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Reliable and flexible Quality Management Systems in the automotive industry: monitor the context and change effectively

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Abstract

Suppliers have an increasing role in the automotive industry and Quality Management Standards (QMS) are key requirements to ensure a competent supplier network, with properly selected and qualified suppliers.
By surveying IRCA registered auditors concerning ISO 9001:2015 certified organizations, this research highlights the need for the automotive industry OEM and Suppliers to properly monitor the organizational (internal and external) context and identify the key issues that affect the ability of their QMS to deliver quality products, and to plan, design, implement and control change in an effective and timely manner, within the whole supply chain.

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Keywords: Automotive industry, Quality Management Systems; ISO 9001:2015; Organizational context; Change management; improvement performance;

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1. Introduction

The International Organization of Motor Vehicle Manufacturers (OICA) states that 60 million vehicles are built annually, employing about 9 million direct people (5 percent of the world's total manufacturing employment) with an additional 50 million indirect jobs in other related industries [1]. Due to its global footprint, the automotive industry has been a major focus of studies both by academia and media.

This industry is presently confronted with considerable challenges, such as increased competition, more brands, models and complex vehicles, tighter regulatory requirements (e.g., emissions), and the need to manage global supplier networks with shorter development cycles.

To respond to customer demands and to improve business performance, more than 1 million organizations, of all activity sectors worldwide, have implemented ISO 9001 International Standard Quality Management Systems (QMS) [2]. Considering the specific characteristics and challenges of the automotive industry, the sector has relied on ISO 9001 and ISO TS 16949 (to supplement ISO 9001 International Standard requirements), aiming for QMS that provide customer satisfaction while emphasizing defect prevention and the reduction of variation and waste in the supply chain. Within the automotive industry (e.g. ISO TS 16949) there is an additional emphasis on quality tools and techniques, such as product and process FMEA (Failure Mode and Effect Analysis), SPC (Statistical Process Control), MSA (Measurement System Analysis), and the use of APQP (Advanced Product Quality Planning) and PPAP (Production Part Approval Process).

Customers expect their vehicles to be innovative, safe, reliable and have a great performance at a reasonable price, which requires defect-free supply chains for manufacturing, producing and servicing vehicles and supplying replacement parts. However, the increased number of model variants and the extensive use of electronic components involving complex software, combined with time cost pressures, has led to an increase in the number of recalls.

In the US, per the National Highway Traffic and Safety Administration (NHTSA) the number of auto recalls has risen from approximately 24 million in the year 2000 to 64 million in 2014 [3]. Garvin [4] considers that product recalls are a manifestation of poor quality. They are an example of external failure costs and can negatively impact firms' financial and market performance making a solid case for the use of effective QMS in the automotive industry, as supported by Sabbagha et al. [5].

With the purpose of ensuring that ISO 9001 remains actual in a world of increasingly complexity and interconnection, ISO issued the revised ISO 9001:2015, with novel and reinforced approaches [6]. Croft et al. [7] support the view that ISO 9001.2015 does deliver value to the organizations that adopt it. This lead to the development of the revised automotive quality management system standard IATF 16949, by the International Automotive Task Force (IATF) that should be comprehended as a supplement to, and used in conjunction with, ISO 9001:2015 [8]. While ISO 9001:2015 is more focused on the organization and its customers (and relevant interested parties that influence the quality of the organization products), IATF 16949 greater emphasizes the OEM (Original Equipment Manufacturer) and statutory and regulatory requirements, emphasizing defect prevention and the reduction of variation and waste in the supply chain. Following IATF 16949 edition in 2016, certificates to ISO/TS 16949:2009 will no longer be valid after 14th September 2018 [9].

The automotive suppliers' proportion of value added to worldwide automobile manufacture shows a consistent growth, from 56% in 1985 to 82% in 2015 [10]. QMS are a key requirement to ensure a competent supplier network, with properly selected and qualified suppliers [11] aiming for customer satisfaction, lean processes, and defect free products. Due to the highly complex and global automotive industry supply chain, QMS has been a key topic in the study of supply-chain management in the automotive industry [12].

This research goal is to access if, for organizations that have been independently audited against ISO 9001:2015, there is a relationship between the way they identify their external and internal contexts, they change managing processes, and their capacity to effectively improve performance and results.

Considering that ISO 9001:2015 was released in September 2015, its time to access if organizations that properly identify their internal and external contexts, and have high change intensity, show higher improvement performance.

Since the new ISO 9001:2015 QMS International Standard, specifically requires organizations to address the internal and external context and to manage the change processes in a consistent and effective way, a study of the organizations that have already implemented and were independently audited against ISO 9001:2015, was