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EVOLUTION OF MANAGEMENT SYSTEM CERTIFICATION AFTER "BIG REVISION"

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Abstract. *Purpose* – the article provides part of the broader research in the area of management systems standards and management systems certification. In the paper we analyze the evolution of management system standards after implementation of High-Level Structure (Annex SL) on the example of the most popular management standard ISO 9001:2015 with the comparison to ISO 14001:2015. To understand the evolution and predict the future of certification we examine more deeply the behavior of individual standard worldwide and on the particular markets.

Research methodology – this study presents a quantitative overview of the quality management system standard certification during and after the last revision transition period. It presents analyses based on ISO survey data, data of the certification structure in Slovakia and particular data of broader research on adoption of an environmental management system in Slovak companies. The data were presented in graphs and tables to outline the change of dynamics of standards usage. We compare certification markets and analyze the observable impact by the type of standard, sectors penetration and possible certification impacts.

Findings – the evolution charts of the volume of certificates over time express a saturation effect and stable reduction in the dynamics of ISO 9001 and ISO 14001 standards. The analysis of certificates numbers by industrial sectors highlights a decrease in the majority of sectors, only a few of them show up a positive trend in the last two years.

Practical implications − the results of this study should be considered indicative rather than definitive. Taking into account the assembled data, multiple questions appear about the future. The future studies could proceed in qualitative research on causes of certification reduction and the possible incentives for management system standards application in organizations to sustain a system of credibility in international trade.

Originality/Value – the paper analyses the evolution of management system standards ISO 9001 with a focus on "Big Revision" impact.

Keywords: quality management system, environmental management system, certification, high-level structure, ISO 9001, ISO 14001.

JEL Classification: M19, L15, M11, M53.

Conference topic: Contemporary Organizations Development Management.

Introduction

After years of desperate effort to integrate badly integratable ISO management system standard brought ISO Technical Management Board's and Joint Technical Coordination Group in ISO/IEC Directives Part 1 adequate solution which avoids the need to comply parallel multiple management system standards covering separate aspects of performance and opens bride integration potential (ISO/IEC, 2018). Full integration of management systems offers implementation of similar processes without reduplication or process overlapping, rather than just creating parallel systems. Elements that exist in deferent systems can be managed as common requirements. They are defined, applied and treated in the same way and without multiple, not precise interpretations in the implementation of individual standards. This should be a milestone with a significant impact on organizations, certification bodies, accreditation bodies, auditors, etc. ISO/IEC Directives, Part 1, Consolidated ISO Supplement 2015, issues out the rules to be complied within ISO and the IEC in technical work, by standards development in technical committees and subsidiary bodies. Annex SL of the directives settles "Proposals for management system standards" and defines High-Level Structure (HLS): 1. Uniform

chapters and subchapters titles – the main 10 chapters with titles in equal sequence. 2. Uniform text and common terms – include subchapters titles as well as text within the sub-chapters. 3. Basic definitions for application in Management Systems Standards (ISO/IEC, 2015 and ISO/TMB, 2013). ISO technical committees revise the standards every five years to ensure that the standards are up to date and relevant to the market. In 2015 also the standards ISO 9001 and ISO 14001 have been redesigned to comply with Annex SL and respond to the market requirements. IAF issued "Important information for Certification Bodies regarding the transition to ISO 9001:2015" which determines that from 15 March 2018, conformity assessment bodies had to provide all ISO 9001 and ISO 14001 initial, surveillance and recertification audit only to the versions 2015 (International Accreditation Forum, 2015). The undergo successfully transition the organization has to apply 4 steps: 1. Define the scope of the management system. 2. Perform gap analysis and develop an implementation plan. 3. Update the existing quality management system and related documentation. 4. Implement new requirements and provide training (Susanto & Mulyono, 2017) (International Accreditation Forum, 2015).

