several economic agents and governmental and non-governmental bodies, associations, consultancy firms, etc.

We consider the topic selected for research to be actual, taking into account the fact that the respective area is being given attention by international bodies and central public institutions through the approval of a number of agreements, laws, national and international decisions, but also due to studies conducted by scientists from abroad and from RM.

**Description of the situation in the research field and identification of the research problem.** The issue of the total quality management is studied in the works of the Moldovan scientists. Among the authors who have developed scientific papers on quality and/or total quality management (which served as sources for the PhD thesis), can be mentioned the following: Hriscev E., Belostecinic G., Sirbu I., Platon N., Galanton N., Solcan A., Savga L., Guzun M., Cojocaru I., Turcanu Gh., Gusev A., Zetia V., Serduni S., Savga Gh., Oleiniuc M., Cotelnic A., Nicolaescu M., Cojocaru V., Baciuc S., Vaculovschi E., Mancas M., Cernavca M., Raischi N., Cozmic V., Spac Gh., Fedorciucova S., Handrabura A., Calmiş V., Panfil I., etc. Carrying out a study on PhD and doctor habilitate theses from the Republic of Moldova for the period 2017-2004, we can mention tangents (*performance, quality management, performance management, quality administration, implementation of the management system*) of the research

topic with other works of the authors: Guzun S., Calughin S., Dragalin I., Samoilenko F., Costea D., Turcan I., Postolachi V. The finishing materials segment and especially paints and varnishes offer originality to the studied topic. We can mention a single PhD thesis of the author Marginean S.S. from Romania, in which the market of paints and varnishes is researched, but only from the point of view of the marketing segment. The thesis is entitled "*Study on the marketing strategies used on the varnishes and paints market from Romania*" [13].

At the same time, we mention that there is no comprehensive study that would address this interdisciplinary topic, which would analyse quality, quality management, TQM and the performance of the implementation of principles in producing/marketing companies of finishing materials in general and of paints and varnishes, in particular, which has conditioned the research in this field.

**The aim of the research** is to deepen and develop theoretical and applied precepts from the field of total quality management and to determine the interdependencies between the TQM elements and performance of the manufacturing and/or trading companies of finishing materials through an econometric model.

**Research objectives.** The intention to achieve the predetermined purpose has led to the formulation of the following objectives:

- Studying and theoretical and scientific development of the precepts in the field of quality, quality management and TQM;
- Evolutionary analysis of quality precepts, TQM, quality management, performance indicators, TQM principles, excellence models in the field of quality;
- Analysis of evolution and trends in the production and marketing fields of paints and varnishes at both, international and national levels;
- Establishing directions in the field of import and export of RM for finishing materials;
- Analysis of the economic and financial situation of the local producer of paints and varnishes (selected as a pilot company for the implementation of research results, similar to the international practices);
- Research of the legislative particularities in the production/marketing field of paints and/or varnishes, having the quality and the quality management as the basic vector;
- Analysis of infrastructure quality at the national level and development of its model;
- Studying the process of transition to European standards;
- Development of a complex study in the field of production and marketing of finishing materials (paints and varnishes), based on the multilateral and contradictory analysis of the quality vision by the main subjects in the studied field: "producers and/or traders (dealers) – consumers – experts";

- Empirical study of the quality of finishing materials products (eco paints) manufactured and marketed on the RM market;
- Studying interdependencies between the results of consumers' questionnaires and those of producers and/or dealers;
- Development and use of methods, as well as statistical and econometric models of analysis of the total quality management of local enterprises in order to increase the performance and as a result – their competitiveness;
- Valorisation of research results through theoretical validation and implementation of results within the pilot company.

**Theoretical significance and applied value of the thesis.** Taking into account the specificity of the scientific investigation theme, we have used information resources from the field of economy and quality management, having an important utility both in the works of local scientists, as well as foreign scholars such as: Marx K., Engels F., Ishikawa K., Kelada J., Rinne H., Mittag H.J., Juran J., Toma J., Giroux H., Sylvain L., Feigenbaum A.V., Schonberger R.J., Knod E.M., Grönroos C., Dr. Taguchi G., Erickson Q.E., Eiley L.A., Crosby Ph., Peterson E., Garvin D.A., Conti T., Kifor C.V., Koller J., Barrow J., Mattana M., Ciurea S., Dragulescu N., Paraschivescu A., Oprean C., Titu M.A., Raboca H.M., Olaru M., Enatescu A.M., Enatescu M.A., Ilieş L., Brokgaus F.A., Efron I.A., Rijikov H.I., Ilienkovă S.D., Mhitarean V.S., Gorbashko E.A., Burchakogo M.A., Mizintseva M.F., Bishimbaeva V.K., Zedginidze I.G., etc., as well as specialized scientific dictionaries.

The results obtained in the paper represent a revelatory support of theoretical and methodological concepts in the field of total quality management and managerial information of administration, increase of competitiveness and performance of producers and/or paints and varnish dealers. Implementation certificates from three companies: J.S.C. "SUPRATEN", L.L.C. "Verix-Grup" and T.C. "METSANA-SERVICE" L.L.C., in which the research results have been integrated into practice serve as an argument in favor of the applied value of the research.

The applied value of the thesis consists in the usefulness of scientific arguments and practical recommendations presented in the paper, which can be used in a wide range of fields:

1. *At theoretical and methodological level*, the obtained results can be used both in the academic environment during the didactic process in the higher education institutions, with the purpose of substantiating the theoretical knowledge on the notions of quality, quality management and TQM, as well as by the scientific researchers in the research activity through the introduction of new research directions in the following areas: transition to new European standards, market trend towards ecological paints, interdependence between consumers and producers/dealers on the finishing materials market, etc.

2. *At macroeconomic level:* research results could be received and used by state institutions: the Chamber of Commerce and Industry, the Agency for Consumer Protection and Market Surveillance, the Ministry of Environment, the Ministry of Justice, for amending and completing the legal framework.

3. *At microeconomic level:* the results obtained during the research could be taken over and applied by economic agents in the field of production, marketing of finishing materials in determining the directions of development of companies' activity.

**Research methods.** Classical methods of research have been used in the development of the thesis: empirical observation, (quantitative, qualitative, historical) analysis, dynamic analysis of reality, field analysis, interview method, comparison, synthesis, induction and deduction, questioning method, graphic and tabular illustration of the studied materials. Afterwards, they were researched using statistical, mathematical and econometric methods. The results are shown in figures and tables.

**The object of the research** is represented by local and foreign enterprises of production and trade of finishing materials. Thus, the data collected by the author, from 11 local companies, 18 experts, 243 consumers and over 100 foreign brands have been used. In accordance with national and international practices, a pilot company was determined – Supraten, the largest producer in the Republic of Moldova in the selected research field, and the results have been implemented in 3 companies (confirmed by implementing certificates).

**The scientific novelty and originality of the work resides in:**

1. Developing the notions of quality, total quality and total quality management;
2. Introduction of new concepts such as: Quality arrow, Quality chronological axis, Quality palm, TQM scale, TQM toothed wheel, Octagonal star of European standards implementation, Quality infrastructure in the Republic of Moldova;
3. Developing a new verso of the page for completing complaints;
4. Developing a complex management method and tool of evaluation of performance offered by the total quality management as a determinant factor of the enterprises' functionality in order to increase their performances and competitiveness;
5. Elaboration and application of statistical and econometric methods and models in accordance with the econometric calculations among different determinant factors of the economic and managerial results of the analysed companies.

**Approval and implementation of scientific results.** The theoretical-methodological and practical results, developed in the paper, have been reported at national and international scientific and practical conferences, such as: *Scientific Symposium of Young Researchers of AESM: 2016, 2017, 2018*; International Conference: *"Trade, commodity research and service:*

*situation, problems and developments in the conditions of economy globalization*” Kazani, 2017; International conference: *“Cooperatives and entrepreneurship: state, problems and perspectives”*, Kazani, 2017; International Conference *“European economic integration”*, Chisinau, 2016; International Scientific Conference *“Competitiveness and innovation in the knowledge economy”* 2015 and 2017, International Conference *“The role of investment in the development of the digital economy in the context of financial globalization”*, 2016. Also, research results were reported in the specialized journals such as: *Social Economic Debates*, 2018; *Economica*, 2018; *Strategic Universe*, 2018; *CSIE Working Papers*, 2018. The results of the paper were published in a total of 12 scientific papers. The author contributed to the modification of the legal framework characteristic for quality management. The results of the research have been recognized and registered by AGEPI, as evidenced by the two certificates of registration of copyright and related rights, as well as two other innovator certificates issued by the CITT. Also, other results of the work were recognized and approved by three notorious companies in the Republic of Moldova: J.S.C. "SUPRATEN", L.L.C. "Verix-Grup" and T.C. "METSANA-SERVICE" L.L.C., through the implementation certificates.

**Volume and structure of the thesis.** The aim and objectives of the thesis determined the structure of the paper on the following compartments: introduction, three chapters, general conclusions and recommendations, bibliography and annexes. The content of the paper is presented on 150 pages and 47 annexes. 329 bibliographic references are listed.

## II. KEYWORDS:

quality, quality management, TQM, performance, finishing materials, paints, varnishes, requirements, standard, GOST, European standards, quality infrastructure, ecological paints, certification, accreditation, laboratories, complaints, questionnaires, etc.

## III. SUMMARY OF CHAPTERS

The actuality and importance of the research theme, the scientific significance and the applicative value of the thesis were justified, the goals and the objectives proposed for the realization were formulated, the solved scientific problem, respectively the scientific novelty and the approval of the research results, as well as the methodologic, scientific and informational support were emphasized in *Introduction*.

