TWO QUALITY EVOLUTIONS: INDUSTRY VS. HEALTH CARE

Paper explains evolution of Global Quality Management Theory through changes of different quality management approaches in time and compares it to the evolution of Quality Management in Healthcare. Authors relied on already existing information and data sources published in scientific journals to define evolution paths and conduct their comparison to identify gaps and recommend improvements in Healthcare Quality Management. Additionally, four major activities that could improve healthcare quality management emerged from analysis, such as: mechanism for constant and systematic tracing errors, managing quality of supportive processes, control of outsource organizations and application of IT for quality assurance.

Keywords: Quality management, evolution, Health Care, industry, comparative analysis

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1. INTRODUCTION

Healthcare system is an integral part of every society and it is considered to be an important indicator for country's level of development. The development level of a health care system is in direct correlation with the development level of the belonging country. On the one side, the quality of the health care system and health care services depend on the financial resources invested in health care, as a percentage of country's GDP. On the other side, the life quality of every citizen depends on the quality of the health care system. Therefore, the first aim of this system is to improve the quality of services and health of people in their daily life¹.

Quality management in health care organizations evolved relatively independently from the development of the quality management theory². One of the reasons for independent quality evolution could be the perception that health care differs from other hazardous industries in important ways³. Other reasons could be found in affiliation of those who contributed to healthcare quality management theory, while most of them were experts in medical sciences, but lacked in formal organizational and management knowledge, therefore neglecting similarities between healthcare and other industries, which resulted in neglecting existing achievements of the quality management theory.

Studies on the results of the implementation of quality management theory achievements testify that application of proposed models, principles and knowledge in industry, enables significant costs reduction⁴, performance improvement through productivity and effectiveness⁵, an increase in customer satisfaction⁶ and elimination of noncon-

¹ Salimifard, K., Zanjirani, D.M., Keshtkar, L. (2014): "Using simulation to improve hospital resource management", *Megatrend Review*, 11 (3), 229-238.

² Huycke, L.R., All, A.C. (2000): "Quality in health care and ethical principles", *Journal of Advanced Nursing*, 32(3), 562-571.

³ Wears, R. L., Hunte, G. S. (2014): "Seeing patient safety 'Like a State'", *Safety Science*, 67, 50-57

⁴ See: Seth, D., Tripathi, D. (2008): "Impact of Japanese Quality and Maintenance Management Solutions (TQM and TPM) on Business Performance: An Assessment for Indian Manufacturing Industry", 377-389, in: Mohanty, R.P. (ed.): *Quality Management Practices*, Excel Books, New Delhi; Jain, D. R., Mishra, V. (2009): "Total Quality Management: An Empirical Study on Employee's Perspective", 248-260, in: Dhar, S., Dhar, U., Jain, R. K., Parashar S. (eds.): *Value Based Management For Organizational Excellence*, Indian Society for Training and Development, New Delhi; Ardianto, Y. T., Natsir, M. (2014): "Hybrid Strategies Study: Total Quality Management Practices and Supply Chain Management as a New Antecedent to Improve the Performance of Manufacturing in East Java", *European Journal of Business and Management*, 6(30), 1-10.

⁵ See: Seth and Tripathi, 2008; Heras-Saizarbitoria, I., Boiral, O. (2013): "ISO 9001 and ISO 14001: Towards a Research Agenda on Management System Standards", *International Journal of Management Reviews*, 15(1), 47-65; Douglas, A., Glen, D. (2000): "Integrated management systems in small and medium enterprises", *Total Quality Management*, 11, 686-690; Jang, W., Lin, C. (2008): "An integrated framework for ISO 9000 motivation, depth of ISO implementation and firm performance. The case of Taiwan", *Journal of Manufacturing Technology Management*, 19, 194-216.

⁶ See: Vouzas, F., Psychogios, A. G. (2007): "Assessing managers' awareness of TQM", *The TQM Magazine*, 19(1), 62-75; Yang, C. C. (2006): "The impact of human resource management practices on the implementation of total quality management: an empirical study on high-tech firms", *The TQM*

formities or low quality of products and services⁷. At the other side, there are numerous discussions on quality results and effectiveness of applied measures and concepts in health care, whereas problems of high costs⁸ poor service⁹ and too frequent patients' disappointing outcomes¹⁰ are constantly stressed in reports, studies and manuscripts. Poor quality in other industries has no fatal impact on human's life, and in most of the cases it can be reparable, but poor quality of health care can make lethal consequences immediately or after a certain time. Therefore, it could be concluded that achieving quality in health care is one of the most important goals, and that all efforts and obtained scientific knowledge should be aimed at achieving total quality in health care.