Professionals, academics and mainly certification organizations trying to find out whether companies appreciate the benefits of revisions the most popular management systems standards and how the revision will affect the certification numbers in the future. There is relatively bride research on the implementation of ISO 9001 and ISO14001 before the transition period, but only a few of them investigate the effect of revision on the nowadays national or global certification market. Fonseca research (Fonseca, Domingues, Machado, & Harder, 2019) outlines differences in the transition process between countries (the survey launched in April 2018 in Portugal, Romania, Switzerland, Turkey on 222 organizations certified to ISO 9001:2015). Based on the study the organizations that successfully undergone ISO 9001:2015 transition recorded the main benefit in risk-based thinking application and alignment with other management systems. The cost reduction effect provided by High-Level Structure have been assessed by 3 on a scale of 5, is in line with expectations. The obstacles have been identified in the transition process. The organizations faced major difficulty by risk-based thinking, organizational context and scope, interested parties' requirements identification. Ahnudi et al. analyzed the effectiveness of the ISO 9001:2015 transition process in the company in the range from 82% to 94% (Ahmudi, Purwanggono, & Handayani, 2018).The main shortages have been identified in the area of sources management and personal competencies, planning clauses of the standard- especially handling risk and opportunities and the requirements regarded to leadership. Almost all requirements clauses with a high rate of change after revision. Other authors also point to the relevance of the new reinforced requirements. Rybski, Jochem and Hommas study (Rybski, Jochem, & Homma, 2017) showed the significant role of High-Level-Structure in management systems integration and leadership emphasize in new revision standards. The same situation was predicted in connection with the transition to ISO 14001:2015. Fonseca's and Domingue's research in 2017 on the Portuguese organization pointed out the lagging of the transition to revised ISO 14001:2015 (Fonseca & Domingues, 2018) and highlighted as the most beneficial concepts of ISO 14001:2015 the risk-based thinking, the "life-cycle approach" and "mapping of the context of the organization". Simultaneously the same concepts generate the significant problems in transitioning to the ISO 14001:2015.

1. Data and methods

This study offers a quantitative overview of management systems standard certification during and after the transition period to "2015" revision of ISO 9001 and ISO 14001. It presents analyses based on ISO survey data (ISO, 2017), data of the certification structure in Slovakia (data Slovak National Accreditation Service) and particular data of broader research on adoption of environmental management system in Slovak companies (Džubáková, 2019). The data were presented in graphs and tables to outline the change of dynamics of standards usage. Two main aspects are investigated:

Review of the research and studies on ISO 9001 and ISO 14001 certification reasons, effects and benefits of the "big revision" – ISO 9001 and ISO 14001 standards. The study contents bibliographic review of scientific articles on management systems application, the ISO (International Organization for Standardization) standards and guidelines and IAF and European accreditation policies determining revisions and the transitions processes (EA, 2018) (European Parliament and the Council of EU, 2008).

The evolution of global certification with the possible effects of "2015 revision" on the example of the most popular management standard ISO 9001 with the comparison to ISO 14001 standard. We examine the dynamics of standard ISO 9001 and ISO 14001. The comparison is outlined for ISO 9001 and ISO 14001 global and national certification numbers. We investigate the behavior of the standard ISO 9001 in different industrial sectors.

2. Reasons to become ISO 9001 certified company

ISO 9001 standard offers effective methods to improve continuous performance in the organizations. It is the most popular management system with the highest number of certification global. According to the latest ISO Survey of certifications is ISO 9001 widely applied by all industry sectors in 188 countries global (ISO Survey, 2017).

ISO 9001 plays an important role by supply chains requirements specification to your supplier and customers and requirement control (Neyestani & Juanzon, 2017). The ISO 9001 provides a set of requirements that allows significant confidence that the supplier will steadily deliver goods and services that meet the requirements and expectations of the customer

and in accordance with the applicable regulations. ISO 9001 covers a variety of issues – the supplier's top management commitment to quality, customer focus, quality management, risk management, employee competence, process management and monitoring, measurement, calibration of measuring equipment, service and support process delivery, product development and design, contract review, purchasing, outsourcing, complaint handling, corrective actions and continuous improvement of QMS, ect. It is important that the supplier monitors customer feedback on the quality of the goods and services provided. ISO 9001 does not contain specific quality criteria for goods or services. The customer defines needs and expectations for the product (product specifications, tolerances, quality assurance procedures, design drawings, product compliance requirements, second-tier suppliers' requirements, manufacturing competence requirements, or other documents) (ISO, 2017). ISO 9001 can be applied in conformity assessment systems. Conformity to ISO 9001 means that the organization has implemented and sustains a systematic approach to continuously improve quality and is focusing its business to ensure that customers' requirements are understood, reviewed and met. A statement of conformity to ISO 9001 cannot be considered sufficient and perceived as a substitute for a statement of product conformity (ISO, 2012). Several studies determine the benefits and positive impacts of ISO 9000 on the success and performance of companies. Ginevičius, Trishch, and Petraškevičius (2015) refer to that the system of the indicators of quality must be developed and their values based on the particularities of assessment of quality management as a high-performance driver. Lushi, Mane, Kapaj, and Keco (2016) reviewed 50 highly-ranked papers dealing with the impact of ISO 9001 on the company's performance. They identified thirteen benefits that ISO 9001 brings to organizations: improving the quality of the product, improving customer feedback, increasing market share and sales, increasing export potential, efficiency, increasing competitiveness, goodwill, increasing employee satisfaction and improving relationships with suppliers and customers, improving relations with regulators and other stakeholders, increasing profitability. ISO 9001 can be a useful "proactive strategy" to improve performance in organizations and across the supply chain from raw resources to the end customer (Mangula, 2013). Casadesús and de Castro (2005) supported ISO 9001 as a basis in sustainable supply chains. They point out "synergistic incorporation of Quality Management Systems into the Supply Chain Management" when the whole "supply network fully engaged in continuous improvement". Srdic and Selih (2011) describe the concept of integrated quality management (ISO 9001) and environmental management (ISO 14001) framework in connection to the product life cycle management. It is important for the final conformity statement that the ISO 9001 and ISO 14001 certified participants fully ensure that quality and environmental reliability is satisfied in all stages of the product life cycle: inception, design, execution, operation and maintenance, and end-of-life. Requirements related to the evolving Circular Economy regulations in Europe encourage businesses to engage in reliable supply chains. If the reliable life cycle approach is not applied in all stages of the supply chain and the structure of all stakeholders involved does not meet the requirements the failure and burdens occur, which may flow from the stage to stage and to the end customer and result to the environmental pollution (Ali Bastas & Liyanage, 2018).

