

# Integrated Management System: The Converging of Key Quality Standards into Single Standard

H. Muzaimi<sup>1</sup>, S.R. Hamid<sup>2</sup>, S. Isa<sup>1</sup> and B. C. Chew<sup>1</sup>

<sup>1</sup>Universiti Teknikal Malaysia Melaka, UTeM

<sup>2</sup>Gebze Technical University, GTU, Turkey

*hafizzudin.muzaimi@yahoo.com.my*

**Abstract**—This paper discussed the Integrated Management System (IMS) that combined the quality (ISO 9001), environment (ISO 14001) and occupational health and safety (OHSAS 18001) management system. The management system used in previous time, resulted more work, time-consuming and bigger expenses. Meanwhile, the existing separated management system has tendency that the management system documents are being double-checked, contain redundancies or mismatched. Therefore, the usage of IMS enables them to overcome the problem and influence them in term of cost, time and resources saving. In order to investigate the component that can be integrated with IMS, the research focuses on identifying two parts, 1) Converged component and 2) Diverged component. A series of the interview was conducted through in-depth interviews with 5 experts in this field, while the collected data were analyzed qualitatively. As a conclusion, this research identified the component in IMS that can be applied for better quality management in terms of cost, time and resources towards sustainability practices in the organization.

**Keywords**—*converged components; diverged components; ISO standards; Integrated Management System.*

## I. INTRODUCTION

THE integration means a combination; that is putting all the internal management practices into one system in such a way that the components of the system are linked to form one integral part of the company's management

system [1]. The Integrated Management System (IMS) can lead to direct cost savings through reduced audit cost and reduced certification cost [2]. In line with this, the IMS provides benefits and advantages for quality management [3]. Moreover, the IMS has received major attention within the organization to create a competitive advantage and contributed to sustainable development [4]. The IMS is a management system that combines all the components of business into one coherent system [5]. The IMS includes ISO 9001 Quality Management, ISO 14001 Environment Management and OHSAS 18001 Occupational Health and Safety Management but not limited to just these standards [6]. Figure 1 shows the core of an IMS and examples of standards through which the integration can be achieved.

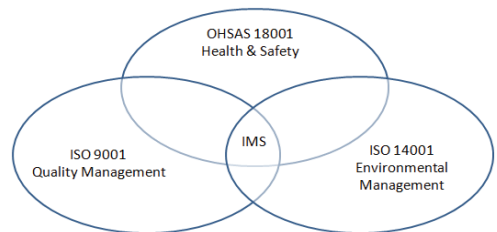


Fig. 1. The core of the Integrated Management System and examples of standards on which it can be based (adapted from Winder, 2001).

The factors that lead to the management system integration is meant to allow the achievement of the strategic purpose, mission, and goals. An IMS is a management system, which combines all components of a business into one systematic system to enable the achievement of its purpose and mission [7] as mentions early in the introduction. The integrated management system is a process

Article history: Manuscript received 28 February 2019; received in revised form 4 April 2019; Accepted 5 April 2019.

of putting together different function-specific management systems into a single and more effective integrated management system [8]. Besides, the IMS refers to the actions and the effect of combining or merging the elements of the individual managing system [9]. The ISO 9001, ISO 14001 and OHSAS 18001 standards share similar management techniques and principles [10]. The ISOs require organizations to formulate policies, to define roles and responsibilities, to assign management representatives and to train personnel [11]. As per mentions, this implies that organizations need to take action for sharing tools, methodologies and systematic management of different areas, and to comply with the different standard or models governing the management systems [9].

#### *A. The Necessity of Using IMS*

At the present time, most organization management units are focusing on the strategic dimension to improve the organization management, especially in managing the management system and reducing any complexity. In order to create competitive advantages and achieve sustainable development, many organizations have implemented quality management system (ISO 9001), environmental management system (ISO 14001) and occupational health and safety management systems (OHSAS 18001). Under these circumstances, an organization may have multiple management systems implemented and has the option to manage them either separately or in an integrated manner. However, the separated management system nowadays resulting in more work, time-consuming and bigger expenses. Furthermore, the existing separated management system has the tendency that the management system documents are being double-checked, containing any redundancies or mismatched.