However, today's results in certain area of scientific discipline represent a significant scientific heritage, which a scientific discipline has passed from the moment of its birth until today. The evolution path of a scientific discipline in some areas can be seen as a series of interdependent steps, while previous finding influences next research, and therefore the future findings as well. To understand whether there is a difference in the perception of health care quality and perception of quality in the industry, as well as if whether there were an actual difference, then in order to understand why such difference would exists, we would have to study evolution of quality management in both areas.

Magazine, 18(2), 162-173; Mersha, T., Sriram, V., Herron, L. (2009): "The impact of TQM implementation in a human service agency", *International Journal of Productivity and Quality Management*, 4(1), 1-19.

⁷ Martínez-Lorente, A. R., Martínez-Costa, M. (2004): "ISO 9000 and TQM: substitutes or complementaries?: An empirical study in industrial companies", *International Journal of Quality and Reliability Management*, 21 (3), 260-276; Alic, M., Rusjan, B. (2010): "Contribution of the ISO 9001 internal audit to business performance", *International Journal of Quality and Reliability Management*, 27(8), 916-937.

⁸ See: Cutler, D. (2014): *The Quality Cure: How Focusing on Health Care Quality Can Save Your Life and Lower Spending Too*, University of California Press. (Volume 9); Cabin, W., et. al. (2014): "For-Profit Medicare Home Health Agencies' Costs Appear Higher and Quality Appears Lower Compared To Nonprofit Agencies", *Health Affairs*, 33(8), 1460-1465; Turan, A. H., Palvia, P. C. (2014): "Critical information technology issues in Turkish healthcare", *Information and Management*, 51(1), 57-68; Parekh, A. K., Kronick, R., Tavenner, M. (2014): "Optimizing health for persons with multiple chronic conditions", *JAMA*, 312(12), 1199-1200;

⁹ Turan, A. H., Palvia, P. C., 57-68; Amarasingham, R. et. al. (2014): "Implementing Electronic Health Care Predictive Analytics: Considerations and Challenges", *Health Affairs*, 33(7), 1148-1154; Attanasio, O., Oppedisano, V., Vera-Hernández, M. (2014): "Should Cash Transfers Be Conditional? Conditionality, Preventive Care, and Health Outcomes", *American Economic Journal: Applied Economics*.

¹⁰ George, V. M., Shocksnyder, J. (2014): "Leaders: Are You Ready for Change? The Clinical Nurse as Care Coordinator in the New Health Care System", *Nursing Administration Quarterly*, 38(1), 78-85; Main, D. S., et. al. (2007) "Relationship of processes and structures of care in general surgery to postoperative outcomes: a qualitative analysis", *Journal of the American College of Surgeons*, 204(6), 1147-1156.

2. METHODOLOGY OF RESEARCH

The aim of this manuscript is to explain evolution of Global Quality Management Theory through changes of different quality management approaches and to compare it to evolution of Quality Management in Health Care, both timely based. Additionally, comparison should result in enabling identification of the gaps and recommendations for future research and improvements in Health Care Quality Management.

In order to pursue the aim of this research the authors relied on already existing information and data sources published in scientific journals. The research was divided in three phases of research: research on evolution of Global Quality Management Theory, research on evolution of Quality Management in Health Care and comparative analyses of both obtained researches.

For the purpose of the first research phase, EBSCO scientific base was used to access scientific journals which contained useful data for the research. Period in which reviewed and analysed scientific journals were published dated from 1900-2014, although the history of scientific management begins with the life and career of Frederick Winslow Taylor¹¹. Key words „quality evolution“ or „quality history“ or „quality movement“ in the title of manuscripts were used as a criterion of search, which resulted in 217 manuscripts. Abstracts of all manuscripts were analysed while only 37 of them were useful for research on Global Quality Management Theory evolution. According to the analyses of useful manuscripts, phases in Global Quality Management Theory evolution were identified, timely ordered and specified through their characteristics.

For the second phase of research EBSCO base together with Free Medical Journals base were used to obtained data referred to the evolution of quality management in health care. This time key words were „health care“ in the text of manuscript and „quality“ and „evolution“ in the title of manuscript, which resulted in 334 manuscripts, but only 14 of them contained useful information. All useful manuscripts were analysed, stages in Health Care Quality Management evolution were identified and timely ordered, separately from the results of previous research phase and each stage of evolution was specified through their characteristics.

In the third phase of research, obtained results of the second research phase were compared to obtained results of the first research phase, gaps were identified and recommendations for future evolution path were defined.

¹¹ Kreis, S. (1995): „Early experiments in British scientific management: the Health of Munitions Workers' Committee, 1915-1920“, *Journal of Management History*, 1(2), 65-78.