3. ISO 9001:2015 transition period results

In 2017 we witness the transition of QMS from ISO 9001:2008 to ISO 9001:2015. The IAF has allocated a 3-year transition period (from date of publication of the standard) for certification bodies to transfer their QMS from 2008 to the 2015 version of the standard. To 31st December 2017, 9 months before the deadline, 42% of certified quality management systems went under the transition. In Slovakia it is the rate higher − 59% of all quality systems went under the transition audit. In Lithuania is the situation similar to 56% of recertified QMS systems. Companies in different countries are undergoing transition at different speeds. For example, Chinese companies, despite their number, behave in a certification similar to the worldwide average. Significant lagging in the transition is apparent in Italy. Up to 76% of all QMS had to be recertified in 2018.

	ISO 9001:2008 certificates	**ISO 9001:2015 certificates**	**Sum of certificates 2017**
	619 033 (58%)	439 471 (42%)	1 058 504
China	232 421 (41%)	160 587 (59%)	393 008
Italy	97 646 (76%)	22 982 (24%)	74 664
Germany	64 658 (63%)	30 312 (47%)	34 346
Slovakia	1575 (44%)	2017 (56%)	3592
Lithuania	530 (41%)	759 (59%)	1289

Conclusions of the global perspective are not sufficient for understanding future development and possible prediction of certification. Even in view of the promises connected to "BIG REVISION" was expected the rapid increase of ISO 9001 certification.

4. Evolution of ISO 9001 certification in comparison to ISO 14001

The first edition of ISO 9001:1987 has been published in 1987. In September 2015 ISO published a 5th revision of this most popular management standard. Based on the results of the comprehensive overview of certifications to these standards currently available of IAF in 2017 we observe the decrease in 4% worldwide certifications (taking into

account the inaccuracy of the survey due to the difference in the number of participating certifying bodies, year on year in the IAF countries) (Figure 1).

Number of certificates ISO 9001 in 2016: 1 105 937
Number of certificates ISO 9001 in 2017: 1 058 504
Change: –47 433
Change in %: –4

We observe the substantial decrease in the number of certificates for ISO 9001 compared to 2016 for Italy and, to a lesser extent, for Germany, Brazil, India, Japan, Poland, Slovakia, Switzerland, Taipei, Thailand and Turkey. For all of them, the variation in the data provided explains for a large part of the decrease but not for all of it (ISO Survey, 2017). Other countries experiencing a decrease, a substantial part of it is explained by certification bodies not participating in the survey (United States, Japan, Vietnam, Spain, Serbia, Taipei, Russia and Poland).

At the global world level, we can confirm a continuous increase in the certification of ISO 9001. There was a significant decrease in the in 2015, the year of revision and a quick return to the prevision period certification number in 2016. A similar situation we observe in 2017, with a decrease in certification by 4% (Figure 1). Due to the change of survey methodology, there was a decrease in the number of reported certification according to ISO 9001.