Chapter I *„Total quality management – theoretical and methodological aspects”*. This study has taken root starting with the definition of quality since antiquity, the Middle Ages and the Industrial Period, followed by a characteristic of philosophical visions of quality of: Socrates, Aristotle, Plato, Cicero, B. de Jouvenel, Hegel, Marx K., Engels F., Brokgauz F.A. and Efron I.A. Research continued with the definition of quality through encyclopaedias, dictionaries,



standards, and notions offered by national and international scholars. The study finds its continuation in the realization of the chronological axis of the "quality" precept and of the model "*Stages / requests / approaches of quality*", developed by the author. Following the evolution of quality, the author carries out a critical analysis of several theories by giving his own vision through the "*Quality arrow*" (Figure 1). Further, it modifies the "*Conceptual quality chart*", offered by: Dragulescu N., Dragulescu M.; "*Quality spiral*" offered by Kravetz M.A., Traistaru A., Dunga L.I.; "*Quality pyramid*" offered by Ilienкова S.D. and Mhitarian V.S. There are described such models as: "*Positioning the quality approach*", "*Quality loop*", and "*Quality spiral*".

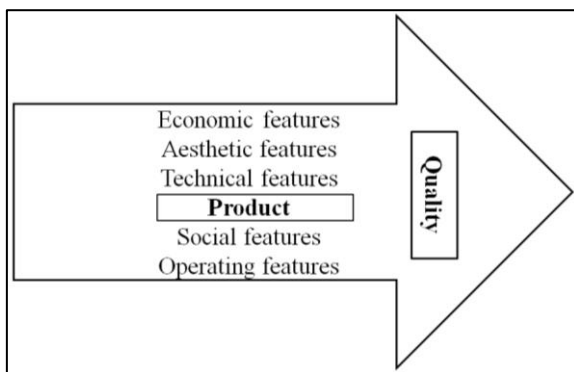


Fig. 1. Quality arrow  
 Source: Developed by author based on source [16, p. 14]

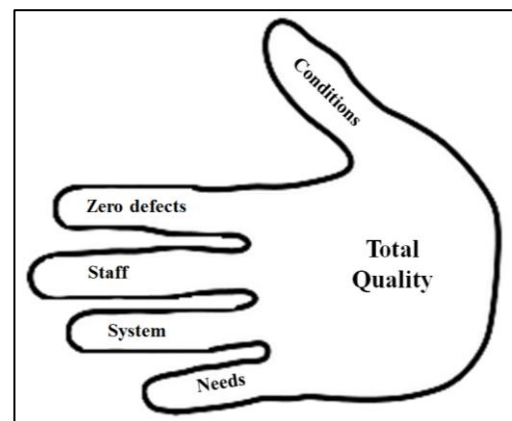


Fig. 2. Quality Palm-PQ  
 Source: Developed by author

The paper analyses the multitude of precepts of "*total quality*", including those of: AFCERQ, Merli, Iannaccone, Galvano, Kelada J., Frasinianu I. and Frasinianu C., Ciurea S., Dragulescu N., Olaru M. and Paraschivescu A.O., etc. At the same time, there is presented a comparison between controlled and total quality.

In the author's opinion, the *total quality* could be interpreted by means of a palm (Figure 2). Palm is the inner part of the hand, and the hand is the creator of all that surrounds us. Thus, as the hand has 5 fingers, so the total quality has 5 leverages. Namely, total quality must start from:

1. **Customer needs** – any product or service needs to meet consumer needs (destination, utility degree, raw materials, shape, colour, taste, size, quantity, post-delivery service, exploitation/use/validity term, etc.).

2. **Quality system** – production of goods or provision of services, must necessarily follow and meet certain principles, norms, organized methods, techniques, valid and recognized rules by the company, as well as standardization institutions.

3. *The staff of the enterprise* – absolutely all the staff of the enterprise must be mobilized to participate in the process, since any employee is considered as the supplier and customer of his own enterprise. Thus, staff involvement develops continuous improvement of quality and competitiveness.

4. *Zero defects* – the "acceptable quality level" is no longer valid, which implies accepting lots of merchandise with a certain percentage of defective specimens. Defects and non-conformities in production or provision must be prevented, so that the entity is exempted from the cost of repairing, replacing, or destroying the scraps.

5. *Customer requirements (conditions)* – total quality must begin with the design of the product and end with delivery to the customer, respecting certain conditions: the required quantity at the indicated time and place, with the lowest costs for the customer, legal requirements and international requirements.

There is offered an own model of "Quality management evolution" (Figure 3), starting with the 1900s, followed by about 20 concepts of "quality management" offered by standards and scholars such as: Ishikawa K., Juran J.M., Kelada J., Oprean C., Kifor C.V., Suciú O. and Olaru M., etc. The study continues with the reference to quality and quality management tools, Ishikawa's statistical methods for quality control, and the "Quality management functions (according to Kelada)" and "Relationship between quality management and business management".

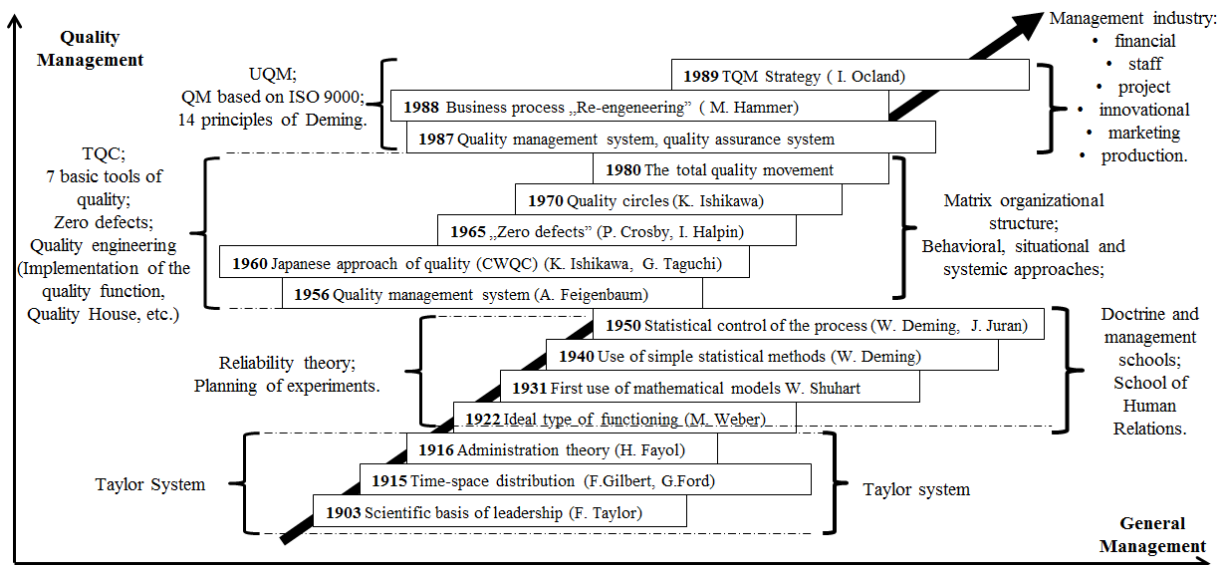


Fig. 3. Evolution of quality management  
Source: Systematized by the author

A brief history of the "TQM" notion is presented, followed by about 60 concept definitions offered by the scientists: Deming W.E., Harrington H.J., Drummond E., Berry, Dahlgaard B., Zink K.J., Shiba S., Burchakogo M.A., Mizintseva M.F., Zedginidze I.G.,

Kalanovoy S. M., Bishimbaeva V.K., followed by the philosophical vision of Zsifkovits, Kelada and Olaru M. The study continues with a characterization of the stages of the correct implementation of TQM through: "Quality chain", followed by the personal characterization of the benefits from the implementation of TQM and their transposition into own model "*TQM scale* (Figure 5)".

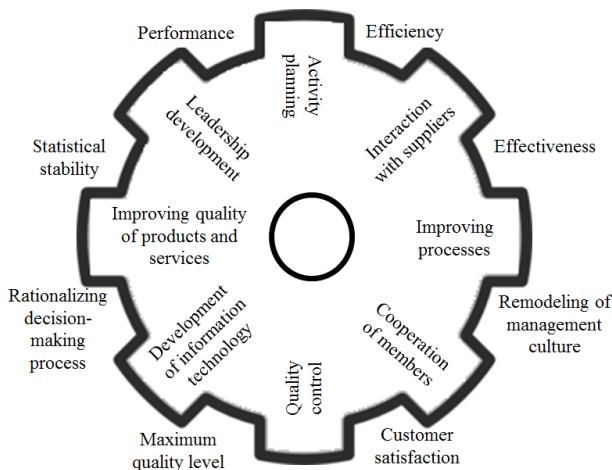


Fig. 4. TQM cogwheel  
Source: Developed by author

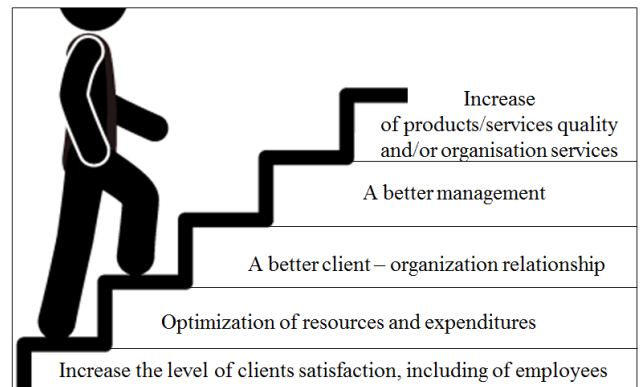


Fig. 5. TQM scale  
Source: Developed by author

In the research is offered an own notion of TQM transposed into the personal model "*TQM cogwheel*" (Figure 4). We state that *total quality management* is seen as a cogwheel of a whole mechanism, consisting of several variables: improving processes in the organization, cooperation of its members, development of leadership and information technology, improving the quality of products and services offered, interacting with its suppliers, activity planning and quality control. These variables, simultaneously and permanently interacting, will form the system's output elements as: efficiency, effectiveness, remodeling of management culture, customer satisfaction, achieving maximum quality level at all levels of the enterprise, rationalizing decision-making process, statistical stability and obtaining performance.