3. EVOLUTION OF GLOBAL QUALITY MANAGEMENT THEORY

Some authors argue that there were four main stages in Global Quality Management Theory evolution in the last century¹². Some other authors insist on five stages in quality movement¹³ also in the last century, arguing that last phase begun in late 90s and is still on-going. The authors of this manuscript have opted to the evolution of the Global Quality Management Theory based on five phases in the last century, aiming to better comprehend the difference in approaches and methodologies for quality achievement. Therefore, the most suitable manuscript for tracing changes in evolution of the Global Quality Management Theory was written by Raho and Mears and was published in 1997. Research and analysis of happenings in Global Management Theory pointed to the adoption of new concepts and methods in 21st century. Therefore, the authors argue that evolution of the quality management theory has developed through six main phases, constantly using experience of industry. Each phase of quality management theory evolution characterise application of methods or approaches which were motivated by an efforts for assuring quality of particular entity, i.e. a part of an organization or its output. Also, in each phase the quality was understood in different ways, and attention was directed to different entities of an organization to be managed for quality achievement, as well as the different parts of an organization were considered as responsible for the quality of stressed entity. Phase characteristics of the Global Quality Management Theory evolution are explained in Table 1.

The switch from previous phase to the next one was not characterized by reengineering, which assumes abandoning everything that has marked the previous phase. The evolution of quality management theory is rather proposing a growth of knowledge in the field of the quality management, based on adding new concepts to the concepts that showed results in previous phases. It means that inspection of products and detection of nonconformities were never abandoned, as methods for quality achievement¹⁴. Moreover, nonconformities are not looked at only as defective products, but also as mistakes and errors in all processes of a business system. Analyses of causes that led to nonconformities enable system's corrective actions that are important part of continuous quality improvement.

¹² See: Zhao, X., Yeung, A. C., Lee, T. S. (2004): "Quality management and organizational context in selected service industries of China", *Journal of Operations Management*, 22(6), 575-587; Prickett, T. W., Rapley, C. W. (2001): "Quality costing: a study of manufacturing organizations. Part 2: main survey", *Total Quality Management*, 12(2), 211-222; Kuei, C. H., Madu, C. N. (2003): "Customer-centric six sigma quality and reliability management", *International Journal of Quality and Reliability Management*, 20(8), 954-964.

¹³ Raho, L., Mears, P. (1997): "Quality system chaining: The next link in the evolution of quality", *Business Horizons*, 40(5), 65-73; Salah, S., Carretero, J. A., Rahim, A. (2009): "Six Sigma and Total Quality Management (TQM) similarities, differences and relationship", *International Journal of Six Sigma and Competitive Advantage*, 5(3), 237-250; Ivanovic, M. D., Majstorovic, V. D. (2006): "Model developed for the assessment of quality management level in manufacturing systems", *The TQM Magazine*, 18(4), 410-423.

¹⁴ Berlin, C. (1994): "Implementation of the total quality management concept within space business", *Total Quality Management*, 5(4), 123-137.

Until the early 1980s the manufacturing sector was centre stage in the quality debate¹⁵. However, from the mid-1980s quality management theory started to pay a greater interest to issues of customer services while nature of service organizations raised methodological and conceptual issues in relation to the transfer of quality management practices developed in manufacturing¹⁶.

Through time, quality management theory developed concepts and models that are applicable on any type of industry. All concepts and models are based on standards, regulations or recommendations that can be used as guidelines for designing a specific model for a specific organization¹⁷. However, the major breakthrough was made in 21st century by the appreciation of other scientific disciplines achievements and the development of the Global Quality Management Theory through the synergy of IT technology, cybernetics, theory of organization and management in all disciplines.

4. EVOLUTION OF QUALITY MANAGEMENT IN HEALTH CARE

Evolution of quality management in health care was caused by efforts to reduce high mortality rate of wounded soldiers in the Crimean War¹⁸ which led to establishing standards for nursing care and efforts to manage conditions which would enable desired results of care. Until than up to nowadays, quality in health care has gone a long way during which the theory of management and theory of organization were slowly creating an impact on contemporary understanding of quality in health care.

The beginnings were based on the attempts to control the isolated parts of the health care business system, which was not seen at that time as a system at all, until Donabedian proposed his model. Although achievements in maintenance of human health have been the main goal of the health care system always, the quality has been understood in different manner in the different periods of evolution. The change in perception of quality of health care was heavily influenced by the development of medical science. In fact, in the beginnings of evolution of quality management in health care, the medical knowledge was modest compared to today's knowledge opus; the medical equipment was rather primitive compared to today's modern medical devices and the pharmaceutical industry was still in its infancy. Therefore, the desired results could not be achieved anyway; however, the question of whether results would be better in past if

¹⁵ Yong, J., Wilkinson, A. (2002): "The long and winding road: The evolution of quality management", *Total Quality Management*, 13(1), 101-121

¹⁶ Lewis, B. (1999): "Managing service quality" 181-197, in: Dale, B. (Ed.) *Managing Quality*, Blackwell, Oxford.