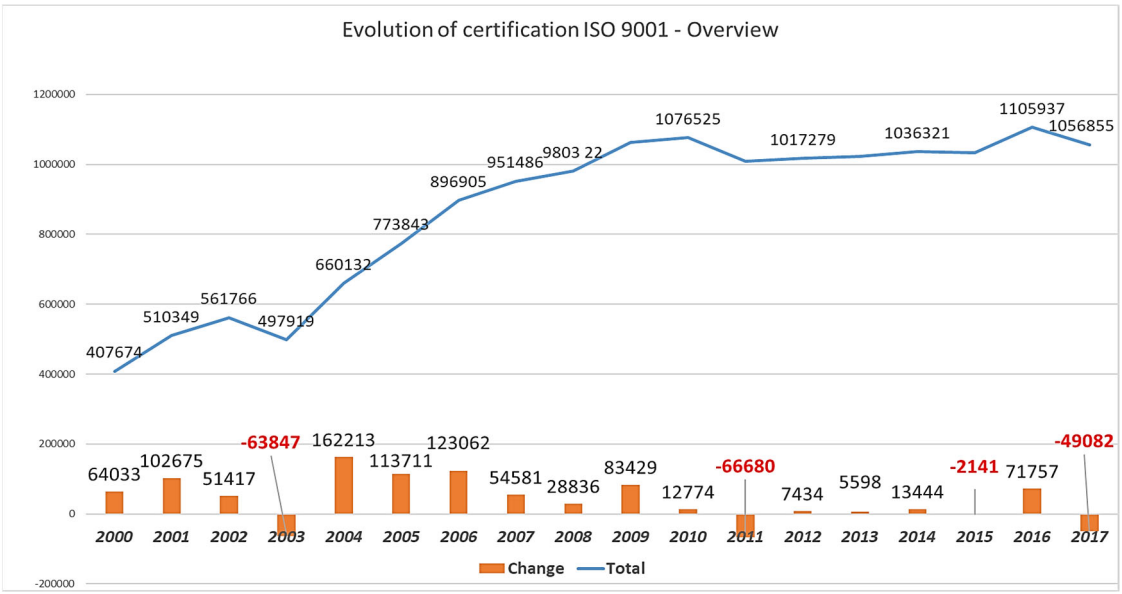

Figure 1. Evolution of ISO 9001 certification – Global (data source: ISO, 2017)

After the long-term review, the standard ISO 9001 grows since 2000 except the years after the transition periods. There was decrease by 63847 certificates in 2003, three years after the transition period end of the revision ISO 9001:2000. After 3 years' transition period of the revision ISO 9001:2008 in 2011, we observe a decrease by 66680 certificates. Last revision ISO 9001 in 2015 provoked reduction of certification twice, in the year of the revision publication and in 2017. The decreased sum of 2015 and 2017 is equal to the overall decrease observed in the previous revisions. The ISO 9001 standard behaves not unusually after the 2015 revision.

The first edition of ISO 14001standard was born in 1996. After the second edition in 2004 standard new revision in 2015 took place. ISO 14001:2015 corresponds to the new trends in the environment protection such as identification of the internal and external factor that influence companies' environmental impacts, product life cycle management, green supply chains development, environmental risk and opportunities management, eco-design and eco-labeling, zero waste and zero pollution concept, etc.

The number of ISO 14001 certificates increase slowly from 2000. In 2017 the changes are again positive and the number of certificates is 5% higher than in 2016 (taking into account the inaccuracy of the survey due to the difference in the number of participating certifying bodies year on year in the IAF countries and the number of certificates they report) (Figure 2).

Number of certificates ISO 14001 in 2016: 346 147
Number of certificates ISO 14001 in 2017: 362 610
Change: 16 463
Change in %: 5%