In most current practice in the area of quality standard, the organization needs to spend a lot of cost in order to gain the certification for each quality management standard such as ISO 9001, ISO 14001 and OHSAS 18001. By now, this quality management can be integrated in order to

become more systematic by using the Integrated Management System (IMS). Furthermore, instead of enhancing the effectiveness and efficiency in the management, the usage of IMS enables to give influence in cost, time and resources saving [12]. Thus, there is a need for the management to look at the potentials and the opportunity of using this system rather than separated management system. As such, there is a trend for any organization to implement an IMS to overcome the problem resulting from multiple management systems.

This paper study on the specific clauses that are involved in IMS. Previously, the study on the component of IMS is being mentioned generally and it focused on the basic components that can be integrated or converged. In this study, the researchers would like to investigate the specific clauses of the converged and diverged components based on the International Organization for Standardization (ISO) manual. Besides, the researchers would like to identify the related component inside IMS, which is based on the real practices in the organization that has implemented it.

Thus, in order to investigate the components involved in IMS, the researchers have divided the components into two (2) sections and there are the converged and diverged components. This is because the researchers want to investigate the suitability clauses in ISO that have in common which enable the system to be integrated.

## **II. LITERATURE REVIEW**

#### *A. The Components in Integrated Management System that could be Converged and Diverged*

Continuous quality improvement is the key to long-term success and high performance [13]. In line with this, the management systems share many common requirements and the continuous improvement goal. The differences are the approaches and the degree of prescription, but ISO 9001, ISO 14001 and OHSAS 18001 standards are sharing some commonalities in content, terminology and many of the requirements [14]. Supported by Chartered Quality Institute, the management system shares the same processes in which it consists of document

development and control, training, internal audit, management review, corrective action, preventive action, risk assessment, regulatory management, programme management, and public awareness [5].

*i. The proposed converging components for Integrated Management System*

According to Integrated Standard, there are seven main components in ISO 9001, ISO 14001 and ISO 18001 which are the structure and responsibility, training, awareness and competence, document control, records, corrective and preventive action, internal audits and also management review [14]. Besides, the system documentation, records, policies, planning, responsibility, implementation, operational control, communication, verification, audits, conformity, continuous improvements, and prevention are specific requirements that are common to the standards that share the same structure [15]. As supported, the standards of quality management, environmental management and employee health and safety management have a very similar structure. Thus, the standards are possible to integrate/ converged [16].

The component's clause for IMS was identified by using data categories, data reduction, and data display. The researchers identify which clause and statement in the ISO document that refers to the stated criteria. The clauses in each ISO requirement were arranged accordingly based on the criteria and then formed based on the component that can be integrated together for IMS. In addition, it can be noted that the clauses which are integrated are based on the ISO content, understand the explanation in the ISO clauses and also identify whether the clauses can be integrated or not. Therefore, the results for the clauses in Table I shows that the clauses have the same content and context; similar meaning and explanation referred to each criterion that can be used as the IMS combining ISO 9001, ISO 14001 and OHSAS 18001.

TABLE I. CLAUSES FOR INTEGRATED MANAGEMENT SYSTEM COMPONENTS.

