

Research on Management System of “Three-standard Integration”: A Literature Review

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Abstract—To promote further research and application of “three-standard integration” management system, this paper used literature analysis method to summarize research results about integration of quality, environment and occupational safety management system, which includes connotation, integration basis and strategy, and integration implementation steps. Finally, this article pointed out research direction of “three-standard integration” that involves re-integration of other management systems, integration strategy selection, system quantitative analysis and evaluation, and integrated certification.

Keywords—Management system; Integrated management system; Three-standard integration

I. INTRODUCTION

The advent of ISO9001, ISO14001 and OHSAS18001 provides theoretical basis for enterprises to establish quality management system (QMS), environmental management system (EMS) and occupational health and safety management system (OHSMS). Since the more and more intense competition, enterprises realize independent operation system will waste resources and bring great difficulties. To improve competitive advantage, enterprises integrate three management systems into a comprehensive management system. Academic and business circles have also studied on integration of management systems from different perspectives, mainly focusing on integration strategies, methods and integrated implementation steps, or studying success model and integrated certification through case analysis. This paper makes a comprehensive summary of these studies, and looks forward to future research direction, which provides reference for further research.

II. CONNOTATION OF THREE-STANDARD INTEGRATION

"Three-standard integration" means that enterprises integrate compatible parts among three management system standards of quality, environment and occupational health and safety based on their own situation. Namely, on basis of refining common elements of three systems, management activities reflecting operational characteristics of respective system are integrated into a comprehensive management system, which includes structure, procedures, processes and resources. The comprehensive management system takes into account three standards, including GB/T19001-2016, GB/T24001-2016 and GB/T28001-2011, which not only meets the requirements of international management standards, but also can better meet needs of company. "Three-standard integration" is mainly guided by product realization process,

which forms an intensive, serialized and standardized management system through resource optimization and sharing. Its purpose is to standardize enterprises management behavior, please customers, employees and society, and obtain the effect of $1+1+1>3$.

III. OVERALL RESEARCH SITUATION

Since the 1990s, International Standardization Organization has successively released ISO9000 and ISO14000, which caused business community, certification and consulting organizations strongly reflected on three-standard integration and integrated certification. Many countries gradually begun to study the integration of three standards. For example, Australia and New Zealand have jointly established research group to explore methods that helps enterprises to establish an integrated system. The UK has held a series of seminars to discuss it.

According to CNKI, the themes of “Quality, Environment, Occupational Health and Safety System Integration”, “Three-standard Integration” and “Integrated Management System” are received 1445 messages from 1998 to 2017. After screening, 698 papers are reserved. The earliest research results on integration of the three standards in China were in 1998, which introduced and explained purpose, theoretical basis and management category. From 1998 to 2001, domestic scholar begun to study three-standard integration, which mainly focused on the necessity and feasibility of integration. In November 2001, our country adopted OHSAS18001 and introduced GB/T28001, the number of related papers increased rapidly.

Three-standard integration has been increasingly valued by society, enterprises and scholars, research trend is also from necessity of integration, feasibility analysis and other theoretical research to how to achieve integration, how to build integration system framework, how to write management brochure and operating documents; how to conduct internal and external audit, management review; how to implement it.

IV. ANALYSIS OF RESEARCH CONTENT

Through analyzing relevant literature on integration of quality, environment, occupational health and safety, we can sort out research results from different aspects. It can be found that research results mainly focuses on integration basis, integration strategy, and implementation steps. Among them, the most popular is integration strategy and integration model. How to establish and implement an integrated management

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system, how to implement standardization and stylization are also research topics that scholars pay more attention to.

A. *The Basis of Three-Standard Integration*

After summarizing and analyzing related literature, we can find that the integration basis can be roughly divided into two aspects: internal foundation and external conditions.

