Development of an integrated preparation method for the implementation of ISO 9001, ISO 14001 and ISO 45001: A Case Study from Indonesia Automotive Industry

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Abstract

In the globalization era, competition pace among the industry has been becoming faster. This leads in changes on business process of many companies, including companies in Indonesia. High competition in the business world force company to always give the best to the consumer. Implementing international standards for management system becomes a critical step and decision for the companies in order to survive in the competition. This research will find the impact of requirements in the integrated management systems on the company operational performance. The object will be 5 manufacturing companies in Indonesia which have implemented the integrated management system. Literature study is conducted to show requirements shared in the integrated management system and operational performance criteria. Structural Equation Modeling will be used in order to analyze the relationship between requirements stated in three standards of ISO 9001, the ISO 14001, and ISO 45001 with operational performance criteria. The result of this research shall find the best strategies in implementing these systems specifically for Indonesian automotive industries in order to optimize the operational performances.

Keywords
ISO, ISO 9001, ISO 14001, ISO 45001, integrated management system, quality management, environmental management, safety management, analytic network process, automotive industry

1. Introduction
The automotive industry is one of the most complicated sectors (Orsato and Wells 2007; Kannegiesser and Günther 2014). Regardless of the fact that the automotive sector is a critical industrial sector affecting the global economic system's sustainability, car manufacturers' and other companies in the automotive supply network's environmental and social output does not always meet expectation of customer (Koplin et al 2007; Orsato and Wells 2007). Therefore, to enhance competitiveness, it is important for companies to foster a sense of innovation, and to focus on the quality of the products or services provided (Nurcahyo et al 2021), in order to maintain their competitive advantage (Al-Najjar and Jawad 2011).

Global competition encourages manufacturing especially automotive industry to become more competitive on a multidimensional scale (Desai and Prajapati 2017). When producing any kind of product, overall quality and customer satisfaction is very important. This is especially important for complex products such as vehicles. Quality assurance can become more complicated when components and assemblies for the final product are manufactured in different factories around the world. ISO and other standards are the basic rules for companies to continuously measure, evaluate and improve systems that ensure overall product quality and reliability. The first ISO standard was published in 1987 by the International Organization for Standardization based in Geneva, Switzerland (Abraham et al., 2000). ISO standards and the certification process based on these standards, marked the consolidation scenario Quality systems in Europe and the world have decided to work according to the requirements of ISO informs and raises awareness among managers of the significant advantage (Sanz-Calcedo et al 2015). ISO is the abbreviation for The International Organization for Standardization. It is a non-governmental body consisting of more than 160 countries. ISO will provide world-class specifications in various ways. Companies that have been verified by ISO will have the opportunity to win the global market competition because they provide product quality assurance so that consumers

have more confidence in the product. Because, ISO is responsible for developing standards for various industries that promote quality, safety and efficiency.

The company applies integrated management systems methods and approaches as a means to improve performance and business systems in the organization or company itself. Many companies have implemented systems of quality management, environmental and occupational risk prevention to ensure profitability and reliability of its results. The integration of management systems is a goal from companies that have already installed quality management and environmental standards, as well as future management health and safety standards, or from published models (Sanz-Calcedo et al 2015). The implementations of quality management system (ISO 9001), environmental management system (ISO 14001) and health and safety management (ISO 45001) are some strategies in which companies within different countries around the world used to stay competitive (Nunhes, Motta, & de Oliveira, 2016). There is an urgent need to install multiple of these standards, and the integration of these standards is becoming an important competitive decision for enterprises (Savino and Batbaatar, 2015). In addition, implementation and certified management systems share the same philosophy (continuous improvement with the introduction of the PDCA cycle) and the same principles and values (Domingues et al 2016).