Implementing the TQM has a number of benefits that have been represented in the thesis. In our opinion, the benefits that arise from the implementation of the TQM can be compared to the steps that you climb, for achieving success. Thus, in Figure 5 the post-implementation benefits can be noticed.

It is mentioned that the main Quality Awards (DAP, PNCMB, EAQ) have been analysed, but they are called with a short feature both the Juran Award from the RO and the French Quality Award. In the Republic of Moldova, State Awards for Quality Achievements are offered. The competition is launched by the Chamber of Commerce and Industry of the Republic of

Moldova in partnership with ONA MOLDAC, INM, INS and APC. The contest aims to identify companies that have successfully implemented quality management and promote modern quality approaches [8]. The State Award is annually awarded on a competitive basis for the implementation of effective quality management methods, advanced technologies for achieving high and stable product and/or service quality results in order to ensure their harmlessness as well as the promotion of products competitive on the external market [12].

Participants are awarded according to some evaluation criteria, such as obtaining high quality performance results; promoting creativity and innovation; creating partnerships; increasing the value created for the consumer; management of work based on strategic orientation, incentives and responsibility; getting success with the help of staff; procedural management; promoting creativity, innovation and, of course, responsibility for sustainable development [10, 18]. The 9 criteria of the excellence model of the Quality Achievement Award are assigned with a specific weight and a number of sub-criteria. The criteria are grouped into two general categories: outcomes and possibilities [18]. This model of excellence is tailored to the EFQM Excellence Award.

Table 1. Quantitative performance indicators following the TQM implementation

No.	Quantitative performance measurement indicators
1.	Competitiveness of the workforce = Value added / Labour cost
2.	Annual cost of a unit of labour, lei
3.	Asset competitiveness = Value added / Wear of fixed assets
4.	Competitiveness rate = Productivity / (Total production costs + Stocks of unfinished products)
5.	Productivity = Value added / Employee
6.	Sales volume per employee, lei
7.	Productivity of fixed assets = Value added / Fixed assets
8.	Operational capital productivity = Value added / Operational capital
9.	Productivity rate = Productivity / Total inputs (for all the company)
10.	Raw material consumed as a percentage of total inputs, %
11.	Volume of production / raw material
12.	Export, % of sales, %
13.	ROE (rate of financial return) = net profit / equity x 100%, %
14.	ROA = net profit / total assets * 100%, %
15.	Sustainable growth index = ROE x (1-b) / (1-ROExb), where b = Dividends / Net Profit

Source: Modified by the author according to the source [18]

The thesis presents such models as: "*Deming cycle*", "*Framework of the excellence criteria of performance according to PNCMB*", "*The Structure and Criteria of the EFQM*", "*The excellence award for the quality achievement*", "*TQC subsystems*", "*Ishikawa diagram*" and "*Basic components of CWQC*". Similarly, the application of the PDCA cycle and the TQM core

principles has been developed. In the research, the concepts of "performance" and "high performance" concepts were offered, the ways of measuring them were quantified using quantitative indicators (by means of calculation formulas) and the qualitative performance indicators have been specified. It also mentions for which performance of the organization quality prizes are offered and how to measure performance for different levels of managers and areas (Table 1).

Chapter II „*Producers of finishing materials at international and national level*”. The evolution of the world's largest varnishes and paints producers is represented by the world's largest producer's rating based on annual USD sales and an annual turnover of more than 100 million USD. For the 2011-2015 period, the leaders of the TOP are producers from USA, Japan, Germany and South Korea. Among the leading manufacturers of each year, the following ones can be mentioned: Akzo Nobel, PPG, Henkel, Sherwin-Williams, DuPont, BASF, Valspar, Kansai, Nippon, Sika, RPM, Axalta, 3M [3, pp. 102-105].

The leading paint and varnish producers from RO for the years 2014-2015 are: Köber, Fabryo-Atlas Paints, Azur, Deutek, Policolor, Daw Benta, Duraziv, Sentosa Impex, Druckfarben and Akzo Nobel. Romania's market of varnishes, paints and decorative plaster grew mostly in 2008. Due to the crisis of 2009 and 2010, economic indicators stagnated, continuing a slight increase from 2011. In 2013, the market of varnishes, paints and decorative plasters rose by 2% in volume due to increase in repairing works, renovation of the residential segment, growth in manufacturing and automotive production. RO is on the last place in terms of paint consumption reported to the no. of inhabitants, and the data accentuates an inertia for choosing white paints for decoration. In 2015, the varnish and paint producers segment amounted to over 120 million EUR.

Among the Ukrainian leaders in the production of paints and varnishes, for the years 2014-2015, are: Ukrainian Chemical Products, ZIP, Polisan, Sniezka-Ukraine, Kolorit, Kirovogradpostach, Chimpostavshik, etc. The Ukrainian market of paints and varnishes is dependent on imports that have a double demand compared to domestic products. According to data provided by the National Service of Statistics, in 2015, the Ukraine produced only 136 thousand tons of paints and varnishes. Among the leaders of the Russian producers of paints and varnishes in 2016, we can name "Kraski-Tex" – 22%, "Empils" – 16%, "Lakra" – 7%, "Russkie kraski" – 7%, "ABS Farben" – 6%, "Himik" – 3%, "Pigment" – 3%, etc. [26, p. 9].

During the years 2013-2016, RU recorded both the recession and the increase in the production of water-based paints and varnishes. The dynamics of production in 2014 registered the highest indicator in April: 98566 t, with 4496 t more than in June 2013 and by 59286 t more than in January 2014. In 2016, paints and varnishes were produced with 6.6% more than in 2015. The

manufacture of polymer-based paints and varnishes in December 2016 increased by 29023.3 t compared to the same month of previous year.

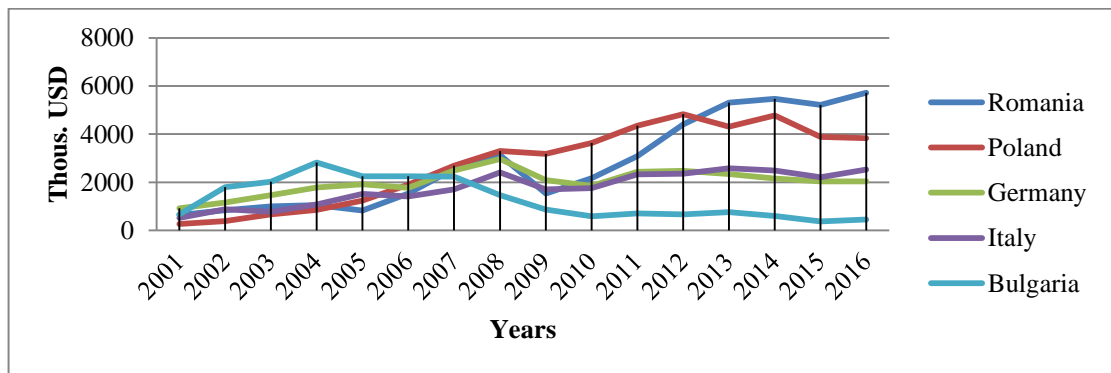


Fig. 6. Comparative imports of product group 32, according to the NM (the first 5 participants with the biggest totals)

Source: Developed by author based on source [6, p. 27; 3]

In this study, the totals of RM import figures from the EU for 2011-2016 have been studied (Fig. 6). RO comes as an import leader for the mentioned years, with the value of the imported goods amounted to 44493.9 thousand USD, followed by Poland with 4411.6 thousand USD, Germany with 31937.2 thousand USD, Italy with the value of 28257.6 thousand USD and Bulgaria with the value of 20539.5 thousand USD. The rest of the countries participating in the import of the product group 32 have accumulated less than 20000 thousand USD.

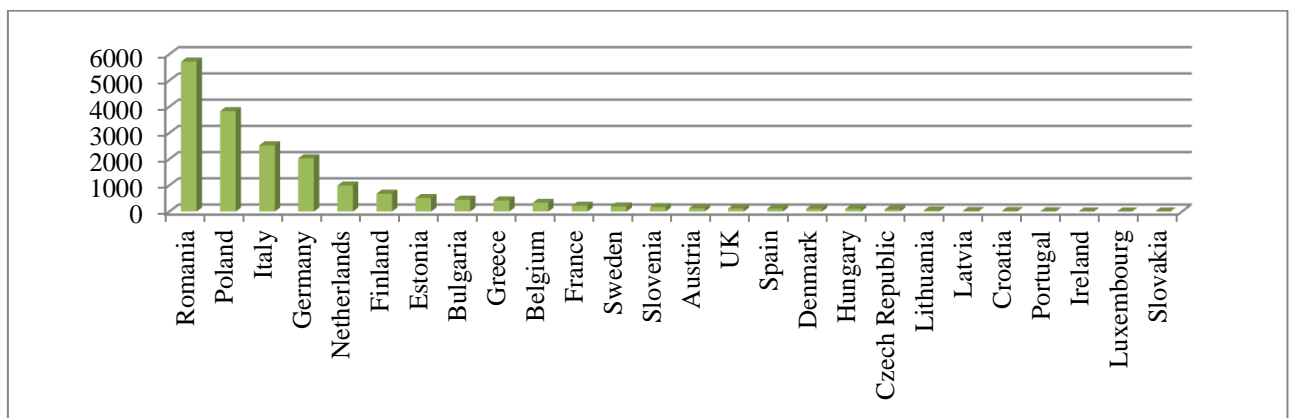


Fig. 7. Imports from the EU countries in RM (2016) of the product group 32, according to NM (thousand USD)

Source: Developed by author based on source [7]

We consider it important to provide import data for product group 32, according to NM, from EU countries for the year 2016 (Fig. 7). Thus, according to Fig. 6, it is noticed that Ro, Poland, Germany, Italy imported in the Republic of Moldova goods with a value of more than 2000 thousand USD, the Netherlands, Finland, Estonia, Bulgaria, Greece, Belgium, France, Sweden, Slovenia, Austria, Denmark imported in the Republic of Moldova goods worth 1000-100 thousand USD, Hungary, the Czech Republic, Lithuania, Latvia, Croatia, Portugal imported goods in Moldova worth 10 to 100 thousand USD, Ireland, Luxembourg, Slovakia have

imported goods worth up to 4 thousand USD, and Cyprus and Malta did not import goods into the RM, so they were not included in the chart.