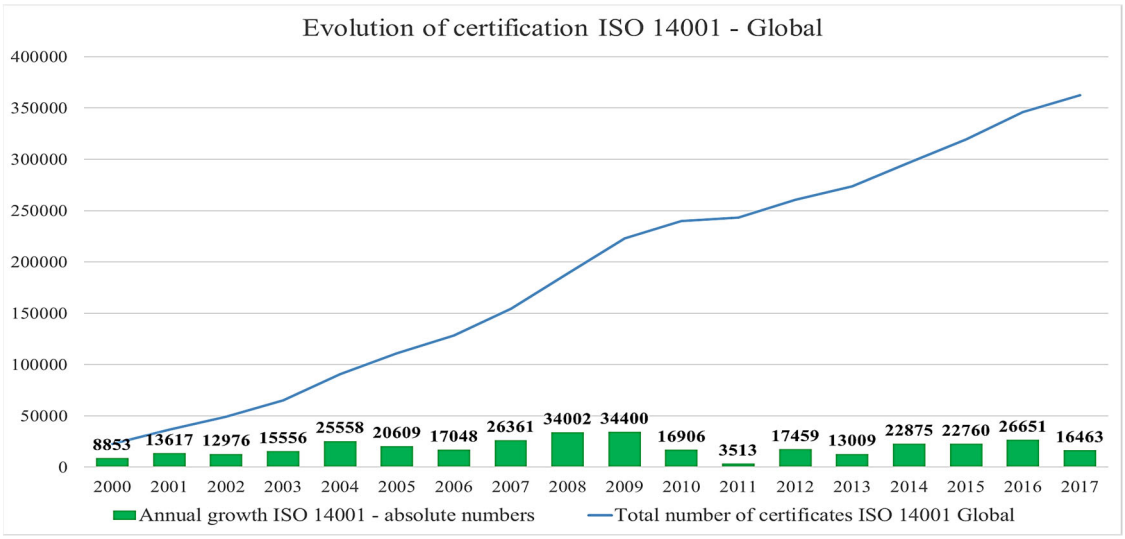

Figure 2. Evolution of ISO 14001 – Global (data source: ISO, 2017)

The ISO 14001 standard does not demonstrate the same response to revisions and during the transition period as ISO 9001 (Figure 3). In 2004 and the transition period to 2007, we did not observe a decrease in the number of certifications.

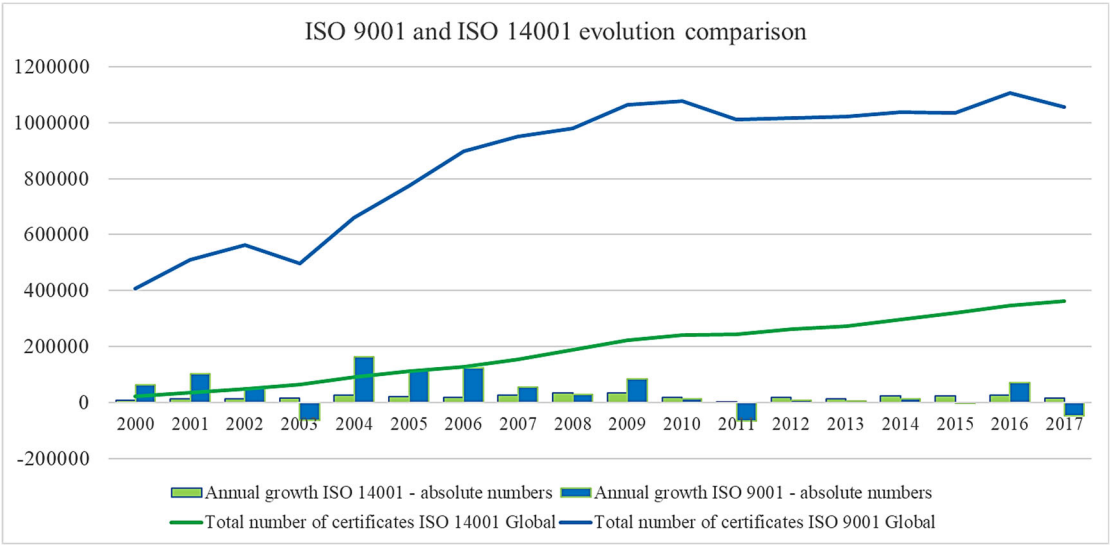

Figure 3. Evolution of ISO 9001 and IS 14001 comparison – Global
(data source: ISO, 2017)

On the contrary, the standard ISO 14001still grew, as during and after the transition to ISO 14001:2015 revision. The comparison reveals the different behavior of both standards. Both ISO 9001 and ISO 14001 have been growing since 2000.

The ISO 14001 standard grew slower than ISO 9001 from 2000 and is still growing steadily. As we observe in Figure 3, both of the standards (ISO 14001 and ISO 9001) slowing the growth of certification and visibly ISO 9001 faster. ISO 14001 shows stable long-term growth. There is an evident high positive correlation between the certification to the ISO 9001 and the certification to ISO 14001 (r = 0,906). Therefore, will be examined the dynamics of growth/change (Figure 4). The dynamics (rate of growth year-on-year) of both standards are declining as shown in figure 4 from 2000 with positive moderate degree correlation (r = 0,66). The number of certifications to ISO 14001 has been declining since 2000, from 60% today to 5% growth. The ISO 9001 standard has been on the market since 1987. The older standards market capacity declines slower and this assumption can be confirmed also for ISO 9001 in comparison to the "younger" ISO 14001 standard.

