

## Chapter 36

# An Immersive Tractor Application for Sustainability: A South African Land Reform and Learners' Perspective


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### ABSTRACT

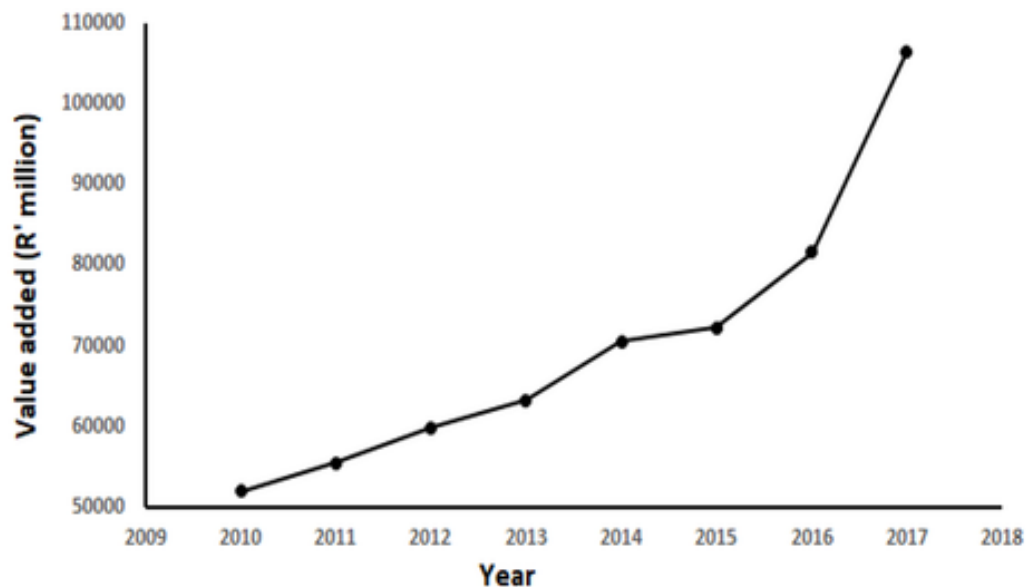
*South Africa is currently addressing the issue of land reform. This research explores how immersive technology could serve as an intervention to avoid unintended consequences in the agricultural industry. This work used participatory design, a stage-based approach, and the SCRUM project management methodology to develop a novel tractor-based immersive technology mobile application. The tractor application developed serves to support novice farmers and learners alike, to learn about and test their skills on tractor components. Three-dimensional modelling software and EON reality software were used to develop the mobile application. Upon completion, the application was tested by experts in this domain of interest and compared to the objectives identified, resulting from land reform as set out by the Department of Agriculture. The tractor application shows promise in promoting Farming 4.0. Moreover, feedback from potential users and experts in this domain confirms the success of the application and interest in future immersive research.*

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## 1. INTRODUCTION

The role of agriculture in a country's economic development cannot be overemphasized. For example, agriculture is a major contributor to South Africa's GDP as seen in Figure 1, where value added from agriculture between 2009 and 2018 is illustrated (Department of Agriculture, 2018). The trend of a GDP has a huge impact on a country's development and indicates whether the economy is expanding by producing more goods and services, or contracting due to less output. Hence, sustaining agricultural production is important for any country. Moreover, the agriculture sector offers great potential for poverty alleviation and job creation, particularly among vulnerable rural communities and urban dwellers with limited job opportunities.

*Figure 1. Value added from agriculture (R' million) between 2009 and 2018*



In South Africa, land reform is currently one of the major topics at the forefront of the National Development Plan (NDP) and Vision 2030 (South African Government. National Development Plan 2030, n.d.). This requires careful intervention to avoid unintended consequences that will impede production in the agricultural industry. Moreover, one of the propositions of the NDP is to ensure sustainable production on transferred land by making sure that human capabilities precede land transfer through incubators, learnerships, mentoring, apprenticeships and accelerated training in agricultural sciences. With the emergence and development of immersive technology, some of the challenges of land reform can be addressed. Immersive technology is an enabling technology that offers smart and sustainable choices on agricultural learnerships, training and productivity (Katsaro, 2017; Zheng and Campbell, 2019). However, limited developments and applications of immersive technology in agriculture is impeding its adoption rate, and consequently the education and productivity of farmers. Hence, this research presents a novel immersive technology solution that affords learners and naive farm workers, with limited access to a physical tractor, to learn and interact with the different exterior and engine components of a tractor.

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