

Defining and improving technology transfer business and management processes in university innovation centres

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Abstract

The complex and dynamic behaviour associated with technology transfer business processes combined with the technological risk involved in the participating small firms, has led to a lack of business process definition and improvement in this area. Furthermore, the embryonic firms are highly individualistic with differing needs for assistance and development. There may also be a tendency to provide infrastructure and basic services with an avoidance of business process definition and hence, improvement.

The aim of this paper is to investigate how potential business and management inputs can be used to define and to suggest improvements for two key technology transfer business processes, namely the technology licensing process and the business building process.

A stratified pathway process mapping approach is used. This research approach includes semi-structured interviews with University Innovation Centre small firms, focus groups with Innovation Centre stakeholders and best practice benchmarking.

The findings indicate that a modified processual approach can be adopted to define key business processes within technology transfer. Using this approach it is possible to show where business and management interventions can most effectively be deployed in each process.

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1. Introduction

Technology transfer (TT), relating to the formation of New Technology Based Firms (NTBF) in University Innovation Centres within a wider Science Park infrastructure, consists of a wide and dynamic range of activities. For example, there is idea generation (Rothwell and Segveld, 1982 from Oakey), new knowledge creation (Oakey et al., 1996), spin out and spin in companies (Muent, 1999), technology licensing (Jensen and Thursby, 1998), securing Intellectual property (Agrawal and Henderson, 2002), venture capital and funding (Murray and Marriot, 1998), technology appraisal (Mason and Harrison, 1998) and developing business plans and business growth (Keogh et al., 2001; Erikson and Gjellan, 2003). The activities are often complex, interrelated, interdependent and are characterised by being high risk and extremely dynamic in

comparison to other types of small firm formation and development.

In addition, the TT stakeholders involved come from a range of differing perspectives. The NTBF founder is likely to be a scientist with an overriding interest in technology development with members of the management team being more focused on developing and growing the business (Jones-Evans et al., 1999). The University Innovation centre success measures may conflict with those of venture capitalist and other funders, with differing criteria for return on investment (Laurie, 2001).

The annual HEFCE (1997) survey on “Higher Education-Business Interaction shows that this area is growing rapidly to become the “third leg” of higher education activity. There was a 25% increase in IP disclosures, a 20% rise in patents granted and a 30% increase in spin-out companies over a 12 month period.

Overall, this growth and diversity prompts a number of questions. Are NTBF formations in University Innovation centres so diverse and unique that each company must be

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treated in a unique manner? Is the only commonality the Innovation Centre and Science Park infrastructure? If these questions are answered in the affirmative then those that seek to help NTBF in this context will have an inordinate drain on resources. Moreover, the NTBFs will have totally uncharted futures, adding to the inherent risks.

If some definition and level of business processual clarity can be added, then there exists an opportunity to at least lower the risk to NTBFs by offering generalised progress pathways. Moreover, a more systemic targeting and allocation of business and management resources would lower the burden on the University and Government provisions. There is a paucity of research studies in this area, with many studies investigating business and management activities within this area as distinct from mapping the overall process activity (Evans et al., 2001; Dawson, 1994).

The aim of this paper is to investigate how potential business and management inputs can be used to define and to suggest improvements for two key TT business processes, namely the technology licensing process and the business building process.

2. Embryonic activities and stakeholders within NTBF in university innovation centres

The literature and understanding of TT in relation to NTBFs in University Innovation centres and Science Parks continues to grow rapidly as Universities and Governments see mutual benefits (Cordullo, 1999). Thus, there is a substantive literature in this area relating to economic issues such as the long term economic benefits of Science Parks (Oakey and Mukhter, 1999), the role of the University in the economy through TT (Ferguson, 1995), Government involvement and funding (Westhead and Storey, 1994 from Ferguson) and venture capital funding (Murray and Marriot, 1998). Closely lined to this research are studies, which take a technology perspective to TT (Oakey and Mukhter, 1999). Key research questions in this literature include, how can technology be appraised for funding purposes and is there a method for evaluating technological risk in emerging technologies within NTBFs in University Innovation centres (Mason and Harrison, 1998).

The business and management literature on TT in relation to NTBFs, in University Innovation centres and Science Parks is much less clear (Oakey and Mukhter, 1999; Muent, 1999). There are a number of key reasons. First, academics in Business and Management faculties have been marginalised in the TT process. The emphasis is on bioscientists; informatics and engineering where technology based ideas emerge with the potential for commercialisation (Chiesa and Piccaluga, 1998). Secondly, many scientists and technologists entering the field of TT have an overly simplified view of business and management issues (Brown and Soderstrom, 2002). Thirdly, the need for physical infrastructure and services (i.e. buildings, internet,

heat and light) has obscured the need for more in-depth business and management services and interventions, such as mentoring (Blaydon et al., 1999), which is much needed by NTBFs. Oakey and Mukhter (1999) state that these NTBFs usually have “*poor business skills*” and that “*more training should be provided....to improve the in-house competencies of the founder*”.

Existing literature on business and management in this area, which includes incidental business and management add ons in economics and technology based studies, can be divided into that dealing with key activities in the discourse and that which covers key stakeholders (Blaydon et al., 1999).

Some of the key activities referred to, and arranged in an approximate sequential and concurrent order, are technological idea generation, technology appraisal, venture capital funding and funding in general, spin outs, spin ins, technology licensing, joint ventures and business building and growth (Siegal et al., 2002; Jensen and Thursby, 1998). The overriding emphasis on technology and science is the *raison d'être* of TT, however, this approach has led to some of the above activities being “*reified*” in the unquestionable nature of rationale science and the assumption that NTBFs will emerge and grow in the Science Park infrastructure. Alvesson and Willmott (1996) indicate that this approach limits in depth critique, development and the infusion of business and management dimensions.

Key stakeholders in the discourse are discussed by Evans et al. (2001). They focus on the need to balance the “*differing objectives of the various stakeholders*” and refer to the stakeholders as including Universities, Councils and Government agencies, from a sponsoring perspective. These groups may have different needs based on local, national and international needs (Oakey et al., 1996). Other key stakeholders from a more operational perspective are identified as technology based academics who originate the ideas (Danson, 1996), management teams to enable growth (Atherton and hannon, 1999) and technology assessors to add credibility to funding applications (Mason and Harrison, 1998). The literature also refers to a range of supportive bodies such as knowledge clubs and Inter Organisational Relationships (IORs—Oakey and Mukhter, 1999; Maniukiewicz et al., 1999) in which NTBFs can also act as brokers of knowledge for each other in spreading knowledge (Hargadon and Sutton, 1997).

It is suggested that the development of these literatures have reached a stage where some form of integration in relation to both activities and stakeholders can be achieved. This integration is needed to facilitate “*best practice*” benchmarking studies. Mashari and Zairi (1999) suggest that a processual approach is useful in clarifying and transferring “*best practice*” approaches. The possibility of using process management approaches for “*best practice*” in NRBF development in University Innovation centres and Science parks is further discussed as follows.

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