CRITERIA	ISO 9001	ISO 14001	OHSAS 18001
Scope	1, 4.3	1, 4.3	1
General Requirements	4.1, 4.2, 4.4, 4.4.1, 4.4.2, 5.1, 5.1.1	4.1, 4.2, 4.4, 5, 5.1	4.1
Management system policy	5.2, 5.2.1, 5.2.2	5.2	4.2
Planning	6, 6.2, 6.2.1, 6.2.2, 6.3	6, 6.1.2, 6.1.3, 6.1.4	4.3
Identification and evaluation of aspect, impacts and risks			4.3.1
Identification of legal and other requirements			4.3.2
Contingency planning			4.4.7
Objectives	6.2, 6.2.1.6.2.2	6.2, 6.2.1, 6.2.2	4.3.3
Organisational structure, roles, responsibilities and authorities	5.3	5.3	4.4.1
Implementation and operation			
Operational control	7.1.4, 8, 8.1	8, 8.1, 8.2	4.4.6
Management of resources	7.1, 7.1.1, 7.1.2, 7.1.3, 7.2, 7.3	7.1, 7.2, 7.3	4.4.1, 4.4.2
Documentation requirement	7.5, 7.5.1, 7.5.2, 7.5.3, 7.5.3.1, 7.5.3.2	7.5, 7.5.1, 7.5.2, 7.5.3	4.4.4, 4.4.5, 4.5.3
Communication	7.4, 8.2.1	7.4, 7.4.1, 7.4.2, 7.4.3	4.4.3, 4.4.3.1
Performance assessment			
Monitoring and measurement	7.1.5, 7.1.5.1, 7.1.5.2, 9.1, 9.1.1	9, 9.1, 9.1.1	4.5.1
Evaluation and compliance	9, 9.1.2, 9.1.3	6.1.3, 9.1.2	4.5.1
Internal audit	9.2, 9.2.1, 9.2.2	9.2, 9.2.1, 9.2.2	4.5.5
Handling of nonconformities	8.7, 8.7.1, 8.7.2	10.2	4.5.3.2
Improvement	10, 10.1, 10.3	10, 10.1, 10.3	
General	10.1	10.1	4.6
Corrective, preventive and improvement action	10.2, 10.2.1, 10.2.2	10.2	4.5.3.2
Management Review			
General	9.3.1	9.3	4.6
Input	9.3.2	-	-
Output	9.3.3	-	-

*ii. The diverge components in the Integrated Management System*

In the genuine concept of integration, it is impossible to integrate everything [17]. Consistent with this, in the theoretical analysis of IMS, all the management systems cannot be well integrated into a principle and the system is only able to be partly integrated and coordinated [16].

The diverged components were identified based on the criteria stated previously (data categories, data reduction, and data display). The diverged component as summarized by researchers from ISO requirements and manual is as shown in Table II. This is a result of the clause which is based on the ISO manual and requirements, the understanding and the explanation in the ISO clauses are also identified whether the clauses can be integrated or not.

TABLE II. DIVERGE COMPONENTS IN IMS

Criteria	Diverged
Identification and evaluation of aspect impacts and risks	OHSAS 18001
Identification of legal and other requirements	OHSAS 18001
Contingency planning	OHSAS 18001

### III. RESEARCH METHODS

This study is an exploratory qualitative study, based on the in-depth interview. The qualitative is an approach to explore and understand the meaning of individuals or groups ascribe to the social [18] and this method offers ways of finding out what people do, know, think and feel by observing, interviewing and analysing documents [19]. The IMS is the approach that people do practically; therefore, the researchers can gain the data from what respondents do, or experienced and ask for their opinion. In this article, the case study strategy was adopted, there are 5 respondents (i.e. Managers and middle manager) from Company X, which involved in the manufacturing of solar cell technology. This company was successfully implemented the IMS for five years. There were two key data collection methods that are used in this study, which are: (1) Primary data from a face-to-face interview with respondents and (2) Secondary data from official documents. In this article, through the interviews with respondents, the researchers could then understand the converged/ diverged management system components from the industrial practitioner. The interview questions were designed to be semi-structured in order to encourage participants to talk freely and openly about their opinions and experience.