¹⁷ Wagner, C., et. al. (2006): "The implementation of quality management systems in hospitals: A comparison between three countries", *BMC Health Services Research*, 6(1), 50– 61.

¹⁸ Bull, M. J. (1997): "Lessons from the past: vision for the future of quality care. Improving Quality", 3-16, in: Maisenheimer, C. G. (ed.): *A Guide to Effective Programs*, Gaithersburg, Md.: Aspen Publishers, Massachusetts (2nd edition)

than knowledge of the Global Quality Management Theory was applied in health care quality attempts is arising.

Authors of manuscript recognized five stages of the quality management evolution in health care. Those stages along with their characteristics are given in Table 2.

Every next stage in evolution did not bring radical redesign destroying all the previous approaches. The evolution of quality management in health care was also contributing to the upgrade of knowledge base, where in certain periods of time some of the approaches and methods dominated the stage by incorporating previous accomplishments. Influence of the Governments and role of the World Health Organization in quality management of each health care institution should not be neglected, while health care is being, in contrast to industry, the area of importance for each country and an integral part of social and political programs of every Government's policy.

5. ANALYSIS AND DISCUSSION

According to comparative analysis shown in Table 3, it is obvious that the differences between evolution paths of health care quality management and global quality management theory actually exist. As authors claimed in introduction part, that quality management accomplished better results in industry than in health care, first question that arises is why there is a difference between those two evolution paths? If the cause for these differences between these two evolution paths does not lay in substantial differences between industry and health care, which would disable implementation of industry methods in health care, than the second question is what health care can learn from quality management theory to avoid unwanted outcomes?

As it is proven that health care institutions can be seen as a business system¹⁹ than no obstacle to the use of industry achievements in improving the quality of health care institutions could be identified. However, the cause of differences in evolution paths could be found in formal education of their contributors while doyens to health care quality management evolutions were not familiar with the science of organization or management science. Edwin Chadwick was a lawyer by training²⁰, Florence Nightingale was a nurse²¹, Abraham Flexner was an educator²², Avedis Donabedian was a physician²³. Therefore, the basis for analysing and conclusions about the ways for improvements in health care institutions in that time could not be the same as the conclusions

¹⁹ Živaljević, A., Mitrović, Ž., Petković, M. (2013): "Conceptual and mathematical model for quality improvement in health care", *The Service Industries Journal*, 33(5), 516-541.

²⁰ Hébert, R. F. (1977): "Edwin Chadwick and the economics of crime", *Economic Inquiry*, 15(4), 539-550.

²¹ Cohen, I. B. (1984): "Florence Nightingale", *Scientific American*, 250(3), 128-137.

²² Drake, R. L. (2014): "A retrospective and prospective look at medical education in the United States: Trends shaping anatomical sciences education", *Journal of anatomy*, 224(3), 256-260.

²³ Mullan, F. (2001): "A founder of quality assessment encounters a troubled system firsthand", *Health Affairs*, 20(1), 137-141.

of their contemporaries who have shaped the evolution of global quality management theory through researches and studies in the industry. Comparative analyse showed that health care quality management failed to apply:

- Mechanism for constant systematic identification of errors and its analysis in order to eliminate its cause (concluded from last row in table 3: identifying errors; identifying critical activities in processes; setting control points; using recorded data on errors to prevent them in future)
- Applying system and process approach on whole health care institution, not only on clinical parts (concluded from last row in table 3: control of supportive processes in certification and accreditation; controlling all elements of system; not just stuff, clinical processes and equipment; applying TQM principles on whole organization, not just clinical stuff and processes; using quality tools, methods for process and costs optimization and Six sigma for any improvement; monitoring and measuring quality parameters of key and critical processes, not only of medical methods, departments or facility.)
- Controlling outsource organization.
- Using IT for quality achievement and for service delivery

5.1. Systematic identification of errors

Identification of nonconformities was the base to the first phase of evolution in industry and that method is still present in practice and theory, nowadays. However, it has spread from production process on whole business system by monitoring and measuring key processes, conducting internal audits and analysing customer complains. All nonconformities are analysed to identify their causes and to eliminate them by corrective actions. It is common mechanism for quality improvement in industry, which cannot be applied in health care if errors are not traced.

Serious errors in health care are reported, but methods that would allow detection of minor errors in the whole system of health care facility and which would enable health care facility to react before something serious happens are not implemented. Authors believe that major reasons for absenteeism of systematic tracing errors could be:

- Tracking errors in health care institutions is not an easy process and requires additional engagement of employees and their conscientiousness, honesty and self-criticism.
- Errors which are caused by lack of medical knowledge can initiate serious consequences for employee's career, while those errors caused by malicious intentions can open judicial processes in which the doctor can face a jail and exclusion from society
- Patient complain only when they have suffered serious consequences of errors but they usually do not recognize errors if there were no serious consequences

- Internal audits are conducted in clinical processes while supportive processes are neglected even if it is known that supportive processes influence results of health care institution²⁴
- Internal audits are conducted by experts in medicine who are usually not familiar in audit methodology²⁵.

