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## **Editorial**

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### Ross Barnard and John Kapeleris

There is an ongoing debate about what constitutes an appropriate method for research into technology transfer. The history of research has demonstrated that it is best to bury prejudices and not to ignore insights that can emerge from unconventional approaches (Simonton, 2004). Technology transfer is a complex process. One approach to understand a complex process is to deconstruct it into simpler elements and then to consider factors that may influence the behaviour and the relationships between the elements. Another approach is to investigate the experiences of the participants in the process, to extract points of common experience and to identify novel factors. The approaches should not be viewed as mutually exclusive; indeed, case studies can be used as a prelude to quantitative studies because they allow the identification of unexpected features in the landscape of the field of investigation. The culmination should be the 'triangulation' of insights from both approaches and, hopefully, the incorporation of the lessons into a strategy for improving technology transfer.

This issue of *International Journal Technology Transfer and Commercialisation* (IJTTC) contains examples from the spectrum of approaches to the investigation and description of technology transfer—from holistic to reductionist.

The paper by Barnard and colleagues leads off at the theoretical and reductionist end of the spectrum and provides a radical approach to modelling social networks. The paper is based on the premise that the transmission of information between individuals in a social network is a prerequisite for technology transfer. The model captures the inherent variability of interactions between individuals over time and in different *dimensions* of information. The paper introduces the idea of a multidimensional information space (a concept that descends from the analytical method of Lotman (1977)) that is sampled and distorted by social networks.

Of course, enhancing the flow of information within organisations and tapping into the 'information space' that exists around an organisation increases the opportunity for an organisation to absorb new ideas. However, these do not guarantee that new ideas will be integrated into production or management practices. Indeed, Whangthomkum and colleagues, firmly grounded in the realities of the packaging industry, focus their research lens on the connection between absorptive capacity and the *integration* of new ideas and new technologies into company *procedures* and *products*. Although grounded in the hard-edged realities of a competitive industry, their work shares a common thread with the theoretical work of the first paper in this issue, as it involves deconstruction of absorptive capacity and technology transfer into multiple dimensions. By this means the authors have facilitated a systematic and revealing analysis of the two concepts and their relationship, which has been often assumed but not proved.

Steenhuis and colleagues discover that the strategy development process in NSF science and technology centres is considerably more heterogeneous than previously thought. They suggest that this presents an opportunity for systematic analysis because the NSF programmes can be viewed as 'natural experiments', where the levels of intervention and guidance and, in the longer term, outcomes, can be compared between different models.

In a similar approach, Yencken and Gillin cast a critical eye over support mechanisms for 'spin-offs' in Australia and emphasise the need for the adequate nurture of new ventures to a sufficient level of maturity before they are 'spun-out' of their parent research institution.

Plewa and Quester consider the motivation of individuals to engage in technology transfer. The sense of pleasure and accomplishment when working with the industry appears to act as a significant driving force for research groups' approach towards a university – industry relationship. In a similar vein, Fulop and Martin consider the motivations of scientists and academics to become involved in the commercialisation of their work. However, they do so in the context of examining the internal structure of start-ups. They pinpoint some key characteristics of an entrepreneurial scientist. There are certain characteristics and attributes that a person should have to be able to champion and drive a start-up. These characteristics and attributes might not be teachable. These include the following: energy and enthusiasm, entrepreneurialism, leadership qualities and willingness to make personal sacrifices. Clearly, not all people have the ability to successfully create a start-up. Fulop and Martin emphasise that a careful analysis of capabilities, competencies, as well as short- and long-term goals of both the technology and the people, need to be conducted before a decision is taken to start up a new biotechnology company. Start-ups should be built around a sound management team and a serious intention to develop and expand the business. They should not be started for the sake of generating a start-up statistic for the parent organisation.

Millen and Hine take a case study approach and present the novel technology management strategies adopted by an innovative biotechnology start-up company in Australia as a possible paradigm for similar ventures. Shih and colleagues focus their investigative lens on the young but rapidly expanding biotechnology sector in Taiwan. They used preliminary case studies to develop a questionnaire-based approach to identify and rank the factors that contributed to the success or failure of technology transfers managed by the office of technology transfer at Academia Sinica. Some of the findings are region specific, particularly those in relation to technology transfer dealings with China. However, there are lessons to be learnt (especially in relation to intellectual property and licensee-licensor communication) by those engaging in technology transfer in other countries whose technology sectors are undergoing rapid expansion and who could use Shih's study to avoid the pitfalls.

In conclusion the critical role of relationships and communication between individuals, within a supporting institutional framework, emerges from this selection of papers. It is clear that the construction of environments conducive to technology transfer requires "out of the box" thinking, a focus on communication between individuals and an awareness of the intellectual property and licensing fundamentals. We trust that some of these constructions will be informed by the content of this special issue.

**References**

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