In order to achieve another objective of the research, it is necessary to analyse Republic of Moldova's exports to EU countries. We mention that the products from the product group 32 according to NM were exported only in 18 EU countries. From the figure below, it is noticed that RM, in 2016, recorded the most quantitative exports to Poland, Romania, Portugal, France and Italy.

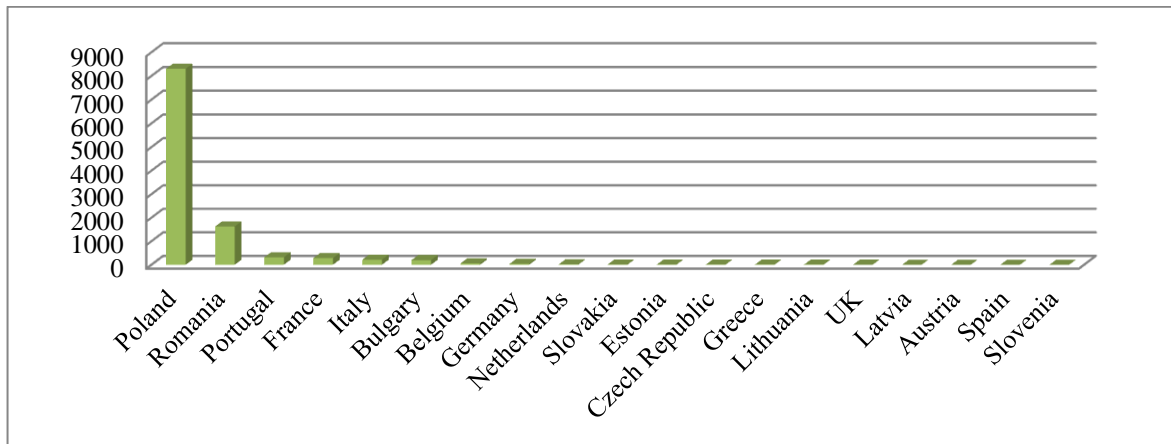


Fig. 8. RM exports in EU countries (2016) of the product group 32, according to NM (thousand USD)

Source: Developed by author based on source [7]

Comparing the import/export values of finishing materials from/to the CIS countries from/to the RM, it is noticed that the imports prevail over the exports, which is negatively interpreted in the economy of the country. The difference between CIS import and export averages is over 10300 thousand USD. Imports prevail with approximately 85% more.

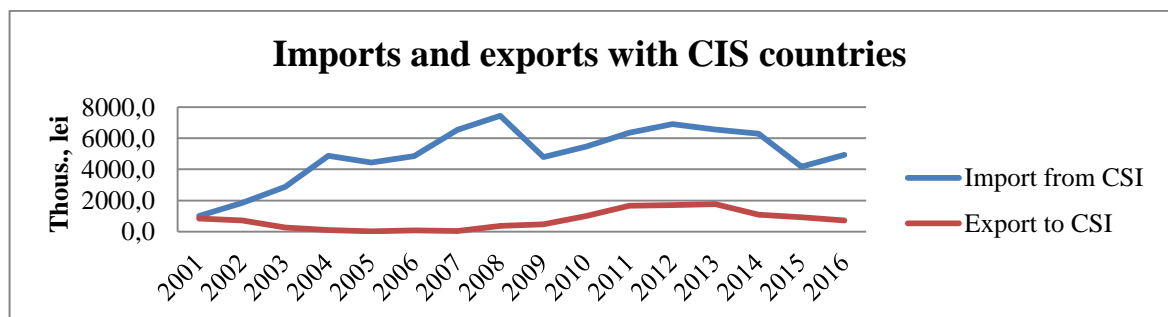


Fig. 9. Imports and exports with CIS countries of the product group 32, according to NM

Source: Developed by author based on source [7]

By making a parallel between the export/import values of finishing materials from/to RM to/from EU countries, there is an exhaustive difference, which is negatively interpreted by the country's economy. Imports prevail over exports, with an average of over 14000 thousand USD. Imports from EU prevail with 98% more over exports to the EU.

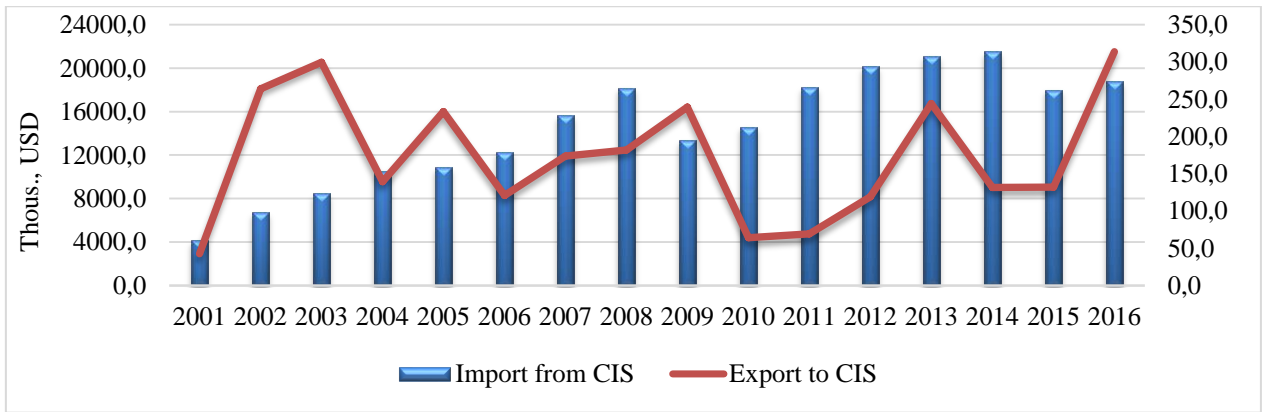


Fig. 10. Imports and exports with EU countries of the product group 32, according to NM  
*Source:* Developed by author based on source [7]

The leading producer of paints and varnishes in RM is J.S.C. SUPRATEN, which in 2016 produced 27682 units of paints and varnishes worth 285448 thousand MDL, a volume higher with 14606 units more than in 2012, i.e. by 27710 thous. MDL more. In 2013, there is registered the smallest produced quantity, about 4 times lower than in 2016. Generally, there is a tendency to increase the production of paints and varnishes. It is remarkable that the share of revenues from the sale of paints and varnishes in the company's total revenues accounts between 0.03-0.04% for the year 2016.

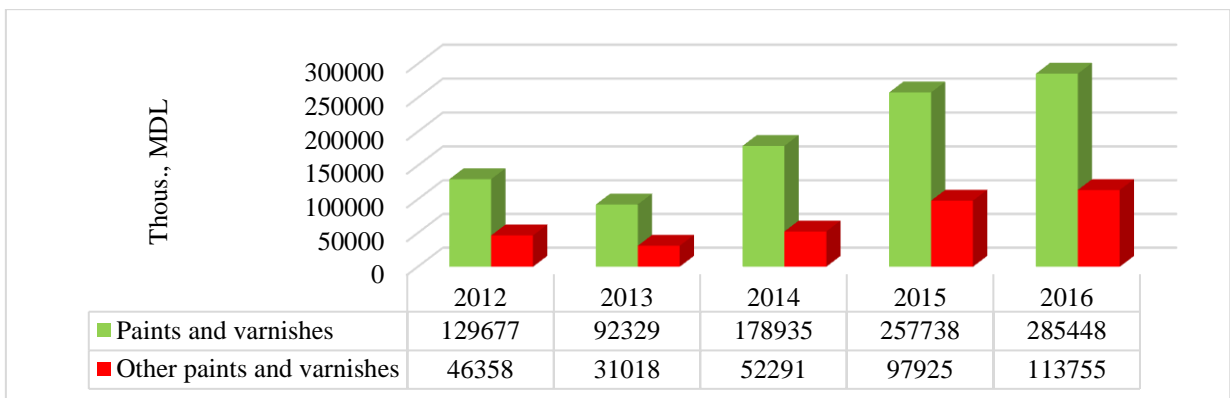


Fig. 11. Value of sales of paints and varnishes (thousand, MDL)  
*Source:* Developed by author based on source [1]

By calculating the quality indicators for the pilot company, we have witnessed a downward trend over the 3 years period: 2007-2010. The trend is decreasing due to the unstable political and economic situation in the country. We mention that world production is declining for this period, starting to increase from 2010. We must emphasize that the implementation of the quality management system, within J.S.C. SUPRATEN took place in 2007. Maturity of the system allowed to deliver good results, after the second certification cycle starting with 2010.