1) *Internal Foundation*

Through comparing framework structure, content requirements and operation modes of three system standards that is ISO9001, ISO14001 and OHSAS18001, Shi Zhengping, Xiao Qipeng [1-2] thought that internal foundation of integrating is mainly reflected in the following four aspects:

a) *A corresponding relationship exists in the terms of three system standards*

Three systems are similar in structure, content, and the description of related elements. Most importantly, ISO14001 and OHSAS18001 are not only similar in terms of elements and content, but the overall framework and hierarchy are almost identical, both of them include reference scope, reference standards, system elements, terms and definitions, etc.

b) *Management framework of three systems is similar*

There are many similarities in management requirements, such as organizational structure and responsibilities, management review, communication, internal audit, correction and prevention, resource management.

c) *The basic ideas of three system standards are the same*

Wang Lijun, Liu Ke [3-4] thought their guiding principles and basic logic are similar, which aim at achieving the best order of quality, environment and occupational health, pleasing customers, employees and society. All of them have introduced information theory, system theory, and cybernetic and reflected eight basic principles. Their cores are building a dynamic cycle framework for enterprises and controlling operation system through continuous improvement.

d) *The operating modes are same*

Three systems adopt PDCA cycle, which can identify factors that affect quality, environment and occupational safety and health. Enterprises make plans or management scheme based on factors, discover and solve problems through process monitoring and measurement. Entire management system can achieve continuous improvement through PDCA cycle.

2) *External Conditions*

Besides the commonalities mentioned above, some external conditions also provide a good opportunity for integration. In summary, there are three main points:

a) *Certification audit*

Firstly, their objects for consulting certification are the same. In addition, whether it is internal audit, external audit, management review, their requirements and certification period are roughly the same, which helps enterprises to carry out joint internal audit and joint external audit [5].

b) *Multiple revisions add integration opportunities*

Bei Jinlan [6] mentioned that their contents can meet the needs of organizations in different periods, and their expression become clearer in structure, terminology, standards, and their translatability is stronger after multiple revisions, which are benefit for the integration of three systems. In addition, the International Standards Organization have defined that all ISO system standards must be revised in accordance with the "high-level architecture" mentioned in Part I of ISO/IEC Guide.

c) *Successful cases about integrated certification*

Many domestic and foreign companies have been succeed in establishing and implementing "three-standard integration" and accomplishing integrated certification, which set a successful example for others. For example, Japan Hexing Engineering Technology Co., Ltd., Rongshida Electronic Appliance Co., Ltd. and other enterprises have arrived management goals through establishing and implementing it, and successfully passed the one-time certification review.

It is not difficult to find that three systems lie in an integrated management system. Their similarity and compatibility take great benefits for building integrated management system. Multiple revisions and successful cases show that integration of three standards is feasible and effective.

B. *Three-standard integration strategy research*

Many integration strategies have gained good results in practice. Combining ideas of integrated system with successful cases, the following three strategies are mainly considered:

1) *Adopting PDCA cycle and process approach to construct an integrated management system*

Shanghai Management Quality Science Research Group [7] proposed that using process method to construct the prototype of integrated system, integrating elements of three standard clauses depended on correspondence existed in their terms. Yang Desheng [8] mentioned that building integrated management system based on PDCA cycle and considering the corresponding relationships among them. Luo Hongsen [9] believed that organization needs to find out all processes when using process approach to build integrated management system, including management process, product realization process, measurement and monitoring process.

2) *Establishing a single system based on actual situation, then integrating the other two management system elements.*

Sun Weizheng, Yang Xusheng [10-11] mentioned that regarding ISO9001 as the framework, putting all requirements of ISO14001 and OHSAS18001 into the framework; Yuan Lili [12] proposed that if quality management system is regarded as the core, organization should build integrated management system depended on processes and requirements; Shen Xiaoli [13] thought ISO9000 is complicated to operate and involves many procedural problems, ISO4000 is easier to operate. Jiang Jiang [14] recognized that ISO14000 includes Total Quality Management and Quality Assurance, which is most likely to provide a useful framework.

Any management system can be used as the core of an integrated management system, but it is necessary to concentrate on building a single system based on the actual situation. If quality affects personal safety of customers, priority should be given to quality management systems; if realization process has a significant impact on environment, environmental management requirements are the most important; if risks threatens the safety of employees, priority should be given to occupational health and safety.