5.2. System and process approach

Quality management theory recognized service or product quality dependence on process and system performance. Therefore, most models for quality management are based on process and system approach, which respect all of the important processes, which are supportive processes and production processes, in quality achievement. In health care institutions, supportive processes are less present in percentage compared to clinical processes and in the development of health care institution are often neglected, i.e. considered as not important although their quality significantly affects the quality of clinical processes. An example of the supportive process impact on clinical process can be found in the process of procurement which, if not optimized, can give bad or insufficient inputs or resources to clinical processes: bad or insufficient medical supplies, defective or insufficient medical devices and under competent or insufficient medical personnel, and thus it would jeopardize the quality of clinical processes and the quality of their outcomes. At the first glance supportive processes seem less important for achieving the quality of health services, but they need to be improved and controlled together with clinical processes. As one of the methods of achieving quality of clinical processes is protocol or procedure, the same method should be applied in quality management of supportive processes. If measuring and monitoring quality parameters of clinical processes or conducting internal audits on them, why not doing the same in the case of important supportive processes? While there is no shortage of written protocols in healthcare, they are not as effective as they could be in helping healthcare workers to avoid errors²⁶. Reasons of poor quality in health care could be found in barriers for implementation²⁷, as well as in understanding and transforming guidelines into the specific model, which does not cover all elements of healthcare organization systems in most of the cases²⁸.

²⁴ Naumova, N. A., Kharisova, F. I. (2014): "Effective Internal Audit Service Organisation in Health Clinics", *Mediterranean Journal of Social Sciences*, 5(24), 170-179.

²⁵ Naumova, N. A., Kharisova, F. I., 170-179.

²⁶ Porto, G. G. (2001): "Safety by design: Ten lessons from human factors research", *Journal of Healthcare Risk Management*, 21(3), 43-50.

²⁷ Ferlie, E.B., Shortell, S.M. (2001): "Improving the quality of health care in the United Kingdom and the United States: A framework for change", *Milbank Quarterly*, 79(2), 281 -316.

²⁸ Živaljević, A., Mitrović, Ž., Petković, M., 516-541.

5.3. Controlling outsource organization

Often, more than one healthcare institution participates in the process of delivering healthcare services²⁹ and all of them influence final outcome. Therefore, it is important that all of those manage their quality constantly and systematically. Much like a military control of outsource by conducting audits, in the case of health care institution it would require staff trained in audit methodology, or a partnership with specialized companies tailored for auditing process. However, such effort would decrease possibilities of misdiagnosis or bad treatment and the initial additional financial investments in additional activities of audits would lead to a reduction of costs in the future period.

5.4. Using IT for quality achievement and for service delivery

There are special softwares designed to manage quality in industry. Some of them control production process enabling people-less activity conduction, some of them advise employees in their working process (for example hotel's database on previous customers' needs), while some of them are designed to facilitate monitoring and measuring of quality parameters. Information technology is used predominantly for patient's electronic charts, and for data transfer from one health care unit to another. However, IT can replace people in routine clinical activities, this reducing human-error possibilities and accelerating activities. Also, indicators of possible errors occurrence, such as: diagnose change, too long treatments, complications in treatments, unusual symptoms developed during treatment could be monitored by contemporary and widely available IT.

²⁹ Živaljević, A., Mitrović, Ž., Petković, M., 516-541.

CONCLUSION

In recent years, the increasing importance of quality management has promoted the implementation and diffusion of tools finalized to measure and to monitor the healthcare outcomes³⁰. However, for essential quality improvements it is necessary to trace nonconformities, analyse them to find their root cause and to implement corrective actions. Quality is defined as a customer satisfaction³¹, while the first step for its accomplishment is to eliminate errors and it cannot be done without tracing them. As tracing errors requires additional time, efforts and financial investments IT could be used to minimize all of those.

Researches on TQM implementation in health care facilities suggests that the gains made in health care (as in other organisations) have not been as great as predicted³². A particular problem has been its aggressive rhetoric and its failure to engage the staff on whom the organisation relies³³. Nowadays, it is common to educate employees in industry's quality management practice in order to incorporate them in quality improvement efforts by their participation, team work and self-assessment. However, providers in health care often lacked basic Qi knowledge or experience in instituting Qi programs³⁴. There are clear messages from conducted studies that, where some progress has been made, the engagement of clinicians has been essential, as well as senior management commitment and persistence³⁵. Therefore, health care employees' knowledge on global quality management theory accomplishments has to be improved. Also, it is needed to incorporate quality control of supportive processes and of outsource organizations in quality management efforts in health care.

