Chapter 16
The Impact of Autonomous Vehicles on the Operational Process of the Transportation Industry

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ABSTRACT

This chapter explores the introduction, development, influence, and potential impacts of autonomous heavy-duty vehicles in the Canadian commercial transportation industry. Although still developmental, this technology can change operational processes in a transport organization. The discussion incorporates a framework from government regulatory standards and objectives. It includes academic reviews, journal articles from respected institutions, and editorial sites. The autonomous truck revolution will happen, but it remains unknown when it enters the Canadian trucking industry. The operational management role in this revolution is awareness of ongoing technological advancements. The need for development and adaptation could take years from those initial tests, and many barriers must be overcome. This chapter provides a better understanding of the potential impacts of autonomous vehicles' operational processes and identifies how managers can implement and prepare for the transition.

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1. INTRODUCTION

1.1 Research Background

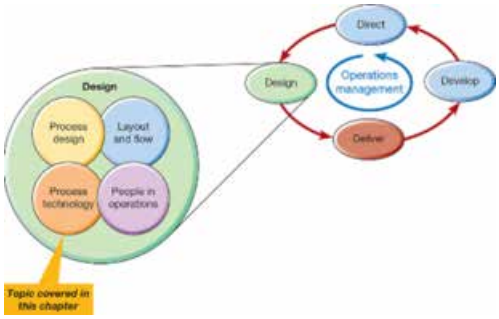
This research explores technology's impact on the Canadian commercial trucking industry. Many technologies, such as electric bicycles, multi-directional elevators, and maglev trains, influence the transportation industry (Crawford, 2020). The business world is being changed to a digital economy and is undergoing a digital transformation at breakneck speed (Taghipour et al., 2021).

This research focused on autonomous vehicles technology introduced or being researched in the commercial transport trucks or Heavy-Duty Vehicles (HDV) industry to focus the study's scope. The research collected opinions and data from academic and public opinion to discuss the following question. what impact will autonomous trucks have on the Canadian commercial transportation industry? The findings provide an overview of industry perspectives on autonomous vehicles in a conceptual review of the industry's views of this technology's impact.

In 1989 trucking in Canada was a $37 billion industry. By 2019, that number grew to accommodate over 134,000 for-hire trucking companies with an operating revenue of $67.8 billion (Statistics Canada, 2021). These transport companies are divided into two groups: One group is companies operating within provincial jurisdiction, and the other is those operating interprovincial. Those operating interprovincial are responsible for following Transport Canada's regulations. For example, Transport Canada mandated using Electronic Logging Devices (ELD) on January 1, 2023 (Transport Canada, 2021a). In addition, in 2021, the Canadian government pledged to reduce harmful carbon emissions by 40 to 45 percent below 2005 levels by 2030" (Environment Conservation and Protection, 2022). These two initiatives will impact the operational management of many industries as they adapt to and change the processes within the operation to follow regulatory and sociocultural trends to maintain a competitive advantage.

Technology has impacted the operational management of the commercial transportation industry. Operations management involves managing services and products provided or created by an organization. Managing an organization's actions can be divided into several different components. For example, direct actions of an organization or daily tasks performed, developing plans to act, delivering or implementing or executing those actions and designing the steps to take actions are often required to remain competitive. Under the designing of those steps falls four other categories: process design, layout and flow, people in operations, and process technology. See Figure 1 (Slack and Brandon-Jones, 2019).

Figure 1. Operations management design



(Slack and Brandon-Jones, 2019)