3) *Based on business survey, integrating core elements with same structure or similar content*

The strategy mainly relies on successful experience of peer companies. Organizations formulate guidelines and objectives with company's development strategy. Applying successful

experience into the operation of various management elements, which is benefit to improve effectiveness and efficiency and achieve a smooth transition. In addition, Cheng Hao [15] proposed to use the classic IE technology to set about work research, which helps to realize a standardized management process. Meng Yanting [16] adopted Six Sigma ideas and various statistical tools to establish an integrated management system .

There are many ways to integrate three systems, each with its own advantages, shortcomings and application. And the study believes that no matter what kind of integration strategy is adopted, using process method and PDCA cycle is necessary. What's more, all strategies must meet requirements of three system standards, and the operation mode is shown in Fig.1.

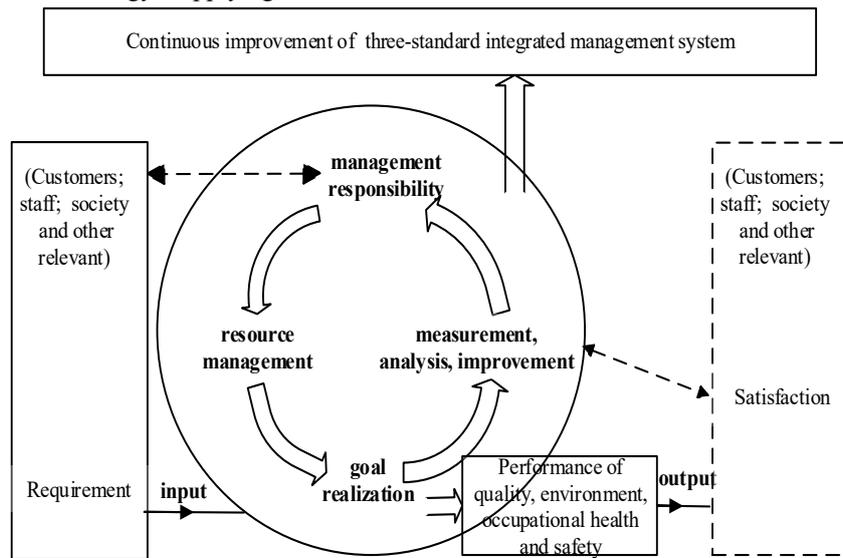


Fig. 1 Three-standard integrated system operation mode

C. Research on implementation of three-standard integration

Xiao Qipeng, Wang Yonggang[2][17] mentioned that whole implement process follows planning, doing, checking and acting. At first, top managers make project decision; next,

related departments conduct initial review to identify influencing factors; then, managers set goals and formulate document structure; finally, finding problems through internal audit and management review. The specific implementation steps are as follows in Fig.2.

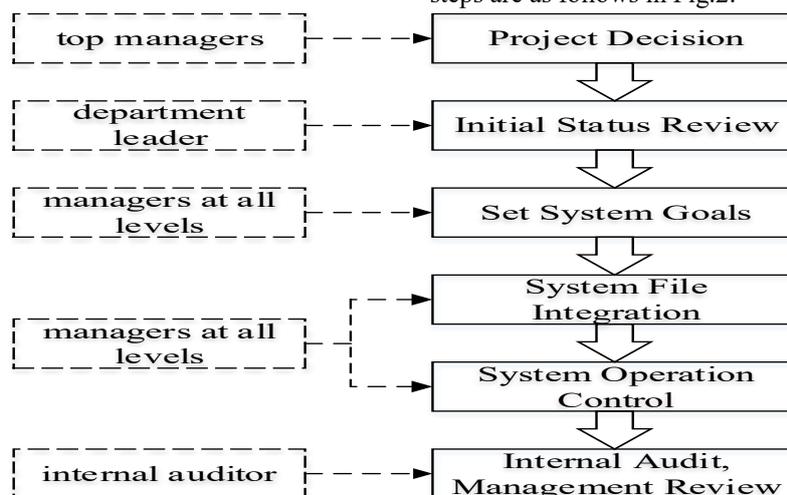


Fig. 2 Integrated management system implementation steps

V. CONCLUSIONS AND PROSPECTS

The integration of three system standards is a development trend of ISO. With "three-standard integration" becoming more and more popular, academic and business circles have also discussed its theory and practice, which produced a series of research fruits. But, in high-impact journals, the amount of relevant literature published is extremely deficient, and breadth and depth of research needs to be improved. So, future research on this field can be carried out in the following four aspects.