Some literatures show that installing the integration system of ISO 9001, ISO 14001, and ISO 45001, also gives some benefits in cost saving and customer satisfaction (Dahlin & Isaksson, 2017). In addition, the benefits that can be obtained by integrating the three systems include simplifying document management and saving time. Implementation of an integrated ISO system in the long term can improve the performance of personnel and organizations. On the other hand, it is also stated that managing these three systems is not a simple job, especially if the company has many management systems that must be implemented. Currently, many industries in Indonesia, especially the automotive industry, already have ISO certifications, including ISO 9001, ISO 14001 and ISO 45001, but they are still not well integrated. Managers struggle with the increasing number of management systems that must be implemented in the companies. Companies will face some difficulties such as lack of human resources and skills, in which can be solved by giving some training for employees about innovation, continuous improvement, safety and risk, and certification process, and also difficulties in models used to implement the integrated management systems (Simon & Douglas, 2013). The need for integration is also due to the potential for problems when the company implements it separately and will place a greater burden on the responsible Manager. So that we need the right main focus in integrating systems that can meet standard requirements, customer needs, government regulations and internal company needs.

2. Literature Review

2.1 Management System

A management system is a framework of processes and procedures used to ensure that an organization can carry out all the tasks required to achieve its objectives (Bolter and Bendel, 2002). This is used to ensure whether the company or organization can meet the standards and carry out their duties to achieve organizational goals. The goals of a company or organization can be in the form of meeting customer quality requirements, complying with regulations both government regulations, state laws or regulations from customers and achieving goals or responsibility to environmental aspects. Therefore, the existing management system in an organization must function properly.

This management system refers to the regulations and standards issued by international agencies and the Government of a country. One of the international organizations that issue management system standards is The International Organization for Standardization (ISO). ISO (International Organization for Standardization) is an international standard setting organization consisting of representatives of national standards organizations from each country Yuri and Nurcahyo 2013). ISO is an organization that is responsible for standards in the Management System and also certifies those standards.

2.2 Quality Management

A management system is a framework of processes and procedures used to ensure that an organization can carry out all the tasks required to achieve its objectives (Bolter and Bendel, 2002). Therefore, the existing management system in an organization must function properly.

Quality management, described in ISO 9000, guides and provides the tool to the companies and organizations to be always with customer's requirements and constantly maintain the good product quality (Maheshwari & Mehta, 2016). With the revision in 2000 of ISO 9001, the focus on customers and continuous improvements became stronger

therefore the organization has to be more oriented towards the product chain in which it operates (Jorgensen, Remmen, & Mellado, 2006). ISO has published a new version of ISO 9001 in the autumn 2015 which focuses on the identification and control of risks, therefore it requires top management to take a more active role in aligning quality policies with business need (Manders, de Vries, & Blind, 2015). This research focus is ISO 9001.

2.3 Environmental Management

Often implemented integrally with quality management system, environmental management system is one of the most widely used standard by industries. Environmental management, described in ISO 14000 series, explain and provide the tools regarding the environmental consideration, besides offering organizations many economic benefits associated with environmental benefits (Neves, Salgado, & Beijo, 2017). Among the series, ISO 14001 is the only auditable standard of Environmental Management System (EMS) which involves regulatory compliance and ideally waste minimization, reduced environmental impact and reduced costs (Maheshwari & Mehta, 2016). By December 2014, 324,148 facilities worldwide had received ISO 14001 certification (ISO, 2015). ISO 14001 also encourages facilities to systematically manage their environmental impacts by requiring them to implement a series of internal management procedures (Arimura, Darnall, Ganguli, & Katayama, 2016).