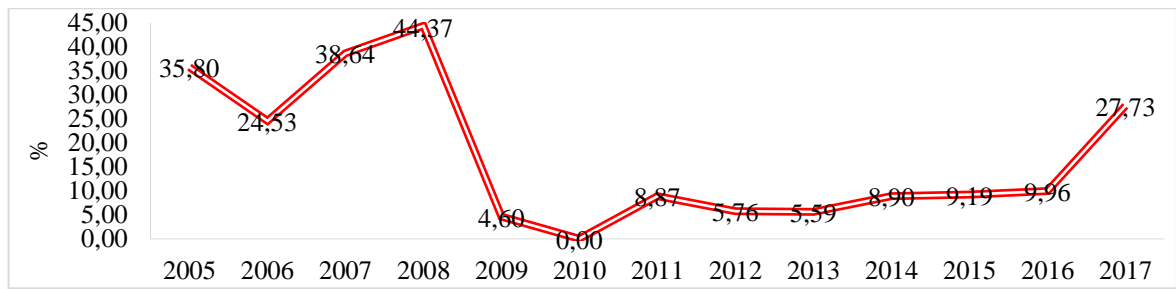


Fig. 12. Rate of financial return of J.S.C. SUPRATEN (performance-quantitative indicator)  
 Source: Developed by author based on source [19]

At the same time, analysing the performance indicators of the pilot company J.S.C. SUPRATEN, especially ROA and ROE, we notice that with the SMC implementation, the company starts to record positive values, which follow an upward trend from the period 2010-2017.

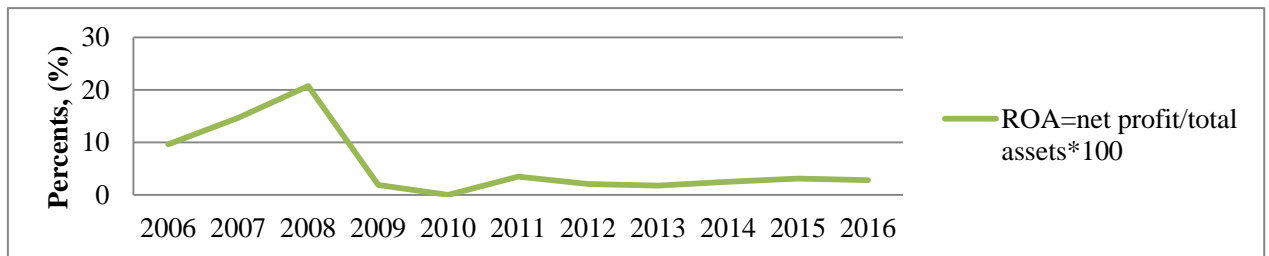


Fig. 13. Return on assets J.S.C. SUPRATEN (performance-quantitative indicator)  
 Source: Developed by author based on source [19]

Also, mentioning in various national tops is a proof of the enhancement of the qualitative performance, following the implementation of the TQM.

Table 2. Qualitative performances (mentioning in national tops) of J.S.C. SUPRATEN following the implementation of the TQM

No.	TOP	Information
1.	(2012) 71 <sup>st</sup> place in top 111 the most beloved brands from the Republic of Moldova [14]	The company has partnerships with over 350 companies in the country.
2.	(2016) 2 <sup>nd</sup> place in top 10 companies with Moldovan private capital [23]	Turnover-over 1 billion MDL, registering a 10% increase in 2015, compared to the previous year.
3.	(2016) 8 <sup>th</sup> place in the top 10 most profitable companies in RM [24]	The company's revenues reach 51.2 mln EUR
4.	(2017) 9 <sup>th</sup> place in the top 10 companies with the highest incomes [25]	The company's revenues reach 52.8 mln EUR
5.	(2017) top 100 brands 2016 [21]	The best 100 brands from Moldova.
6.	(2017) Man of the Year 2016 in Business [14]	The J.S.C. SUPRATEN Administrator became the Man of the Year 2016.
7.	(2018) top 10 construction companies from RM [20]	SUPRATEN is a leading manufacturer of paints and dry mixes for construction in the Republic of Moldova.
8.	(2018) Man of the Year 2017 in Business [15]	20th anniversary of SUPRATEN.

Source: Developed by author based on indicated sources

We note that J.S.C. SUPRATEN has partnerships with over 350 companies in the country, producing up to 40 tons of painting materials and 150 tons of dry mixes. The quality of the products is confirmed by the international certificate ISO 9001:2008. Turnover of the company registers over 1 billion MDL, while having more than 1000 employees. The company's revenue reaches over 50 mln EUR and its manager has won the award "Man of the Year in Business" twice.

Chapter III „*TQM procedures for enhancement of performance in production and marketing of finishing materials*”. Under the Moldova-EU Association Agreement, the RM is committed to progressively transpose the European standards (ES) as national standards, at the same time, being necessary the withdrawal of national standards that contravene the European ones. Most economic agents consider this transition to be tough, prodigious, like an obstacle to the export of products. Thus, it has been tried to convince the economic agents that the transition is a positive one, which will give positive results, thus some own models have been developed, such as: "*Octagonal star of the benefits of European standards implementation*" and "*Benefits of implementing European standards*".

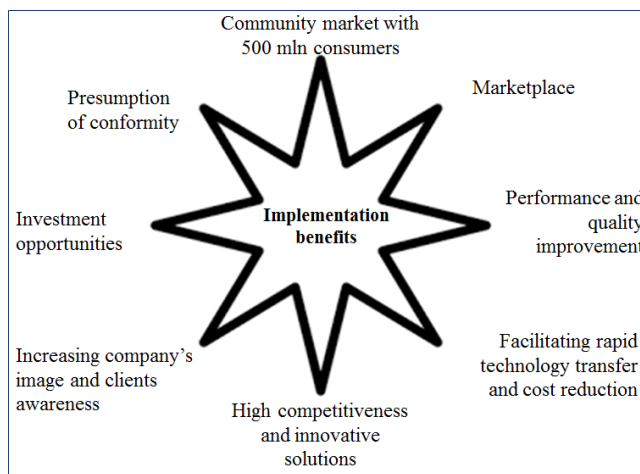


Fig. 14. Octagonal star of the benefits of European standards implementation  
*Source: Developed by author*

The legislation on quality infrastructure has been studied within this research: decisions, regulations, laws, etc.; a study has been carried out in order to establish the most important subjects of the quality infrastructure, thus achieving an own model: "*Quality infrastructure in RM*". Some recommendations have been offered to bodies in this field, the current standards in the paints and dyes industry for the categories: paints and varnishes, paint ingredients and paint coating processes have been identified in the transition process.

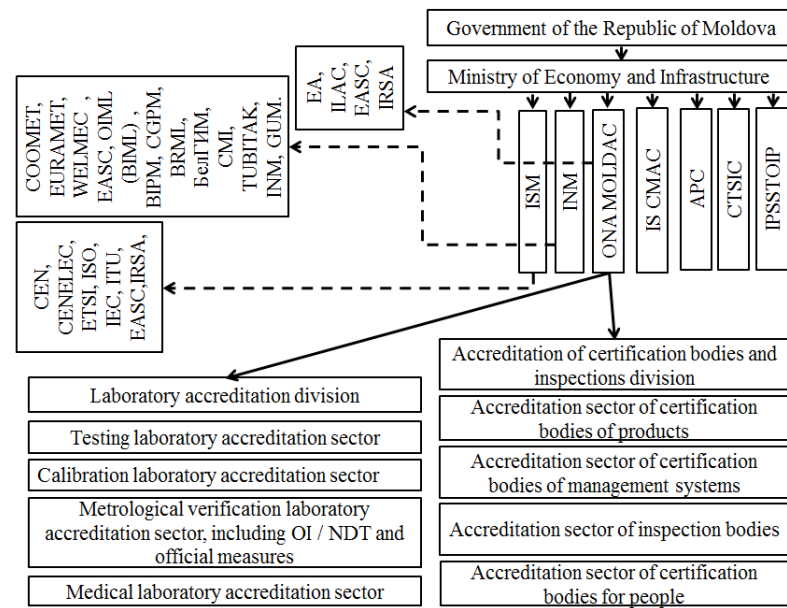


Fig. 15. Quality infrastructure in the Republic of Moldova

Source: Developed by author

During development of this study, the directions for improving the legislation on producing/marketing paints and varnishes were emphasized: introduction of a regulation for the management, restriction or prohibition of chemicals for the production of film-forming products; to issue a decision on the approval of rules on the labelling of non-food products, in particular finishing materials; in order to protect the consumer, a new verso of the page was developed for filling in the complaints; accreditation of a body for the certification of organic non-food products (in particular finishing materials: paints and varnishes); amendment of 2b par. of article 4 (*Producer's obligations*), chapter III (*Producers and distributors obligations*) of Law No 422 on general safety of products in order to avoid the legislative paradox [4].

<p>Name and surname of consumer _____</p> <p>Number of receipt of other document confirming the purchase _____</p> <p>Consumer address _____</p> <p>Measures undertaken by administration (business owner) of the unit _____</p> <p>Signature of the head (business owner) of the unit _____</p> <p>Date _____ 200_</p> <p>The answer was sent to _____ 200_</p>		<p>Name and Surname of consumer _____</p> <p style="text-align: center;"><b>Filling in of at least one paragraph from below is mandatory!</b></p> <p>Consumer address _____</p> <p>Phone number of consumer _____</p> <p>Measures undertaken by administration (business owner) of the unit _____</p> <p>Signature of the head (business owner) of the unit _____ 2018</p> <p>Date _____ 2018</p> <p>The answer was sent to _____ 2018</p>
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Fig. 16. Verso of the modified complaint paper

Source: Developed by author based on annex according to the source [11]

The study also presented dysfunctions of the human body caused by chemical substances used in the production of paints and varnishes; eco paint markings have been exemplified; criteria for granting the European eco-label have been offered; two types of eco paints of the local producer and an English producer were compared [5, p. 110].