To examine deeper, the behavior of the standard we provide the situation in particular industrial sectors. The highest number of ISO 9001 certification global shows Basic metal & fabricated metal products sector, Construction, Wholesale & retail trade, repairs of motor vehicles, motorcycles sector and Electrical and optical equipment certifica-

tion (Figure 5). All sectors whit strict conformity assessment processes and when Quality Management System certification is almost always mandatory. However only by 3 of the sectors, we can see the positive trend in 2017 and increase of the certification numbers: a sector of Manufacturing not classified (NACE 31, 32, 33.19 − Manufacture of furniture, Other manufacturing, Repair of other equipment) by 1250 certificates worldwide. The second is Agriculture, fishing and forestry sector by 181 certificates and Electricity supply sector by 65 certificates. It can be summarized that reducing interest in ISO 9001 certification in 2017 is across economic sectors and does not touch only selected ones (Figure 5). Unfortunately, the biggest decline has been recorded in the Construction and Basic metal and fabricates metal products sector, the worldwide drop of more than 22 000 certificates. Both are the key sectors for industrial development and many downstream sectors (Figure 6).

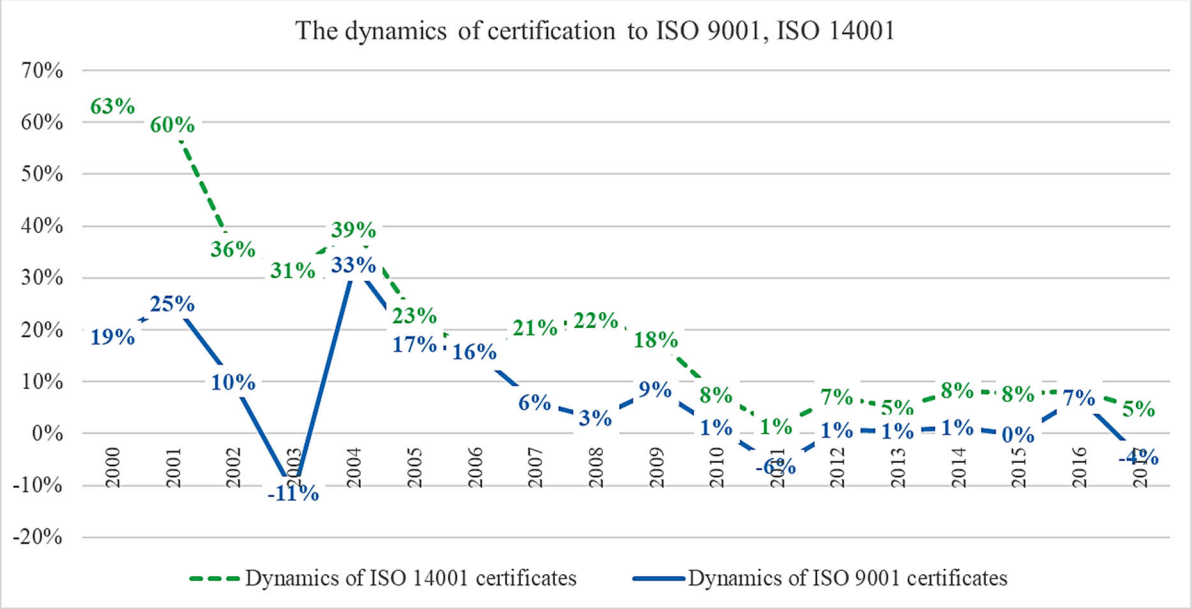

Figure 4. Evolution of ISO 9001 and IS 14001 comparison – Global
(data source: ISO, 2017)

This result needs to be examined in details in the future. This may be associated with the development of independent sector standards. The ISO 9001 is e. g. gradually replaced by standard IAFT 16949 (n.d.) global "Quality Management System Standard for the Automotive industry". The same situation is in the "Food products" sector, where ISO 9001 is replaced by ISO 22001 − Food safety management standard (ISO, 2018), or very often by BRS (British Retail Consortium) standard & IFS (International Food Standard).

Conclusions

Although many literary sources confirm that the quality management system brings significant benefits to businesses and creates confidence in supply chains we observe deceleration of certification to ISO 9001 across the world economy in almost all industrial sectors and the dynamics of the quality management certification markets worldwide decrease. Also, the standard ISO 14001 certification slows. Even the expectation connected to "Big revision" and the benefits promised in Annex SL has not yet been audited by the companies and the increase of ISO 9001 certifications related to system efficiency have not yet taken place (although we had no results number of whole transition period). In 2017, 9 months before the transition deadline, still 58% of certified quality management systems worldwide had to undergo transition. There are observable difficulties in the transition to ISO 9001:2015. Although both ISO 9001 and ISO 14001 have been growing since 2000 we observe a decline of the rate of year-on-year growth of both standards. There is different "behavior" of the standards on the market in reaction to the revision and transition period. ISO 9001 reacts more sensitive than ISO 14001. Based on the long-time investigation it can be assumed that in 2017 certificate numbers return to the pre-revision level. However, it is necessary to state that in 2017 almost all sectors witnessed the decrease of the ISO 9001certificates. These observations can open some disturbing questions about the future development of Quality Management Systems certification. In the global markets, all supply chain parties must ensure that the quality is satisfied in all stages of the product life cycle. Supplier reliability can be verified through other tools such as certifications. However, they bring high transaction costs or express not sufficient confidence (Supplier's declaration of conformity, Second party assessment of conformity). Increasing the transaction costs of quality assurance may threaten economic growth and slow down international goods and services markets.