2.4 Safety Management

Besides the two most often standards used by organizations, safety and risk management have been treated importantly in recent years due to improving productivity and the economic and business status besides reducing the accidents rate (O'Toole, 2002). A safety management system is an integrated mechanism that is designed to control the risks and hazards (Shirouyehzad, Rafiee, & Berjis, 2015). A good safety management system should contain rules, strategies and procedure and confirm internal consistency of the organization (Fernandez-Muniz, Montes-Peon, & Vazquez-Ordas, 2008). This standard is described in ISO 45001. The Occupational Health and Safety Assessment Series 18001 (ISO 45001), which formulated by international certifying bodies based on British Standard 8800 (BS 8800), provides a framework for organizations to put in place proper and effective management of health and safety in the workplace, and also aim at supporting and helping to control the management of risk factors and the promotion of good working conditions (Bevilacqua, Ciarapica, & De Sanctis, 2016).

2.5 Integrated Management System

Since the standards Quality Management (ISO 9001), Environmental Management (ISO 14001) and Occupational Health and Safety (ISO 45001), are three of the most frequently used management systems, the integration of two or three of these standards are frequently used and unification of these three standards is the future of management systems (Dahlin & Isaksson, 2017). Besides, integrated management system (IMS) is very much advantageous as compared to the individual management system, such as it can be handled by inter departmental cross functional team therefore the barriers among them are reduced, the savings in the resources and manpower is evident, and shorter external audit process makes the cost is saved (Jewalikar & Shelke, 2017). Also, the most important common features in terms of concrete approach in designing, implementing and operationalizing the models of quality-environment-occupational health and safety management is to promote the principle of continuous improvement, focusing upon problem prevention, placing the human factor within the center of the design process, implementing and operationalizing each management system (Olaru, Maier, Nicoara, & Maier, 2014).

3. Methods

A. Data Collection

Data will be collected from extracted google review (extracted using WebHarvy Software) from top-six online groceries providers → 1543 reviews.

B. Clustering Analysis

Customer reviews collected in 3.A. will be clustered into satisfaction review and complaints review. The complaints review will be clustered based on the representative feature (Joung et al, 2018).

4. Research Methodology

The first step of the research will be identifying the criteria of operational performances that affected by implementing requirements of integrated management system. Literature study will be conducted in order to specify the criteria. After all criteria are listed, the next step is to obtain primary data. Questionnaire will be spread to 5 manufacturing companies operated in Indonesia. After data has been collected, all factors that will be impacted by these standards

will be analyzed by using ANP. ANP is a new approach in the decision-making process that provides a general framework for treating decisions without making assumptions about the independence of elements at a higher level than elements at lower levels and about the independence of elements in one levels.

5. Conclusion Recommendation

Add numerical results here. Make sure to describe all tables and add inferences (10 font)
The result has shown some impact of three standard certifications on automotive industry. With implementation of these standards, operational performances such as production volume, production efficiency, time efficiency, and waste reduction have been developed positively. The connection between these operational performance criteria and the ISO 9001, ISO 14001, and ISO 45001 criteria is found with ANP analysis, becoming a benefit connection that can be achieved and applied as an optimal operational strategy.

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Biographies

Wirawan Pratama Suwardi is Master Degree student in Industrial Engineering Department, Faculty of Engineering Universitas Indonesia. He holds a Bachelor of Engineering from the Faculty of Engineering, Universitas Pancasila - Jakarta, majoring in Mechanical Engineering in the Energy Conversion specialist program. Previously, he completed his diplomacy program at Universitas Sebelas Maret, Surakarta with a major in Mechanical Engineering, specializing in Production Mechanical Engineering. He currently works in PT Astra Daihatsu Motor as Quality Engineering Senior Staff. His job area are strategy management hoshin control, problem solving analysis, supplier performance control, people development, budget planning and control. With experience as an ISO 9001 auditor on the quality management committee, further development is focused on supplier development and improving the efficiency process of the Slim, Simple and Compact manufacturing process.

Rahmat Nurcahyo is a Professor in Management System, Industrial Engineering Department, Universitas Indonesia. He earned Bachelor in Universitas Indonesia, and Masters in University of New South Wales, Australia, then Doctoral degree in Universitas Indonesia. He has published journals and conference papers. His research interests include management systems, strategic management, maintenance management and business management.