Title Karpography: a generic concept of quality for chain analysis and knowledge transfer in supply chains

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Abstract

As with other areas of science, supply chain analysis suffers from the fact that practitioners of its different component disciplines often find it exchange results and methods of analysis. For fresh produce supply chains a key issue is how to unite the elegant mathematical work on the physiology of quality change with the more qualitative methods of social science that are applied to the analysis supply chain management. This paper explores the possibility of utilising approaches which are widely used in demography to unify concepts of quality modelling and supply chain efficiency in the fresh produce sector. A key feature of demographic (or karpographic) models is that they use the average properties of individuals to model the behaviour of cohorts (or batches) and thus have a direct means of including biological variance within their scope. We illustrate the potential of matrix projecttion models to provide a simple way to unite mathematical analyses of keeping quality and subjective and qualitative analyses of supply chain efficiency. Among other results, the paper demonstrates a rational basis for the assumption, which has been adopted in recent policy changes to the EU food and agriculture policy, that short (or local) supply chains are, ceterus paribus, superior to longer ones. The analytical approach suggested spans the gap between theoretical modelling and knowledge transfer in a single step and requires no more to allow parameterisation than the elicitation of subjective probability estimates from supply chain participants on the transition of produce from one quality class to another.