Table 3. Criteria for awarding the European eco-label for paints and varnishes

<b>Ecological Criteria</b>	<b>Limitations/ Discounts/ Other</b>
<i>Limiting the substances hazardous for the environment and health:</i>	Content in white pigments less than or equal to 38 g/m <sup>2</sup> of dry film, rate of opacity = 98%.
<i>Reducing air pollution</i>	<b>Emissions from production of titanium dioxide pigment:</b> SO <sub>x</sub> <300 mg /m <sup>2</sup> of dry film, with a 98% rate of opacity
<i>Reducing production of hazardous waste</i>	<b>If the white pigment is titanium dioxide (TiO<sub>2</sub>):</b> - waste containing sulphates <20 g/m <sup>2</sup> of dry film with 98% rate of opacity. - wastes containing chlorides: < 5 g/m <sup>2</sup> of dry film, 98% rate of opacity for tiles made from natural products. < 9 g/m <sup>2</sup> of dry film, 98% rate of opacity for tiles made of synthetic materials. < 18 g/m <sup>2</sup> of dry film, 98% rate of opacity for slag.
<i>Limiting air pollution with solvents</i>	<b>VOC:</b> < 30 g/l - without water – for wall paints. < 250 g/l – without water – for other types of paint with hiding power > 15 m <sup>2</sup> /l and 98% spreading rate. <180 g/l – without water – all other products
<b>VAH</b>	<0.15% of the product for wall paints. <0.4% of the product for all other products
<i>Limiting the use of substances hazardous for the environment and health</i>	The product should not be classified as very toxic or toxic, environmentally hazardous, carcinogenic, toxic for reproduction or mutagenic.
<i>The ingredients used must not contain:</i>	- heavy metals or their compounds: cadmium, lead, chromium VI, mercury, arsenic. - alkylphenol ethoxylates (AFE) - diethylene glycol methyl ether (DEGME) - substances and preparations considered to be highly toxic, toxic, carcinogenic, teratogenic or mutagenic
<i>The following substances are limited:</i>	- active ingredients used as preservatives that may be assigned certain risk phases when using <0.1% of the total paint composition - ingredients which may be very toxic, toxic, harmful and which may have long-term adverse effects in the aquatic environment
<i>The sum of the quantities of all the ingredients that, at the time of use, may be assigned certain risk phases must not exceed 5% of the weight of the product.</i>	- isothiazolinone compounds <500 ppm (parts/mln) - free formaldehyde <10 mg/kg of product
<i>Criteria, regarding the rate of suitability for use</i>	- hiding power - resistance to wet rubbing - waterproof - adhesion - abrasion
<i>Information for consumers</i>	<b>The product packaging should include information about:</b> - the use, the support surface, the conditions of use of the product, including instructions on how to prepare the support surface;

	<ul style="list-style-type: none"> <li>- the recommendations on product cleaning and appropriate waste management;</li> <li>- the instructions on storage conditions of the product, including safety measures;</li> <li>- the recommendations on preventive protection measures for the user.</li> </ul>
	<p><b><i>In order to inform consumers</i></b>, the following visible text should be written next to the eco-label:</p> <ul style="list-style-type: none"> <li>- good performance when used indoor;</li> <li>- limited use of hazardous substances;</li> <li>- low solvent content.</li> </ul>

*Source:* [2, 5]

We believe that the demand for organic paints will increase, because there is a need to apply products free of VOCs and HAVs, both for workers and the environment, and for people who will work in the processed premises. There is a need for the RM to develop a regulation for the production of ecological paints and varnishes, declaring it mandatory at the national level. Producers should use the ecological criteria established by the competent bodies, whether they will be taken over and translated from the EU, or that they will be developed at the national level.

It was observed the fact that interviewed economic agents record the marketing/production processes in working instructions – 32%, in procedures – 25%. The interviewed companies perform an analysis of the external environment factors – about 78% and the internal environment – 22%. They communicate and assign responsibilities within the companies: well – about 56%, very well – about 39%. As an improvement in responsibility setting, 40% of respondents indicated on the periodic verification of carried out tasks.

Table 4. Indicators used in the regression model for TQM implementation

No.	Indicators
Y	TQM
x1	Competence
x2	Environment for process operation
x3	Infrastructure
x4	Customer satisfaction
x5	Implemented Management System
x6	Customer orientation is promoted by the entire organization
x7	Maintain CMS integrity
x8	The production / marketing process is described in detail
x9	Analysis of environmental factors
x10	Employee responsibilities
x11	Possibility to improve the area of establishing responsibilities
x12	Risk analysis of the company in the field of production / marketing
x13	The infrastructure available in the company needs improvement
x14	The company keeps / develops employees' skills
x15	Company employees are responsible and aware of completing / retaining internal documents of the company
x16	The company performs analysis of suppliers
x17	The company has implemented a method of marking, identifying or finding products
x18	Detecting non-compliant products
x19	The company carries out monitoring of processes

*Source:* Developed by author

To identify the performance gained from the TQM implementation within the enterprise, we have studied through questionnaires issues that influence performance from the point of view of consumers, producers/dealers, and/or experts from companies. Structured questions were used, thus simplifying the statistical process. After analysing their results, using the software tools: *IBM SPSS Statistics 21; EViews 7.0 and Excel*, we have identified 19 factors that influence TQM and existing deficiencies in the absence of a management system (Table 4).

The regression model parameters were estimated using the smallest squares method, with the condition that the sum of error squares is minimal. The results obtained with the econometric analysis package EViews 7.0 eliminates the insignificant estimators at each stage, where the four most important factors in the paint and varnish production and trade of the TQM (C) have been identified, which influence the company's performance: "Customer satisfaction" (X13), "The need to improve the available infrastructure within the company" (X6), "Customer orientation is promoted by the entire organization" (X13), "Employees responsible and aware of completing/retaining internal documents of the company" (X15) (Table 5). In such a way, we have the following results:

Table 5. Results of linear multifactor regression model through MCMMP

Dependent Variable: TQM				
Method: Least Squares				
Sample: 1 18				
Included observations: 18				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.12024	2.441504	4.964252	0.0003***
X4	1.591676	0.399740	3.981775	0.0016***
X6	1.253337	0.309492	4.049657	0.0014***
X13	4.566101	1.115804	4.092208	0.0013***
X15	2.271119	0.989303	2.295676	0.0390**
R-squared	0.826952	Mean dependent var		27.79889
Adjusted R-squared	0.773706	S.D. dependent var		3.999338
S.E. of regression	1.902499	Akaike info criterion		4.354347
Sum squared resid	47.05352	Schwarz criterion		4.601672
Log likelihood	-34.18912	Hannan-Quinn criter.		4.388449
F-statistic	15.53090	Durbin-Watson stat		1.882604
Prob(F-statistic)	0.000071			

Note: \*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.1.

Source: Developed by author

In this study, the econometric multi-regression model with a high creditworthiness manages to capture how the listed factors influence TQM. Based on the regression output, it is noted that the model parameters are significant with a high degree of validity. At the same time, by testing the function obtained with the help of hypotheses, we have shown that we have a normal classical regression model. The correlations between the dependent variable and the

independent variables are linear and of a strong intensity, while it can be said that the exogenous variables have a great impact on the effect variable in the field of finishing materials production.

#### IV. GENERAL CONCLUSIONS AND RECOMMENDATIONS

Carrying out theoretical, methodological and applicative investigations on the theme of the dissertation allowed the author to formulate the following **conclusions**:

1. An extensive study on the notions of *quality*, *total quality* and *TQM* according to the evolution over time, according to the philosophical vision followed by the definition of the concepts according to encyclopedias, dictionaries, standards, national and international scholarships has been carried out; at the same time, the author's own notions were offered and own models which developed the topic of the research were created.

2. Qualitative and quantitative performance indicators are synthesized in the paper; the calculation formulas for measuring the performance of companies as a result of the TQM implementation were provided; quantitative and qualitative indicators of the performance of the pilot company J.S.C. SUPRATEN were determined. At the same time, the main Quality Awards (including those from the Republic of Moldova) and the criteria for awarding the scores were described.

3. An analysis of evolution and tendencies in the field of paints and varnishes production and marketing at international and national levels was carried out. Top of the world's largest producers of paints and varnishes are manufacturers that record a turnover of more than 100 mln USD. For the 2011-2015 period, leaders of the top are producers from the USA, Japan, Germany and South Korea. We will mention a few well-known brands: Akzo Nobel, PPG, Henkel, Sherwin-Williams, DuPont, BASF, Valspar, Kansai, Nippon, Sika, RPM, Axalta and 3M. Among the Romanian producers of paints and varnishes are: Azur Köber, Daw Benta, Sentosa Impex, Policolor, Fabryo-Atlas Paints, Deutek, Druckfarben and Akzo Nobel Coatings. Among the Ukrainian leaders in the production of paints and varnishes can be named: Sniezka-Ukraine, Meffert Ganza Farben, ZIP, Tikkurila, Arteli, etc. Among the leaders of the Russian producers of paints and varnishes in 2016, we can name "Kraski-Tex", "Empils", "Russkie kraski", etc. And the native producers are represented by four participants: J.S.C. Supraten, L.L.C. Chimtoncom, F.C.P. Soldi L.L.C. and I.S. Knauf-Gips L.L.C. The official list of dealers or so-called merchants of finishing materials (especially paints and varnishes) on the territory of the Republic of Moldova is included in the list of 206 economic agents, attached to the thesis.