Besides, for data analysis, this article applied the explanation building methods. The explanation building is designed to test a theoretical proposition [20]. The qualitative data are consisting the elements of 1) Relating themes or findings to the relevant research literature, 2) Presenting the data, 3) Describing or summarizing the data 4) Interpreting the data. Based on the statement, the data analysis used is the explanation building methods. The explanation building methods required to

undertake the following stages [20]:

1. Devise a theoretically-based proposition, which you will then seek to test.
2. Undertake data-collection through an initial case study in order to be able to compare the findings from this in relation to this theoretically-based proposition.
3. Where necessary, amend the theoretically-based proposition in the light of the findings from the initial case study.
4. Undertake a further round of data-collection in order to compare the findings from this in relation to the revised proposition.
5. Where necessary, further amend the revised proposition in light of the findings from the second case study.
6. Undertake further iterations of this process until a satisfactory explanation is derived.

In short, the data were analysed using the explanation building method that described and arranged according to theory, primary or secondary data; and then researchers' opinion.

### IV. RESULTS AND DISCUSSION

#### A. *The Converging Components for Integrated Management System*

As mentioned earlier in the literature section, accordingly there are seven main components in ISO 9001, ISO 14001 and ISO 18001 namely are; the structure and responsibility, training, awareness and competence, document control, records, corrective and preventive action, internal audits and also management review. In saying that the management system shares the same processes in which it consists of document development and control, training, internal audit, management review, corrective action, preventive action, risk assessment, regulatory management, programmed management, and public awareness. Thus, in turn, this suggests that the standards are possible to be integrated and converged.

Consistent with the above premise, Manager 2 highlights that component that can be integrated into ISO 9001, ISO 14001 and OHSAS 18001 are a manual combination (management review), resources, manpower, manual and procedure.

*“Components in management system being integrated are manuals which consist of quality manual, environmental manual as well as safety and health manual. The other things are the combination of management review, including its procedure, the internal audit procedure, the actual practice procedure, the correlative, and preventive action procedure and the document and record control”.* (Manager 1)

The components of the management system that can be integrated are the integrated management system manual, integrated management system management review, resources management, design and development, a stage gate process, document control, and record; control and record; manufacturing process; monitoring and measuring process and products; control of monitoring and measuring devices; audit procedure, legal and other requirement; EHS objective, target and program procedure; resources, roles, responsibility, accountability and authority procedure; competence, training and awareness procedure; communication, participation and consultation; operational control in environment management system/safety management system procedure; and performance measurement and monitoring procedure.

(Company X IMS Documentation Metric)

Based on the above discussion, there are possible to integrate or converged the component in the management system. Based on the practical implementation by the industrial practitioner, there are many components in the management system potentially could be converged. The system component that was able to converge is based on the requirements and the priorities of the company and also for easier documentation management and application.

#### *B. The Diverge Integrated Management System Components*

In the true concept of integration, it is impossible to integrate everything [17]. Consistent with this, in the theoretical analysis of IMS, all of the management systems cannot be well integrated into a principle and the system is only able to be partly integrated and coordinated [16].

Based on Company X IMS Documentation Metric, components that could not be integrated

or diverged include purchasing procedure, non-conforming product and material review board (MRB) procedures, 8-Discipline (8D) methodology for problem resolution procedure, internal process compliance audit, internal quality system audits, customer-related processes and global customer's satisfaction and complaint procedures.

Besides, Company X IMS Documentation Metric also states that another component of management system that cannot be integrated is environmental aspect and impact identification and evaluation; emergency, preparedness and response procedure; incident investigation, nonconformity, corrective action, and preventive action procedure; and hazard identification, risk assessment and determining control procedure (HIRAC).

Based on the above discussion, the Company X IMS Documentation Metric states that the components that cannot be integrated or diverged such as purchasing procedure, non-conforming product and material review board (MRB) procedures, 8-Discipline (8D) methodology for problem resolution procedure, internal process compliance audit, internal quality system audits, customer-related processes and global customer satisfaction and complaint procedures. The researchers believe that these components are related to the quality management system. The components which cannot be integrated are mainly because they require specific quality management system procedures and structures. Furthermore, the requirements for the components are not identical to another management system. Therefore, organizational management should use this component of the management system as a single system.

