The Role of Innovation Processes within Small and Medium-sized
Mechanically-based Firms

Submitted by David Glenn Brophey to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Management, May, 2007

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___________________________________________
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ABSTRACT

The majority of previous research into innovation has taken place within the context of large firms of all types and small firms that are new technology-based firms - for example biotech and software. This thesis addresses a gap in the literature by studying innovation within the traditional sector of small to medium-sized mechanically-based manufacturing firms (MechSMEs), a sector that has been virtually ignored despite its significant economic impact (for example, it accounts for approximately 4% of the labour force within Canada).

In addition, this sector provides a particularly rich setting for the study of innovation. The sector has been found to compete primarily on product differentiation (von Hippel, 1998) without effective intellectual property protections (Taylor, 1973 cited in von Hippel, 1998, p.47) that provide monopolies that can accommodate temporal gaps in innovative activities. Survival in this sector requires ongoing innovation, and given the size of the firms, there is little room for error in their innovation processes.

This research consists of case studies of the practices and processes involved with thirteen innovations (including a mix of product and process innovations) and the overall innovation processes of four surviving firms within two industries. The findings of previous innovation research were used to identify the typological foci for the interviewing of respondents.

In the absence of a dependent variable (a well-accepted definition of innovation or innovativeness) and any consistently-used method to measure innovation success within the respondent firms, an attempt has been made to identify the two most innovative firms. This identification has been based on the assumption that the firms that are more highly influenced by innovation practices and suffer fewer influential barriers to innovation are likely to be more innovative. Based on this determination, the findings indicate that approximately half of these firm’s innovation practices were shared with the other firms, while the other half of the practices were found to be either idiosyncratic or only partially shared. Of particular interest were twelve innovation practices that were particularly influential within the two most innovative firms and shared by both firms. The identification of these practices offers a potential starting
point for a future research project to evaluate their relative contributions to innovation in this and other sectors.

Another important contribution is related to the absence of use of innovation metrics identified in the extant literature by the respondent firms. This absence either provides an opportunity for outside agencies interested in helping MechSMEs become more innovative (i.e. governments) by introducing MechSMEs to these conventional metrics and the connected improvements that would likely follow, or sounds a warning to those agencies designing assistance programmes based on performance metrics that are not commonly used within this operating context.
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