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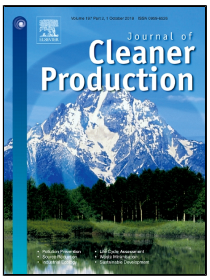

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Determining Factors Driving Sustainable Performance Through the Application of Lean Management Practices in Horticultural Primary Production

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ABSTRACT: This study investigates the determining factors that drive sustainable performance through the application of lean methods in the primary production segment of the horticultural supply chain for apples and pears. The determining factors, identified through a systematic review of the available literature, are thematically synthesized, conceptually framed and utilized for the development of a case study. The single case study approach is utilized to develop a detailed and nuanced understanding of the context, evaluating the practices of 4 cooperative primary producers operating within a forward integrated supply chain. The study posits that the combination of climatic and biophysical dynamism inherent in the primary producer environment, in combination with the inflexibility of seasonal batch production, imposes itself as a key barrier to the imposition of pull and flow in the chain, the fundamental tenets of a lean system. A case is outlined where cold infrastructure is employed to break the inflexibility of supply whilst a process of forward contracting establishes fruit orders up to 1-year in advance, beyond the forthcoming annual cultivation cycle, functionally transforming the system of cultivation from a "push" to a "pull" system of production. It is further highlighted that functional partitioning of the organizational-chain structure is necessary to isolate and mitigate the effects of contextual dynamism, whereby downstream chain structures purposed for agility and responsiveness serve as a protective buffer to lean focused grower operations. The findings reaffirm the positive relationship between the size of the grower operation, the capacitation of the workforce and the ability of the operation to attain superior performance outcomes. However, it is severally highlighted that horizontal cooperation between primary producers may help overcome the resource limitations of smaller growers. Data based decision controls are marked as being a centrally important sustainable performance determinant, both at the level of the grower, in terms of orchard management and harvest process control, as well as at the level of the cooperative serving the needs of crop programming and practice benchmarking processes. This exposition of determining factors driving lean sustainable performance in horticultural primary production represents a new contribution to the body of literature linking lean and sustainable organizational performance. The study should support further development of lean management research and operationalized lean methods within the fruit horticulture subsector as well as the broader agri-food context.

1. Introduction

The global agri-food system faces the challenge of having to increase food production in the context of increasingly limited agricultural productive capacity (Davis et al., 2016; Godfray et al., 2012). Current modes of agricultural production carry with them a significant environmental and social burden which cannot be maintained indefinitely (Foley et al., 2011; Power, 2010; Vitousek, Mooney, Lubchenco, & Melillo, 1997) and if the global agri-food system is to have any hope of keeping pace with the growing demand for food, the means of agricultural production, by necessity, will need to become more sustainable (Davis et al., 2016; Godfray et al., 2012; Tey et al., 2014). Across various manufacturing and services sectors, researchers have explored and established the potential for managerial systems to drive sustainable organizational performance (Chiarini, 2015). Lean methods in particular,