Besides, Company X IMS Documentation Metric further states that another component of management system that cannot be integrated namely are environmental aspect and impact identification and evaluation; emergency, preparedness and response procedure; incident investigation, nonconformity, corrective action, and preventive action procedure; and hazard identification, risk assessment and determining control procedure (HIRAC). In the researchers' opinion, the components that cannot be integrated involve the core requirement or basis



of the management system. Based on the IMS documentation metric, the component that cannot be integrated is mostly about specific procedures. The researchers acknowledge, it is possible that the procedure cannot be integrated, however, in terms of implementation, it could be merged together with the other management system.

All of these suggest that a management system component that can be converged or combined are still based on the requirements and priorities of the company. In line with this, Manager 1 points out that “The different system has different requirements, not all documents or component should be integrated, and if it cannot be integrated then we will use it as a single management system”. The researchers believe that the overall components that converge or integrate are identical with the requirement of the integrated standard or ISO. The difference is in which level the organization wants to integrate their management system that is based on the needs and suitability in the management/ industry.

**V. CONCLUSION**

The researchers conclude that the components in the management system could be converged and diverged. This is because the concept and the model of the components are such similar and identical amongst the standards. Besides, the standards are very generic, and the organization can integrate the components into management standards based on the subject or objectives that the organization intends to achieve. The converged components shared the same content and context; similar meaning and explanation referred to each criterion that can be used as the IMS combining ISO 9001, ISO 14001 and OHSAS 18001; however, the diverged components are vice versa.

Based on the practical implementation by the industrial practitioner, the results are consistent with the components that could be converged and diverged. The management system component that can converge is based on the requirements and the priorities of the company, the component that is used in the management can be integrated for easier documentation management and application. Besides, the researchers noticed that the different system has it a different requirement and not every component or document must be

integrated. This is because, if the components are not suitable or have a contradiction, then it will be used as a single component in the management system. The summary of the converging and diverging components based on case study is illustrated in Table III as follows:

TABLE III. SUMMARY OF CONVERGING AND DIVERGING COMPONENTS IN IMS

Converged Components	Diverged Components
IMS Manual	Purchasing Procedure
Management Review	Nonconforming Product and Material Review Board (MRB) Procedures
Resources Management	8-Discipline (8D) Methodology for Problem Resolution Procedure
Design and Development	Internal Process Compliance Audit
Stage Gate Process	Internal Quality System Audits
Document Control and Record	Customer Related Processes
Control and Record	Global Customer Satisfaction and Complaint Procedures
Manufacturing Process	Environmental Aspect and Impact Identification and Evaluation
Monitoring/ Measuring Process and Products	Emergency Preparedness and Response Procedure
Control of Monitoring and Measuring Devices	Incident Investigation, Nonconformity, Corrective Action and Preventive Action Procedure
IMS Internal Audit Procedure	Hazard Identification, Risk Assessment and Determining Control Procedure (HIRAC)
Legal and another Requirement	NA
EHS Objective, Target and Program Procedure	
Resources, Roles, Responsibility, Accountability and Authority Procedure	
Competence, Training and Awareness Procedure	
Communication, Participation and Consultation	
Operational Control in Environmental Management System/ Safety Management System Procedure	
Performance Measurement and Monitoring Procedure	

The researchers can conclude that all the findings of converged and diverged components in IMS are consistent with the previous research or theory. However, there is some differences/ inconsistency between the previous researches (i.e. ISO standards manual) with the findings. This is because of the empirical findings from the case study are based on real practices and the suitability of the integration from the industrial practitioner. The researchers believed that the overall components, whether to converge/ integrated has similarity with the requirement of previous work. However, the difference is in the different levels of the organization wants to integrate their management system based on the needs and suitability of the management/ industry.

Therefore, it is clear that the converged and diverged components which were illustrated from the real-world case (i.e. Empirical finding) is consistent with the literature with some degrees of commonalities. It is important for readers to understand the overall situation and gain an understanding of the components involved, which may give such an impact on the IMS implementation as appropriate.