Policy makers seek new ways to address continuing problems of variation in the quality of health care and dissatisfaction among patients, the public, and professionals³⁶. Minimizing gaps between industry practices and health care practice, by adopting methods that gave desirable results in quality improvement, can improve quality in health care.

³⁰ Foltran F, et. al. (2009): "Monitoring the performance of intensive care units using the variable life-adjusted display: a simulation study to explore its applicability and efficiency", *Journal of evaluation in clinical practice*, 15(3), 506-513.

³¹ Gill, J. (2009): "Quality follows quality: add quality to the business and quality will multiply the profits", *The TQM Journal*, 21(5), 530-539.

³² Locock, L. (2003): "Healthcare redesign: meaning, origins and application", *Quality and Safety in Health Care*, 12(1), 53-57.

³³ Grint, K., Case, P. (1998): "The violent rhetoric of reengineering: management consultancy on the offensive", *J Manag Stud*, 35, 557-77.

³⁴ Scanlon, D.P., et. al. (2012): "The Aligning forces for Quality initiative: Background and evolution from 2005 to 2012", *Am J Manag Care*, 18(6), 115-125.

³⁵ Locock, L., 53-57.

³⁶ Locock, L., 53-57.

Table 1. *Evolution of the Global Quality Management Theory*

Phase and period	1800-1930 Inspection and Test	1930-1950 Quality Control	1950-1980 Quality Assurance
Entity	Product	Production process	Production and supportive processes
Quality understanding	Compliance of realized product features with the designed product features	Compliance of realized product features with the designed product features but with optimal costs of production	Compliance of realized product features with the designed product features but with optimal costs of important processes
Main Goal	Disabling defective product appearance on market	Decreasing occurrence of defective products and decrease costs of productions	Preventing occurrence of nonconformities
Methods, approaches and concepts	Product characteristics and features were inspected at the end of production process. Defect products were repaired if possible, or rejected if not reparable	Control points were set after critical activities to inspect product quality. Nonconformities were recorded to use data in control charts and statistical methods to anticipate the time of unwanted variations. In identified time production process was stopped and causes of variations were removed if possible.	Flow charts and procedures of processes important for quality were used to direct process. Quality plan for each product or service was etalon and starting point.
Phase was caused by	Taylor F. contributed by introduction of normative and inspection for maximizing productivity and eliminating poor quality of products	Shewhart W. contributed by applying statistical methods on production process in order to detect the time of defect occurrence at Bell Laboratories in the early 1920s and developed the control chart in 1924	Shewhart W. with Deming E. introduced PDCA cycle in 1950. Juran J. contributed with theory of quality costs in 1951.

1980-1990 Strategic Quality Management	1990-2000 Total Quality Management	From 2000 and further Quality of Life and Sustainability
Business system	All organizations in supply chain	Society and all its parts
Satisfying customers' needs by products and services which are result of optimal process conduction in organization	Satisfying stakeholders' needs by outcomes which are result of optimal process conduction in supply chain	Satisfying current and future needs of every person in society
Satisfying customers' needs	Satisfying stakeholders' needs	Enabling quality of life and environment
Strategic planning and SMART goal setting were starting points. QFD method was used to develop features of product or service in quality planning. The entire organization was mobilized to achieve quality. For any improvement quality tools, methods for process and costs optimization and Six sigma were used.	Implementation of revised ISO 9000 Implementation of integrated management systems implementation of Business Excellence models	Supply chain management Sustainable development Social Responsibility TQM principles System and process approach Monitoring and measuring of quality parameters of key and critical processes Information technology
Deming E. introduced, fourteen points of management in 1982 Juran J. contributed with The Quality Trilogy in 1986 Feigenbaum A. developed a concept of „Total Quality Control“ in 1968. Ishikawa K. developed cause and effect diagram in 1970. Six Sigma developed by Motorola in 1986	Deming E. introduced Theory of profound knowledge in 1993 ¹ Industry started with implementation of the first version of ISO 9000:94 series ² Juran J. contributed with concept of process triple role in 1988. Ishikawa K. emphasizes the importance of internal customer and implementation of quality circles in 1980. Taguchi G. introduced The Taguchi Loss Function in late 1980s and helped fuel the continuous improvement movement. Shingo S. developed Zero Defect concept in 1961, SMED in 1970 and JIT in 1990.	Oliver K. introduced the term of Supply chain management in 1982 which Hines P. promoted in 2004 ³ UN World Commission on the Environment and Development set the basis for Sustainable development in 1987 ⁴ Bowen gave definition of social responsibility in his book in 1953 which UN Commission promoted in 2001 ⁵ New version of ISO 9001:2000 adopted TQM principles ⁶ and promoted system approach, process approach, monitoring and measuring quality parameters of key processes ⁷ as well as the continual quality improvement ⁸ .

