ABSTRACT

In an era characterised by unprecedented levels of product variety, this thesis investigates how product elimination can serve as a practical and necessary response to product proliferation. When manufacturers expand their product offerings without considering product elimination, operational performance is likely to suffer due to variety and complexity exceeding manageable levels. With a specific focus on process manufacturing, a context rarely examined in the literature, this thesis outlines specific implications of excessive product variety and examines product portfolio management through the lens of product elimination. More specifically, the research sought to answer the following questions: (1) How does product variety impact quality in process manufacturing? (2) What insights can be drawn from the literature on product elimination? and (3) How can process manufacturing companies effectively eliminate products from their portfolios without jeopardising relationships with key customers?

To address these research questions, this thesis offers three empirically grounded studies and one systematic literature review. A case-study research approach was adopted as the primary mode of inquiry to conduct three distinct case studies within the process industry. The findings revealed a negative relationship between product variety and quality. More specifically, the results showed a negative relationship between product quality conformance in manufacturing and product variety, meaning that higher levels of product variety were associated with higher levels of poor-quality products. Moreover, high product variety, particularly the inclusion of low-runner products, directly degraded the quality and accuracy of production data within enterprise resource planning (ERP) systems. This dynamic creates a self-reinforcing negative cycle of operational inefficiencies. The case-study results also revealed that a reduction of product variety did not necessarily have to jeopardise key customer relationships. By adopting a structured, data-driven procedure that explicitly accounted for linked revenue, companies can effectively reduce the size of their portfolios without risking the financial ramifications that can result from strained key-customer relationships. To complement the empirical insights, this thesis includes a systematic literature review that explores the precipitating circumstances that can trigger a product elimination initiative, the variables and models that are typically used to identify candidates for elimination and the implementation strategies that are available to companies once they have made an elimination decision. The research findings are synthesised into catalogues consisting of 31 distinct elimination triggers, 62 decision variables that companies can use in the assessment of products for elimination, 14 decision-making methodologies, four implementation strategies and 13 key factors that influence the execution of product elimination.

The insights offered in this thesis extend beyond academia by offering insights into the relationship between quality and product variety, as well as into potential means of mitigation. Internal and external innovation mechanisms drive manufacturers to introduce new products, which causes product variety to increase incrementally. Without an understanding of the negative effect, managers may unintentionally allow product portfolios to expand beyond what manufacturing and data systems can handle efficiently. Companies seeking to reduce product variety can draw on this research to structure formalised elimination procedures, inform policy decisions and improve both the speed of execution and the success rate of their product elimination initiatives.