4. In this study, Moldova's import and export directions for finishing materials were established. The Moldovan importing leaders of the product group 32, according to the NM for the years 2001-2016, were determined: Romania, Poland, Germany, Italy and Bulgaria and the

CIS countries: Ukraine and Russian Federation. Comparing the export/import values of finishing materials from/to Moldova to/from EU countries, there is an exhaustive difference, which is negatively interpreted by the country's economy. Imports prevail over exports, with an average over 14000 thousand USD. Imports from the EU prevail over exports to the EU with about 98%. Comparing the import/export values of finishing materials from/to the CIS countries in/from Moldova, it is noticed that the imports prevail over the exports, which is negatively interpreted by the country's economy. The difference between CIS imports and exports is over 10300 thousand USD. Imports prevail with 85%.

5. In this paper, the performances obtained by J.S.C. SUPRATEN due to the implementation of TQM have been identified. An economic and financial analysis of the pilot company was also carried out. By means of a statistical analysis, it has been shown that in the production of varnishes and paints produced by SUPRATEN, the value of their sales and the share of revenues from the sale of paints and varnishes to the company's total revenues are increasing for the period 2012-2016, except for the year 2013 which has diminished due to the economic and political crisis in the country.

6. Legislative acts in the field of production/marketing of paints and/or varnishes have been studied. The benefits of the transition process to EU standards have been identified, an own model of the quality infrastructure in the RM (following its analysis) has been developed and an empirical study on eco paints and eco-label criteria has been carried out. At the same time, according to the questionnaires, the four most important indicators in the field of paints and varnishes production/marketing that influence TQM (customer satisfaction, customer orientation promoted by the entire organization, need to improve available infrastructure in the company, employees responsible and aware of completing/retaining internal documents of the company) and company performance have been identified.

As a result of the carried out scientific researches, we propose the following **recommendations:**

1. The Moldovan Parliament, the Government, the Ministry of Economy and Infrastructure, the Moldovan Customs Service and all paints and varnishes producers / dealers are recommended to introduce a regulation on the management of chemical substances or the incorporation of legislative amendments related to the setting of the ceiling or the ban on import / production of finishing materials containing aggressive diluents. Similarly, it is important to ban the import of raw materials or finishing materials from countries that offer products with a low and harmful environmental quality.

2. The Parliament of the Republic of Moldova, the Government, the Ministry of Economy and Infrastructure, the Agency for Consumer Protection and Market Surveillance, the Product



Certification Bodies, the paints and varnish producing enterprises are recommended an informational transparency to consumers, introduction of technical norms/regulations or the adoption of Regulation (EC) No. 66/2010 on the EU Eco-label for the production of ecological paints.

Similarly, we consider that the existence of the Decision no. 996 from 20.08.2003 on the approval of the norms on food labelling and norms on the labelling of household chemical products is insufficient for producers to indicate the raw materials used and other necessary information regarding finishing materials. Thus, the Parliament of the Republic of Moldova, the Moldovan Government, the paint and varnish producing companies, are recommended to extend the law to several non-food products, thus protecting the consumer against fake or toxic and harmful health products.

Taking into account that the way of handling and completing the Complaints register is not known to all consumers, the Parliament, the Government of Moldova and all the entities in the Republic are recommended that the indication of the personal data spaces in the Register be marked as mandatory without which complaint has no value. At the same time, we believe that consumers' personal data must be protected, so we recommend cancelling their indication.

Law no. 442 from December 22, 2006, in the author's opinion, contains a paradox: "*voluntary obligation*". It is therefore recommended that the Parliament and the Government of the Republic of Moldova to amend par. 2b of article 4 and par. 4 of article 4.

The lack of information submitted by ONA MOLDAC regarding the certification of non-food organic products presents a lack of transparency for consumers, given that the organic BABY SMILE paint produced by J.S.C. SUPRATEN is marked by CNSP as an environmentally friendly one. CNSP is not a certification body for organic non-food products; it has an accredited laboratory for food, industrial and environmental objects. Thus, it is recommended to ONA MOLDAC to certify a body in verifying and offering the ecological marking for non-food products especially paints.

3. Small and medium enterprises in the Republic of Moldova are recommended for the transition from GOST standards to European ones: monitoring the process of adopting European standards as national standards, realizing that the implementation of European standards offers competitive advantages to products and services produced and provided by SMEs, active participation in the process of identifying and cancelling GOST standards that are in conflict with European standards, making reasonable efforts to implement European standards as soon as possible.

4. Based on the empirical study data and the econometric model developed by the author in the thesis, it is recommended to the Moldovan enterprises to implement the TQM

elements/principles and to follow the key elements in order to increase the company's performance: “customer satisfaction”, “customer orientation promoted by the entire organization”, “need to improve available infrastructure in the company” and “employees responsible and aware of completing / retaining internal documents of the company” that influence the effective implementation of the management system.

5. Managers of local enterprises are recommended to use the results obtained in the paper to analyse the managerial situation in the entity and in the external environment in determining the directions of the development of the managerial policies, in order to improve the competitiveness of the company. At the same time, the author considers it necessary to apply various methods and statistical/econometric models elaborated in the thesis for evaluation and analysis of the companies' performance.

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25. TOPul companiilor cu cele mai mari venituri din RM. [on-line]. Disponibil: <https://telegraph.md/topul-companiilor-cu-cel-mai-mare-venit-din-moldova-au-fost-identificate-de-catre-experti/> [accesat 24 apr 2018].
26. Производитель красок и лаков ЗАО „Атлант”. [on-line]. С. 8-9. Disponibil: <http://www.myshared.ru/slide/137426/> [accesat 15 feb 2018].

## VI. LIST OF WORKS PUBLISHED ON THESE THEME

### Scientific papers

#### 2. Articles in various scientific journals

##### 2.2. in recognized foreign journals

1. **CERNAVCA, Olesea.** The import of paints and lacquers on the territory of the Republic of Moldova by the EU and CIS countries. În: *Dezbateri Social Economice*, 2018, Volume 7, Issue 2, pp. 25-30, 0,46 c.a., ISSN 2360-1973, ISSN-L 2248-3837.

2. **CERNAVCA, Olesea.** Identificarea consumatorilor-țintă ai materialelor de finisare, în vederea extinderii segmentului de piață al producătorilor autohtoni. În: *Univers Strategic*, 2018, Anul IX, Nr.2 (34), aprilie-iunie, pp. 44-55, 0,56 c.a., ISSN 2068-1682, Categoria B+.

**in magazines from the National Register of Profiles, with the indication of the category**

##### 2.3. în reviste din Registrul Național al revistelor de profil, cu indicarea categoriei

3. **CERNAVCA, Olesea.** Informarea consumatorilor cu privire la regulamentul și modul de gestionare a registrului de reclamații. În: *Economica*, 2018, Nr. 2 (104), 2018, pp. 51-61, 0,41 c.a., ISSN 1810-9136. Categoria B.

##### 2.4. in journals in the process of accreditation

4. **CERNAVCA, Olesea.** Ecological paints and criteria for awarding the European eco-label. În: *CSIE Working Papers*. 2018, March, Issue 8, pp. 37-43, 0,44 c.a., ISSN 2537-6187.

#### 3. Articles in scientific collections

##### 3.1. international collections

5. **CERNAVCA, Olesea.** *Evoluția marilor producători de lacuri și vopsele pe plan mondial în anul 2011-2016.* În: „Торговля, товароведение и сервис: состояние, проблемы и развития в условиях глобализации экономики”, conf. internațională din 7 aprilie 2017, Кишинев-Казань, pp. 101-105, 0,36 c.a., ISBN 978-9975-3152-6-5.

6. **CERNAVCA, Olesea.** *Packaging criteria and transport conditions of enamel PF-115 (according to GOST).* În: „Кооперация и предпринимательство: состояние, проблемы и перспективы”, conf. internațională, Казань, 2017, 391-396 стр., 0, 30 c.a., УДК 33; 33.336; 009; 339.543; 620.2.

### 3.2. collections of works of international conferences

7. CERNAVCA, Mihai, **CERNAVCA, Olesea**. *Managementul categoriei vopselelor produse și comercializate de S.A. „SUPRATEN”*. În: „Competitivitatea și inovarea în economia cunoașterii”, conf. șt. internațională din 25-26 septembrie 2015, ASEM, Chișinău, volumul I, pp. 147-153, 0,4 c.a., ISBN 978-9975-75-771-3.

8. **CERNAVCA, Olesea**. *Acte legislative și prevederi cu rășfrângere directă și indirectă asupra comerțului electronic*. În: „Rolul investițiilor în dezvoltarea economiei digitale în contextul globalizării financiare”, conf. șt. internațională din 22-23 decembrie 2016, ASEM, Chișinău, pp. 259-260, 0,07 c.a., ISBN 978-9975-75-866-6.

9. **CERNAVCA, Olesea**. *Managementul calității totale-factor de sporire a performanțelor*. În: „Competitivitatea și Inovarea în Economia Cunoașterii”, conf. șt. internațională, din 22-23 septembrie 2017, ASEM, Chișinău, Volumul I, 2018, pp. 137-140, 0,42 c.a., ISBN 978-9975-75-893-2.

### 4. Materials / theses at the scientific forums

#### 4.2. international conferences in the republic

10. **CERNAVCA, Olesea**. *Quality and quantity approaches to analysis of eco paints*. În: „Scientific symposium of young researchers”, simp. șt. din 22-23 aprilie 2016, ASEM, Chișinău, pp. 105-113, 0,73 c.a., ISBN 978-9975-75-823-9.

11. **CERNAVCA, Olesea, ȚURCANU, Gheorghe**. *Managementul calității-concepte și principii: (aspecte teoretice și analiză pe baza materialelor S.A. SUPRATEN)*. În: „Integrarea economică Europeană”, conf. internațională, USEM, Chișinău, 2016, pp. 27-36, 0,61 c.a., ISBN 978-9975-3147-1-8.

