

A PILOT STUDY ON THE ROLE OF TRUST IN UNIVERSITY-INDUSTRY RESEARCH COLLABORATIONS IN THE BIOTECHNOLOGY SECTOR IN AUSTRALIA

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ABSTRACT

This paper describes management of university-industry (U-I) collaborations that underpin science-based industry sectors such as biotechnology. It describes a quantitative/qualitative method called Multi-criteria Mapping (MCM) in a pilot study designed to capture perspectives of U-I collaboration participants. The methodology taps into the interplay of personal and institutional trust in the dynamics of collaborations as they progress through their many stages to closure. Participants found MCM helpful in furthering their understanding of the collaborations they were discussing. Research questions underpinning this study relate to perceptions of trust in the management of U-I collaborations in the biotechnology area in Australia.

INTRODUCTION

U-I collaborations emerged in the second half of last century as key forces in the economy, particularly in the science-based industries. Science-based industries are those that are reliant on science, as compared with industries that make discretionary use of science as a source of innovation and competitive advantage [1]. Biotechnology is an example of the former. Firms in science-based industries are unlikely to invest in the necessary in-house laboratory infrastructure resources and human capital to explore, for example, the endless possibilities of research and product/process development arising from the human and other genome projects. Thus, U-I collaborations allow the single firm to grow beyond the limitations of its resource boundaries [2].

U-I collaborators have different cultural profiles, contribute different resources and pursue different objectives [3]. U-I collaborations are multi-party in that they involve both organisations and individuals. In the case of individuals, there are also different players, such as legal and commercial, involved at different phases of the collaboration. Additionally, there are several stages from commencement to close of the collaboration [4]. Trust in such circumstances is seen to be a dynamic phenomenon that takes on a different character in the early, developing and mature stages of the relationship [5], impacting on the behaviour and interaction of individuals and structure and governance of the collaboration..

Effective management of U-I collaborations is clearly a desirable outcome for both parties. Our purpose is to understand why management of U-I collaborations is challenging. Which criteria do the participants in a U-I collaboration perceive to be important and how does the importance of these criteria vary with the level of formality taken by the collaboration? We seek to understand why and how U-I collaborations continue to perform sub-optimally, and suggest how the collaborating parties might more successfully meet their

respective expectations. At this pilot stage, only collaborations arising from biotechnology are included and these are within Australia to remove any confounding country and cultural effects.

METHODOLOGY

We use two methods in this pilot study to obtain quantitative and qualitative data and information. A structured survey administered by the investigators determined demographics and experience levels, including attitudes to U-I collaboration via a semantic differentiation analysis. Then a technique derived from multi-criteria analysis method called ‘multi-criteria mapping’ (MCM) [6] was used to record key areas of difference and convergence of the stakeholder groups with respect to criteria that they chose. Participants undertake five steps with MCM: (a) review options; (b) define criteria (c) assess scores (d) assign weights; and (e) review ranks. To support and facilitate the mapping, a software program called Multi-Criteria Mapper (*MC Mapper*) was used.

Two representatives of each of four stakeholder groups (university life science researchers who interact with biotechnology companies, researchers in biotechnology companies who interact with university researchers, university commercialisation managers or administrators, and industry contract managers) took part in the pilot study. The individuals were invited to participate on the basis of their established positions or experience in U-I collaborations.

RESULTS

As a pilot study it is only possible to highlight some summary measures from participants. For instance, one industry participant’s low and high probabilities percentages for four U-I collaboration models under eight criteria are shown in Table 1 with the relative weighting provided by the participant to each criterion.

TABLE 1

CORE OPTIONS	Participant's Criteria & Weighting	Cost		Time to completion		Probability of meeting expectations		Level of legal interference		Level of administrative interference		Control over the results		Ability to deal one on one with the researcher		Reporting	
		21.05	7.02	5.26	12.28	17.54	19.29	14.03	3.51								
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
U-I collaboration informal	50	80	30	80	40	70	50	90	60	90	30	90	90	100	20	100	
U-I collaboration formal	30	60	40	70	40	80	20	50	50	80	50	60	30	90	60	90	
Employment - no collaboration	40	50	50	80	60	80	70	90	90	100	50	100	90	100	60	90	
Facility - no collaboration	50	80	70	90	70	90	40	70	60	80	80	100	90	100	90	100	
U-I grants	40	90	20	70	30	90	10	50	20	70	50	65	30	90	60	90	
University consultants used by industry	60	70	60	90	70	90	80	100	90	100	70	90	90	100	60	90	

Overall, industry participants, whether administrators or researchers, ranked more highly strategies for U-I collaboration options where they believed they would have greater control over the relationship with the university. Avoidance of university bureaucracy, protection of intellectual property rights and value for money were key comments. Thus, facility hire, employment of the university researcher and informal collaboration scored ahead of formal collaborations involving broader contractual rights for the university. University administrators commented on the need to have a contract, control of intellectual property for the university and money from industry. University researchers were most opposed to options that would inhibit their creative independence but would gladly collaborate with industry where it provided cash to their laboratory over which they had substantial discretionary spending.

DISCUSSION

MCM is ideally suited to utilising multiple voices from universities and industry in helping to identify the contributing dimensions of U-I collaboration. Use of the qualitative recording features of software such as *MC Mapper* allows us to recognise the wide variety of perspectives essential to understanding complex situations. With MCM, the computer-assisted structuring process helps the investigators convert the variety of perspectives on U-I collaborations, as they have been identified by participants, into a comprehensive portrayal of the problem situation. It promotes participant learning that is derived from their own life experiences, which in turn greatly facilitates participants' understanding of the social interactions in which they are involved.

It is too soon to make generalisations from the results but there are some common threads worth investigating further. For instance, all respondents have alluded to U-I cultural differences and it could be assumed that these differences are the drivers for the respondents' choice of criteria in the MCM interviews. The criteria defined by the participants for ranking the possible types of U-I collaborations and the weightings given to those criteria suggest that in the case of the pilot study participants, trust had not been established in the collaborations in which they acquired their experiences and attitudes.

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