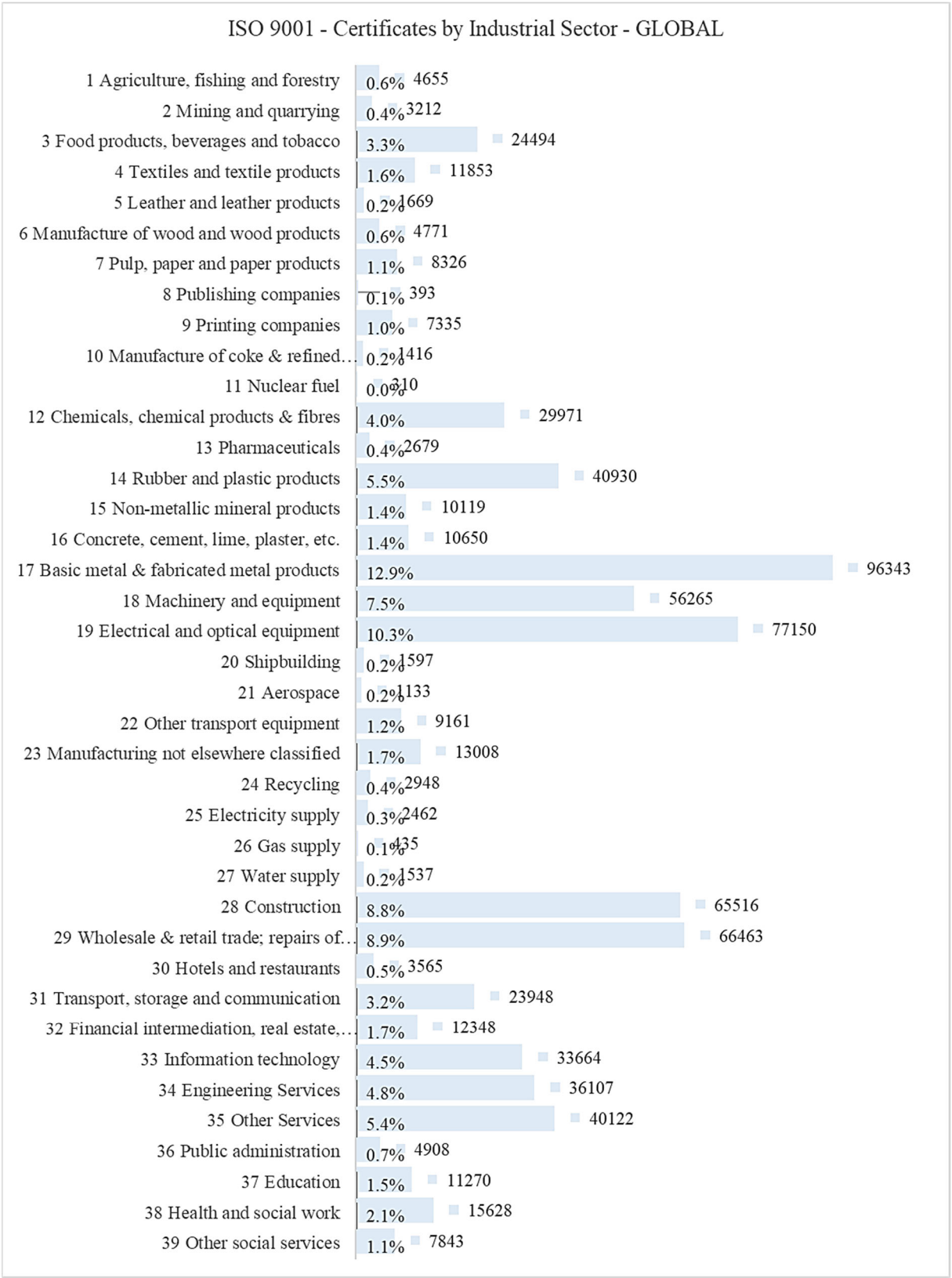

Figure 5. ISO certificates by the industrial sectors
(data source: ISO, 2017)