12. **CERNAVCA, Olesea, ȚURCANU, Gheorghe**. *Analysis of Technical Standards and Technical Specifications with Direct and Indirect Reliability on the Chemical Industry in Romania and the Republic of Moldova*. În: „Scientific symposium of young researchers”, simp. șt. din 28-29 aprilie, 2017, ASEM, Chișinău, pp. 121-125, 0,34 c.a., ISBN 978-9975-75-877-2.

### 7. Patents, registration certificates, inventory materials

13. **CERNAVCA, Olesea**. Certificat de înregistrare a obiectelor dreptului de autor și drepturilor conexe, eliberat de către AGEPI. Seria OȘ, Nr. 6042, din 12. 07. 2018, „Noțiunea Managementului Calității Totale și figura explicativă”.

14. **CERNAVCA, Olesea**. Certificat de înregistrare a obiectelor dreptului de autor și drepturilor conexe, eliberat de către AGEPI. Seria OȘ, Nr. 6043, din 12. 07. 2018 „Noțiunea Calității Totale și figura explicativă”.

15. **CERNAVCA, Olesea**. Certificat de inovator, pentru inovația cu titlul „*Model econometric privind performanțele obținute cu ajutorul managementului calității*”, Nr. 71. Data eliberării: 19.02.2018. Eliberat de către CITT. În: Buletinul inovațiilor al Centrului de Inovare și Transfer Tehnologic, p. 30. ISSN 2537-6411.

16. ȚURCANU, Gheorghe, **CERNAVCA, Olesea**. Certificat de inovator, pentru inovația cu titlul „*Roata dințată a TQM*”, Nr. 75. Data eliberării: 27.02.2018. Eliberat de către CITT. În: Buletinul inovațiilor al Centrului de Inovare și Transfer Tehnologic, p. 33, ISSN 2537-6411.

## VII. ANNOTATION

**Author's name and surname:** Cernavca Olesea

**Title of the thesis:** Total quality management as an important factor of improvement the performances in a production of finishing materials field.

**Requested scientific degree:** doctor of economics

**City:** Chisinau

**The year of perfecting thesis:** 2018

**Thesis structure:** introduction, three chapters, general conclusions and recommendations, bibliography of 329 titles, 148 pages of basic text, 79 figures, 51 tables and 15 formulas.

**Number of publications on the thesis' theme:** the obtained results have been published in 12 scientific papers.

**Keywords:** quality, quality management, TQM, performance, finishing materials, paints, varnishes, requirements, standard, GOST, European standards, quality infrastructure, ecological paints, certification, accreditation, laboratories, complaints, questionnaires, etc.

**Field of study:** Specialty 521.03 Economy and Management in the field.

**The aim of the research** is to deepen and develop theoretical and applied precepts from the field of total quality management and to determine the interdependencies between the TQM elements and performance of the manufacturing and / or trading companies of finishing materials through an econometric model.

**Research objectives** are resumed in: studying and theoretical and scientific development of the precepts in the field of quality, quality management and TQM; establishing directions in the field of import and export of RM for finishing materials; research of the legislative particularities in the production / marketing field of paints and / or varnishes, having the quality and the quality management as the basic vector; analysis of infrastructure quality at the national level and development of its model; development of a complex study in the field of production and marketing of finishing materials (paints and varnishes), based on the multilateral and contradictory analysis of the quality vision by the main subjects in the studied field: "producers and / or traders (dealers) – consumers - experts"; development and use of methods, as well as statistical and econometric models of analysis of the total quality management of local enterprises in order to increase the performance and as a result - their competitiveness; valorisation of research results through theoretical validation and implementation of results within the pilot company.

**The scientific novelty and originality** of the thesis resides in: developing the notions of quality, total quality and total quality management; introduction of new concepts such as: Quality arrow, Quality chronological axis, Quality palm, TQM scale, TQM toothed wheel, Octagonal star of European standards implementation, Quality infrastructure in the Republic of Moldova; developing a new verso of the page for completing complaints; developing a complex management method and tool of evaluation of performance offered by the total quality management as a determinant factor of the enterprises' functionality in order to increase their performances and competitiveness; elaboration and application of statistical and econometric methods and models in accordance with the econometric calculations among different determinant factors of the economic and managerial results of the analysed companies.

**The important scientific problem solved** in the thesis consists in the elaboration of a complex method of evaluating the performance of the total quality management within the paints and varnish producers and dealers, which allowed the determination of an econometric model in order to establish the directions for improvement of the company's performance.

**Theoretical significance.** The results obtained in the paper represent a revelatory support of theoretical and methodological concepts in the field of total quality management and managerial information of administration, increase of competitiveness and performance of producers and / or paints and varnish dealers.

**Applied value of the paper** consists in the usefulness of scientific arguments and practical recommendations made in the paper, which can be used in a wide range of fields: in the academic environment, state institutions: the Chamber of Commerce and Industry, the Agency for Consumer Protection and Market Surveillance, the Ministry of Environment, the Ministry of Justice, etc .; economic agents in the field of production, marketing of finishing materials in determining the directions of development of companies' activity.

**Implementation of scientific results.** The results of the research were positively appreciated by three local organizations, mentioning the special importance of the research theme and of the applicative value, respectively.

## ADNOTARE

**Numele și prenumele autorului:** Cernavca Olesca

**Titlul tezei:** Managementul calității totale – factor de sporire a performanțelor în domeniul producerii materialelor de finisare

**Gradul științific solicitat:** doctor în economie

**Localitatea:** Chișinău

**Anul perfectării tezei:** 2018

**Structura tezei:** introducere, trei capitole, concluzii generale și recomandări, bibliografie din 329 de referințe, 47 de anexe, 148 de pagini de text de bază, 79 de figuri, 51 de tabele și 15 formule.

**Numărul de publicații la tema tezei:** rezultatele obținute sunt publicate în 12 lucrări științifice.

**Cuvinte-cheie:** calitate, managementul calității, TQM, performanță, materiale de finisare, vopsele, lacuri, cerințe, standard, GOST, standarde europene, infrastructura calității, vopsele ecologice, certificare, acreditate, laboratoare, reclamații, chestionare etc.

**Domeniul de studiu:** Specialitatea 521.03 Economie și Management în domeniul de activitate.

**Scopul cercetării** constă în aprofundarea și dezvoltarea preceptelor teoretice și aplicative din domeniul managementului calității totale și determinarea interdependențelor între elementele TQM și performanțele companiilor producătoare și/sau de comerț ale materialelor de finisare, prin intermediul unui model econometric.

**Obiectivele tezei se rezumă în:** Studiarea și dezvoltarea teoretico-științifică a preceptelor din domeniul calității, managementului calității și TQM; stabilirea direcțiilor în domeniul importului și exportului RM pentru materialele de finisare; cercetarea particularităților legislative din domeniul producerii/comercializării vopselelor și/sau lacurilor, având vectorul de bază–calitatea și managementul calității; analiza infrastructurii calității la nivel național și elaborarea unui model al acesteia; elaborarea unui studiu complex în domeniul producerii și comercializării materialelor de finisare (vopsele și lacuri), având la bază analiza multilaterală și contradictorie a viziunii calității de către subiecții principali din domeniul studiat: „producători și/sau comercianți (dealeri)-consumatori-experti”; elaborarea și utilizarea unor metode, precum și a modelelor statistice și econometrice, de analiză a managementului calității totale a întreprinderilor autohtone în scopul sporirii performanțelor și ca rezultat – al competitivității acestora; valorificarea rezultatelor cercetării prin validarea teoretică și implementarea rezultatelor în cadrul companiei-pilot.

**Noutatea și originalitatea științifică** a tezei rezidă în dezvoltarea noțiunilor calității, calității totale și managementului calității totale; introducerea unor noi concepte precum: Săgeata calității, Axa cronologică a calității, Palma calității, Scara TQM, Roata dințată a TQM, Steaua octogonală a implementării standardelor europene, Infrastructura calității în RM; elaborarea unui nou versou al paginii pentru completarea reclamațiilor; elaborarea unei metode și a unui instrument managerial complex de evaluare a performanțelor oferite de managementul calității totale ca factor determinant al funcționalității întreprinderilor, în scopul sporirii performanțelor și competitivității acestora; elaborarea și aplicarea metodelor și modelelor statistice și econometrice în conformitate cu calculele econometrice dintre diferiți factori determinanți ai rezultatelor activității economice și manageriale ale companiilor analizate.

**Problema științifică importantă soluționată** în teză constă în elaborarea unei metode complexe de evaluare a performanțelor managementului calității totale în cadrul producătorilor și dealerilor de vopsele și lacuri, fapt care a permis determinarea unui model econometric, în vederea stabilirii direcțiilor de îmbunătățire a performanțelor companiei.

**Semnificația teoretică.** Rezultatele obținute în lucrare constituie un suport revelator de concepte teoretice și metodologice în domeniul managementului calității totale și a plioforiei manageriale de gestiune, sporire a competitivității și performanțelor producătorilor și/sau dealerilor de vopsele și lacuri.

**Valoarea aplicativă a lucrării** constă din utilitatea argumentelor științifice și recomandărilor practice realizate în lucrare, care pot fi utilizate într-un larg spectru de domenii: în mediul academic, instituțiile de stat: Camera de Comerț și Industrie, Agenția pentru Protecția Consumatorilor și Supravegherea Pieței, Ministerul Mediului, Consiliul Concurenței Ajutorului de Stat din RM, Ministerul Justiției, etc.; agenții economice din domeniul producerii, comercializării materialelor de finisare în determinarea direcțiilor de dezvoltare a activității companiilor.

**Implementarea rezultatelor științifice.** Rezultatele cercetării au fost apreciate pozitiv de trei organizații autohtone, menționându-se importanța deosebită a temei de cercetare și, respectiv, a valorii aplicative.