Table 2. *Evolution of the Health Care Quality Management*

Phase and period	1800-1950 Quality assurance of in health care facilities conditions and medical staff	1950-1970 Quality assurance of structure of health care	1970-1980 Quality assurance of care processes
Entity	Outcome	Structure elements	Process of care
Quality understanding	Decrement of mortality rate	Compliance of structure elements and structure-related standards	Meeting the standards
Main Goal	Avoiding unwanted outcome	Improving structure	Improving clinical processes
Methods, approaches and concepts	Awareness of the sanitary problems associated with community dwellings ¹¹ . Organizing hospital medical staffs ¹² . Limiting staff membership to well-educated, competent, and licensed physicians and surgeons ¹³ . Framing rules and regulations to ensure regular staff meetings and clinical review ¹⁴ . Keeping medical records that included the history, physical examination, and laboratory results of a patient ¹⁵ . Establishing supervised diagnostic and treatment facilities such as clinical laboratories and radiology departments ¹⁶ .	Concepts of accreditation and certification entered the quality equation ¹⁷ . Continued to focus on human and physical resources ¹⁸ .	Introduction in the clinical process-related standards and guidelines. Providers of health care were then “judged” on their compliance to certain explicit standards of care and practice parameters by their peers ¹⁹ .
Phase was caused by	Dr Edwin Chadwick, published a report in 1842 which vividly described the unacceptable sanitary conditions associated with urban and rural communities in Britain at that time ²⁹ . In Britain, around 1854, Florence Nightingale first noticed the positive correlation between the introduction of adequate nursing care to wounded soldiers and the decrease in the mortality rate among this group. She introduced first nursing care standards ³⁰ . Abraham Flexner’s reported on survey results on situation in medical schools and major hospitals in 1910 to Karnage Foundatio ³¹ . American College of Surgeons’ established its Hospital Standardization Program in 1917 ³² .	Creation of the US Joint Commission on Accreditation of Hospitals in 1951, which was renamed the Joint Commission on Accreditation of Healthcare Organizations in 1987 ³³ . In 1966 Dr Avedis Donabedian introduced a model of measuring quality based on “simple system theory” ³⁴ .	From the Joint Commission on the Accreditation of Healthcare Organizations accreditation model was exported via Canada to Australia in the 1970s and arrived in Europe in the 1980s ³⁵ . First regional, state or provincial accreditation agencies and bodies were established all over the world ³⁶ .

1980-2000
Quality improvement

From 2000
Performance improvement

Back to outcomes	Performance which enhance and extend the life
Standardizing care will decrease chance of error and improve control of patient care outcome ⁹ .	Enhancing life expectancy, quality of life, diagnostic and treatment options, as well as the efficiency and cost effectiveness of the healthcare system ¹⁰
Improving outcomes	Excellence of performance
Shifting from an emphasis on process-related standards back to outcomes through assuring quality of clinical processes, equipment, clinical stuff and conditions ²⁰ . Effectiveness and efficiency top the list, stressing that quality can be achieved only if processes are performed appropriately and in a cost conscious environment ²¹ . Quality must be associated with high technical capabilities ²² . Care provided by professionals and teams ²³ .	Institution measures its performance against a number of well-known and agreed-on measures (or indicators), and the results are published so that the consumer can compare this institution with ones similar to it ²⁴ . Engaging highly educated and well informed consumer ²⁵ . Certification, accreditation and licensure measurement and public reporting of the adoption and spread of effective Qi strategies to improve care ²⁶ . Ensuring the equitable receipt of healthcare; and integration of alliance activities with payment reform initiatives ²⁷ . Accreditation has spread across the world to become an established part of healthcare systems in over 70 countries and there is an associated international body ²⁸ .
Strong movement of the industrial sectors towards a new theory of total quality management ³⁷ . JCAHO first entered the field of clinical ethics in 1991, with the introduction of Patient Rights Standards ³⁸	Synergy of medical and other science resulted in advanced, modern medical devices and medical technology for diagnosis and treatment. New quality dimensions have recently been introduced in the US by the prestigious Institute of Medicine in their 2001 report ³⁹ . These are: safety, timeliness, equity, effectiveness, efficiency, and patient centeredness ⁴⁰ . In 2006, Af4Q program works to improve healthcare by engaging patients in their care, publicly reporting the performance of physicians and hospitals, and improving the quality of care delivered in each community ⁴¹ . In 2002, SSM Health Care became the first health care organization in the USA to win the Malcolm Baldrige National Quality Award ⁴² .