## ACKNOWLEDGEMENT

Authors would like to thank all those who have assisted to complete this research. Special appreciation is given to the responded companies and organizations involved in this research. This research was supported by the UTeM MyBrain scholarship, Universiti Teknikal Malaysia Melaka (UTeM) and Gebze Technical University, Turkey (GTU).

## REFERENCES

- [1] Olaru, M., Maier, D., Nicoară, D. and Maier, A., "Establishing the basis for development of an organisation by adopting the integrated management systems: comparative study of various models and concepts of integration", *Procedia-Social and Behavioral Sciences*, pp.693-697, 2014.
- [2] Rajkovic, D. and Aleksic, M., "Corporate motives on implementation of integrated management system (IMS)," *International Journal for Quality Research*, vol. 3, pp.1-5, 2009.
- [3] Abrahamsson, S., Isaksson, R. and Hansson, J., "Integrated management systems: advantages, problems and possibilities" In 13th Toulon-Verona Conference, pp. 1-12, 2010.
- [4] Esquer-Peralta, J., Velazquez, L. and Munguia, N., "Perceptions of core elements for sustainability management systems (SMS)," *Management Decision*, vol. 467, pp.1027-1038, 2008.
- [5] CQI, IRCA, CQI IRCA. [Online] Available at: <https://www.quality.org/> [Accessed 18 Mar. 2017], 2017.
- [6] The British Standards Institution (BSI). "Standards, Training, Testing, Assessment and Certification BSI Group," [Online] Available at: <https://www.bsigroup.com/> [Accessed 15 Feb. 2017], 2017.
- [7] Stamou, T., *Integrated management systems in small medium-sized enterprises: theory and practice*. University of East England, 2003.
- [8] Bernardo, M. and Simon, A., "Multiple standards: Is this the future for organizations?," In proceedings of 28th EGOS Colloquium on Design, 2012.
- [9] Simon i Villar, A., *An empirical analysis of integrated management systems*, 2012
- [10] Zeng, S.X., Shi, J.J. and Lou, G.X., "A synergetic model for implementing an integrated management system: an empirical study in China," *Journal of Cleaner Production*, vol. 15, pp.1760-1767, 2007.
- [11] Wilkinson, G. and Dale, B.G., "Integrated management systems: an examination of the concept and theory" *The TQM Magazine*, vol. 11, pp.95-104, 1999.
- [12] Zutshi, A. and Sohal, A.S., "Integrated management system: the experiences of three Australian organisations" *Journal of Manufacturing Technology Management*, vol. 16, pp.211-232., 2005.
- [13] Hamid, S. R., Chew, B. C., Abdullah, M. A., & Hanafi, Z., "Placing quality management principles into the future context: what's new? Where next?," *Journal of Technology Management and Business*, vol. 1, 2014.
- [14] *Integrated Standards, What is an Integrated Management System? | Integrated Standards*. [Online] Available at: <http://integrated-standards.com/what-is-integrated-management-system>, 2017 [Accessed 11 Feb. 2017].

- [15] Karapetrovic, S. and Jonker, J., "Integration of standardised management systems: searching for a recipe and ingredients," *Total Quality Management & Business Excellence*, vol. 14, pp.451-459, 2003.
- [16] Raisiene, A.G., "Advantages and limitations of integrated management system: the theoretical viewpoint," *Socialines Technologijos*, vol. 1, 2011.
- [17] Almeida, J., Domingues, P. and Sampaio, P., "Different perspectives on management systems integration," *Total Quality Management & Business Excellence*, vol. 25, pp.338-351, 2014.
- [18] Creswell, J. W., *Research design: Qualitative, quantitative, and mixed methods approach*, Sage publications, 2013.
- [19] Patton, M. Q., *Qualitative research and evaluation methods*, 4th ed. United States of America: Sage Publications, Inc., 2014.
- [20] Yin, R.K., *Case study research: Design and methods*, Sage publications, 2013.