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A3 method as a powerful tool for searching and implementing green innovations in an industrial company transport

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Abstract

The A3 method is a systematic problem solving and continuous improvement approach, which was first employed at the company Toyota. The paper presents possibilities of using the method for searching and effective implementing green innovations in an industrial company transport. Advantages and potential problems related to the method utilization are identified on the basis of a case study focused on technological innovations in ŠKODA AUTO internal transport.

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1. Introduction

In recent decades, the performance of economic and non-economic activities has required them to be environmentally-friendly. In the field of transport, this proactive approach to addressing and eliminating negative environmental impacts from transport processes is called Green transport. The green transport can be divided into an urban and industrial [1]. The industrial transport is the area having considerable potential within the scope of the implementation of green innovations since it occupies top positions in negative impacts on the environment. The current goals in the area of the industrial green transport are focused on reducing greenhouse gas emissions, especially CO₂ and other exhaust gases.

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The aim of the paper is to analyze possibilities of using the A3 problem solving method for searching and effective implementing green innovations in an industrial company transport. The transport is usually divided into three areas [2]:

1. Inbound – transport from suppliers to producers.
2. Internal – transport inside of the company.
3. Outbound – transport from producers to customers.

Green innovation can be also divided into three areas:

1. Technology – technical innovations of the means of transport, equipment, ICT systems and packages.
2. Management – innovations focused on planning and subsequent execution of transport.
3. Staff – innovations whose motive power is represented by the people and their skills.

Advantages and potential problems related to the method utilization are identified on the basis of a case study focused on the technological innovations in the internal transport of a global automotive company.

2. Literature review

A3 method is a problem solving technique, which refers to the international standard name for the paper size 297×420 mm, 11.69×16.54 in. The method was coined by Toyota to describe the process of getting report-writing down to one page [3]. The A3 method is an effective tool because it contains not only text, but also pictures, diagrams, and charts, all of which enrich and clarify the data [4]. The method is a potentially useful tool for organization-wide continuous improvement [5].

There is a variety of A3 report structures in the scientific literature, but all are based on the Plan-Do-Check-Act (PDCA) cycle, a problem solving technique invented by Shewhart in the 1930s and later adopted by Deming in the 1950s [6]. Typically, the report has left and right sections. Usually, the left sections are related to Plan phase and the right sections to Do-Check-Act phases of the PDCA cycle. The most often, A3 report includes the following sections [5,7]:

1. Background – any pertinent background information that is essential to understanding the extent and importance of the problem.
2. Current condition – a diagram that depicts how the system that produced the problem currently works.
3. Target condition – a diagram of the target condition, i.e. how the system should work in the future.
4. Root cause analysis – an understanding the root cause of the problem symptoms.
5. Implementation plan – the steps that must be accomplished in order to realize the target condition.
6. Follow-up plan – an indication of how and when the author will measure the improvement of the system or the results of a specific test.

On the other hand, Bassuk [6] recommends to use ten sections:

1. Issue – a clear, focused, stand-alone statement that defines the problem.
2. Background – details that cannot be described in the Current Condition drawing and useful baseline metrics.
3. Current condition – a drawing that conveys a complete understanding of the current situation is essential in order to realize what improvements may be necessary.
4. Goal – a quantitative statement that will form the basis for how improvement will be measured.
5. Root cause analysis – carrying out the Five Whys analysis or the Ishikawa (fishbone) diagram.
6. Target condition – a drawing that conveys a complete understanding of what the situation will look like once the improvements have taken hold is placed on this step.

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