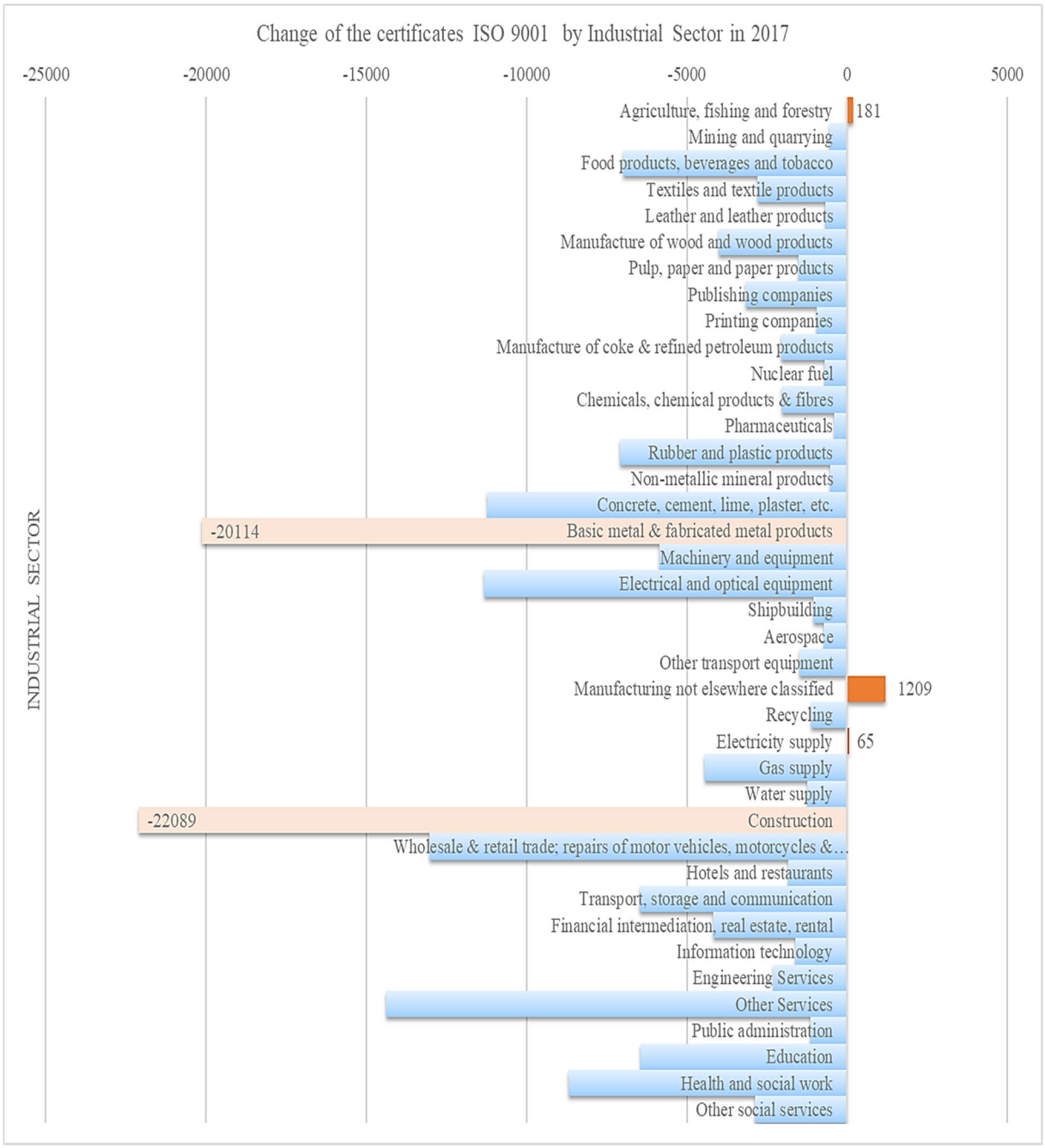

Figure 6. Change of ISO 9001:2018 certificates by the industrial sectors
(data source: ISO, 2017)

Based on the research review we have identified possible obstacles to ISO 9001:2015 transition and submit same reasons to become ISO 9001 certified company in business and economic context. It can be exploited to examine the possibilities initiatives to return confidence in the certification of quality management systems for sustainable the supply chain. Therefore, this study should be considered indicative rather than definitive. Looking at the empirical data of this study, some research questions for the future investigation come out about the future of quality management systems certification and reasons for the growth decline of the quality management systems. Stated information on the importance of certification may be used by policymakers to support Quality Management Certification in sustainable supply chains. In the future studies could proceed in qualitative research on the impact of specified incentives of management system standard application of organizations and regulators.

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