Table 3. *Comparative analysis*

Global QM Theory phase	1800-1930 Inspection and Test	1930-1950 Quality Control	1950-1970 Quality Assurance	1970-1980
Phase of QM in Health Care	Quality assurance of in health care facilities conditions and medical staff		Quality assurance of HC structure	Quality assurance of care processes
Understanding quality in Global QM Theory	Compliance of realized product features with the designed product features	Compliance of realized product features with the designed product features but with optimal costs of production	Compliance of realized product features with the designed product features but with optimal costs of important processes	
Understanding quality in QM in Health Care	Decreasment of mortality rate		Compliance of structure elements with standards	Meeting the standards
Methods, approaches and concepts in Global QM Theory	Product characteristics and features inspection at the end of production proces.	Setting of control points after critical activities to inspect product quality. Using recorded data on nonconformities to prevent variations.	Flow charts and procedures of processes important for quality were used to direct process. Quality plan for each product or service was etalon and starting point.	
Methods, approaches and concepts in QM in Health Care	Managing sanitary conditions. Assuring well-educated, competent, and licensed physicians and surgeons. Framing rules to ensure regular staff meetings and clinical review. Keeping medical records of a patient. Establishing supervised diagnostic and treatment facilities such as clinical laboratories and radiology departments.		Accreditation and certification Managing human and physical resources	Meeting clinical process-related standards and guidelines. Monitoring compliance to certain explicit standards of care and practice parameters by peers

1980-1990 Strategic Quality Management	1990-2000 Total Quality Man- agement	From 2000 and further Quality of Life and Sustainability
Quality improvement		Performance improvement
Satisfying customers' needs by products and services resulted from optimal process conduction	Satisfying stakeholders' needs by outcomes which are result of optimal process conduction in supply chain	Satisfying current and future needs of every person in society
Standardizing care will decrease chance of error and improve control of patient care outcome		Enhancing life expectancy, quality of life, diagnostic and treatment options, as well as the efficiency and cost effectiveness of the healthcare system
Strategic planning using SMART goals. For any improvement quality tools, methods for process and costs optimization and Six sigma were used.	Implementation of revised ISO 9000, integrated management systems and Business Excellence models	Supply chain management, sustainable development, social responsibility, TQM principles, System and process approach, Monitoring and measuring of quality parameters of key and critical processes Information technology
Assuring quality of clinical processes, equipment, clinical stuff and conditions Monitoring effectiveness and efficiency Assuring processes to be performed appropriately and in a cost conscious environment by procedures Assuring high technical capabilities. Assuring care to be provided by professionals and teams		Measuring performance against a number of well-known and agreed-on indicators Publishing of reports on measured results. Engaging educated and well informed consumer Certification, accreditation and licensure measurement and public reporting of the adoption and spread of effective Qi strategies to improve care

Missing in Global QM Theory	Managing sanitary conditions, organizing employees, licencing workers, rules for conducting revius		Controlling quality of stuff Monitoring parameters
Missing in QM in Health Care	Identifying errors	Identifying critical activities in processes, setting control points. Using recorded data on errors to prevent them in future.	Control of supportive processes in certification and accreditation

Table's Endnotes

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Using quality tools, methods for process and costs optimization and Six sigma for any improvement	Controlling all elements of system, not just stuff, clinical processes and equipment	Controlling outsource organization. Applying TQM principles on whole organization, not just clinical stuff and processes. Applying system and process approach. Monitoring and measuring quality parameters of key and critical processes, not only of medical methods, departments or facility. Using IT for quality achievement and for service delivery

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DVE EVOLUCIJE KVALITETA: INDUSTRIJA VS. ZDRAVSTVO

Sažetak

Rad pruža uvid u istorijski razvoj menadžmenta kvalitetom u zdravstvu, kao i rezultate komparativne analize istorijskog razvoja menadžmenta kvaliteta u zdravstvu i istorijskog razvoja naučne discipline menadžmenta kvalitetom. Obe evolucije prikazane su kroz etape razvoja koje karakterišu različiti pristupi menadžmentu kvalitetom i metode koje su dominirale tim etapama. U svom istraživanju autori su se oslonili na već postojeće izvore, publikovane u naučnim i stručnim časopisima, te ga sprovedi kroz tri faze: istraživanje razvoja globalne teorije menadžmenta kvalitetom, koja se razvijala prevashodno kroz primenu u industriji, istraživanje razvoja menadžmenta kvalitetom u zdravstvu, a zatim komparativna analiza prikupljenih podataka o obe evolucije. Za potrebe prve i druge faze istraživanja korišćena je EBSCO naučna baza, kako bi se pristupilo naučnim i stručnim časopisima koji sadrže relevantne podatke. Komparativna analiza je pokazala da su između pomenute dve evolucije postojali jazovi koji su i danas prisutni. Dva evolutivna puta iste naučne discipline u dve sfere, dovode do toga da menadžment kvalitetom u industriji beleži daleko bolje rezultate nego u zdravstvu. Stoga su autori identifikovali četiri važne preporuke za unapređenje menadžmenta kvalitetom u zdravstvu.

Ključne reči: menadžment kvaliteta, evolucija, zdravstvo, industrija, uporedne analize