- How to integrate other management systems on the basis of the future integrated management system. With further deepening of WTO, enterprises may need to introduce more management systems to regulate their own operations, which requires rationalizing integrated management system.
- How to grasp the scale of "different forms of application while meeting the requirements of three standard systems". GB/T9001, GB/T24001 and GB/T28001 are widely applicable, which can be introduced in both manufacturing and service industries. The standards of GB/T9001, GB/T24001 and GB/T28001 are widely applicable, which can be introduced in both manufacturing and service industries. Because the differences in various industries and the changes in internal and external environment of the enterprise. There is no set of integration schemes that apply to all industries and fixed models. Therefore, some clauses need to adopt different strategies based on industry and enterprise reality.
- How to use quantitative analysis methods. At present, there are few studies on using quantitative method to analyze operational effects of integrated systems. How to evaluate the integrated systems? What are the evaluation indicators of integrated management system? Which evaluation method is used? These should be considered as further research in the future.
- Integration certification. The purpose of integrated management system is to reduce burden of company and auditor. How to use IE techniques to simplify audit process? What is the way to cultivate assessor? From what aspects? These are the focus of future research.

REFERENCES

- [1] Shi Zhengping. Discussion on the integration and application of quality, environment and occupational health and safety management system in enterprises [J]. *Light Industry Standards and Quality*, 2014(03): 45-46.
- [2] Xiao Qipeng, Xu Ming. Analysis on Integrated Management System of Quality, Environment and Occupational Health and Safety [J]. *World Standardization and Quality Management*, 2003(09): 7-10.
- [3] Wang Lijun. Discussion on relationship between enterprise standard system and quality, environment and occupational health system [J]. *Nuclear Standards Measurement and Quality*, 2009 (03): 14-18.
- [4] Liu Wei, Zou Hong. Basic methods and steps for integration of quality, environment and occupational health and safety management system [J]. *Science and Technology Information*, 2007 (36): 104+138.
- [5] Liu Yiwei, Pang Yubao. Preliminary Study on Establishing Integrated Management System in Enterprises[J]. *China Safety Production Science and Technology*, 2003(2): 60-62.
- [6] Bei Jinlan, Wang Chunyu. Based on ISO9001 standard to build QEO integrated management system [J]. *Enterprise Vitality*, 2010 (07): 65-69.
- [7] Shanghai Quality Management Science Research Group. Management System Integration Application Research [J]. *Shanghai Quality*, 2015 (01): 48-50.
- [8] Yang Desheng, Yan Xuqing. Preliminary Study on Planning and Design of Integrated Management System[J]. *China Quality*, 2002(04): 12-18.
- [9] Luo Hongsen, Xia Jianbo, Wang Wenzhao. Analysis on Integration Method of Integrated Management System[J]. *West China Science and Technology*, 2009, 8(24): 55-56.
- [10] Sun Weizheng. Establishment and implementation of integrated management system [J]. *Shanghai Quality*, 2011 (10): 12-16.
- [11] Yang Xusheng. The integration of enterprise QEO integrated management system under the new quality standard [J]. *Machinery Industry Standardization and Quality*, 2017(05): 35-40.
- [12] Yuan Lili. On the integration of quality, environment and occupational health and safety management sys.
- [13] Shen Xiaoli, Guo Yusheng, Wei Yanjun. Constructing an integrated management system of quality, environment and occupational health and safety with quality management system [J]. *World Standardization & Quality Management*, 2004(11):46-48.
- [14] Jiang Jiang. Integration of quality, safety and environmental management systems [J]. *China Standardization*, 1998 (12): 38-40.
- [15] Cheng Wei. How to deal with the strategy of integration and integration of "three major systems" [J]. *Productivity Research*, 2009 (23): 206-208.
- [16] Meng Wei, Long Shaoliang. Application of Six Sigma in Management System Integration[J]. *shanghai quality*, 2006(06):70-73.
- [17] Wang Yonggang. Discussion on Integration of Quality, Environment and Occupational Health and Safety Management System[J]. *Technology Supervision of Petroleum Industry*, 2007(05):35-40.