Chapter 75

The Commercialisation of University Engineering Projects:
Entrepreneurship Processes and Practices

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ABSTRACT

The wider context in which technology innovation takes place includes innovation that occurs at various levels within a national innovation network. The national innovation network recognises the role of Universities and other public sector organisations in developing more basic research. However, universities and government agencies may also contribute to more practical technological developments by better utilising students' projects. The focus of this chapter is the commercialisation of university student engineering or design projects including examples of developmental processes and practices in the UK and Malaysia. These highlight the role of universities (staff and resources) in supporting and facilitating entrepreneurship which often necessitates external networking with industry contacts.

INTRODUCTION

The risks are greater for new technology ventures because they have more dimensions of novelty than other new business ventures. The dimensions of novelty for new technology ventures identified by Shepherd et al. (2000) are novelty to the market; novelty in production and novelty to management. A key area of risk is the technical feasibility of producing a commercial product or solution. Feedback from perspective end users may give insights into viewer's perceptions of the functional design of the product and its appearance, however, a more rigorous assessment of the technical feasibility is required in order to convince potential investors (Hart et al. 2003; Cooper, 2008). The proposed product or solution needs to be assessed in terms of the likely performance and functionality against customer requirements which

may depend on the context in which it will be used. Further, product reliability as well as other operating aspects needs to be assessed so that potential customers are able to use the product over a reasonable lifetime (Carbonell-Foulquie et al., 2004).

Product design and development may be undertaken at higher education institutes (HEIs) as well as in industry. This could be as part of the research activities which academic staff and research staff are progressing research projects that may be funded externally (from industry, funding councils or other funding bodies). However, there is also student activity in this area at both undergraduate and postgraduate level particularly for students studying technical courses. Their design and product development work is likely to be as part of a project module which often forms part of the curricula for design or engineering students. These modules tend to be more 'holistic' in nature and typically allow for more independent learning where "project-based learning essentially allows adjusting the rate and the level of learning to the individual according to his/her abilities" (Frank et al., 2003).

The support provided by universities to students undertaking design or engineering projects can be helpful for the student who is trying to formulate their idea or design concept. However, in terms of commercialisation there is often a gap between the support provided during the project process (which tends to be more technically based) and the wider planning for market launch including market understanding; resource and financial analysis as well as IPR protection (Cooper & Kleinschmidt, 2007). A commercial venture requires not only wider planning but also an "entrepreneurial" mind set starting with a clear idea of the marketing concept in terms of the proposed product or solution and its competitive position (Orihata & Watanabe, 2000; Ulrich & Eppinger, 2008). This can be difficult to cultivate from within a university where industry contacts may be limited and hence, there may be a need to "re-locate" a project outside to the relevant sector and expertise.

In this chapter the processes and practices of university design and engineering projects are examined including the potential advantages of these innovation approaches which tend to be more inclusive in nature with design approaches more likely to consider different users given that they are inherently community based with ongoing discussions (Frank et al., 2003). This interactive design approach where designers and developers interact with fellow students and tutors arguably entails a design process that provides some risk reduction. However, conversely the challenges of commercialisation are in some ways greater for these projects since they are not intended for market launch and hence have less focus on aspects such as the competitive situation and financial requirements as well as the societal/human aspects of innovation (Golish et al., 2008).

BACKGROUND ON INNOVATION AND ENTREPRENEURSHIP

This chapter concerns innovation by students within the higher education sector where innovation concerns "the deliberate modification, or transformation, by an organisation of its products/services, processes or structures" (Hislop, 2005, p158). The types of student projects that are the focus of this chapter are technically based ones. High technology innovation is inherently risky due to technology and market factors with increasing risk where both new markets and technologies are involved (Branscomb et al., 2001, p33). To support the development and market launch of an innovative new product firms will need to allocate resources to overcome these areas of risk. Further, promotion of products to the market is also affected by the complexity of a product (Ahearne et al., 2000).

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