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A view from the coal face: UK research student perceptions of successful and unsuccessful collaborative projects

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Abstract

Studies of the effectiveness of collaborative research partnerships between industrial and academic institutions rarely focus on understanding success as perceived by those involved in the research activities. We explore the extent to which three classes of potential success factor are correlated with perceived collaborative research success; supervisor characteristics, project management characteristics, and communication characteristics. Findings are based on a questionnaire-based survey of 348 doctoral students supported by the UK Research Councils' Engineering Doctorate (EngD) and Co-operative Awards in Science & Engineering (CASE) schemes. Conclusions describe how the experience of collaboration as a process influences and how successful students consider the collaboration to be for themselves and the collaborating institutions.

Keywords: Collaborative research; Research students; Perceptions of success; CASE; EngD

1. Introduction

Contemporary approaches to knowledge and wealth generation stress the benefits of collaboration between disparate intellectual, professional, and sectoral actors (both individual and institutional). Accrued advantages from such collaboration include increasing the absorptive capacity of industrial sectors (Cohen and Levinthal, 1989) and improvements to the yield of company R&D activities (Zucker and Darby, 2000).

The industrial and commercial sectors have long recognised the value of such boundary spanning partnerships but more recently governance agencies have introduced specific funding and promotional schemes to encourage and facilitate research partnerships between universities and commercial or public sector organisations. Many of these involve the provision of funding from third parties; facilitating a range of types of research partnership varying in duration, intensity, and level of financial and other resources required to underpin them (AURIL, 1997). Indeed, non-academic institutions have been shown to be highly effective at exploiting the variety of available collaboration initiatives sponsored by government to accomplish a range of business and strategic objectives (Santoro and Chakrabarti, 2002). The university sector has also been pro-active in this regard, initiating thematic or disciplinary collaboration programmes and courting potential industrial partners through networking and marketing activities. For example, many universities have established industrial liaison offices to facilitate contacts with industry, in particular small and medium sized companies. The role that the various collaboration schemes have in stimulating or

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impeding relations between industry and academia was recently highlighted in a benchmarking study (Polt et al., 2001; OECD, 2002).

In the UK, the policy context is of fundamental importance to industry–science linkages (OECD, 2002). Significant emphasis on support for industry–academia collaboration can be traced back to the early 1990s as a result of a government White Paper on the UK's science and technology policy (HMSO, 1993) which set out policies designed to encourage closer contact and exchanges between the science and engineering base and industry. Consequently, UK innovation policies reflect a theoretical understanding of the innovation process at a particular time. Thus, some of the more established policies that encourage universities to commercialise their research reflect an older, linear model (characterised by a uni-directional transfer of knowledge from science to society) whereas recent initiatives take into account a more contemporary 'network' model where knowledge is seen to flow in many directions through a web of nodes and connections (Stewart, 1999).

Based on the assumption that there is a significant cultural divide between universities and (in particular craft-based) commercial companies, the UK government has concentrated on policies aimed at helping the two sides communicate more effectively by using people as 'agents of change' (Stewart, 1999). Examples of such 'people based partnership' schemes include the Teaching Company Scheme (now called Knowledge Transfer Partnerships), the Co-operative Awards in Science and Engineering (CASE), Engineering Doctorates (EngD), and Faraday Partnerships. These schemes facilitate knowledge flows between parties and therefore reflect the network model noted above. Recent comment on these initiatives (e.g. Lambert, 2003) has emphasised both the significance of knowledge exchange as part of the collaboration dividend, and the important role-played by research students in realising the benefits of cooperation.

Such new modes of knowledge creation and dissemination (*sensu* Gibbons et al., 1994) demand new modes of appraisal and evaluation. Consequently, research funders, researchers, and research exploiters have sought to identify practical and robust metrics which can be used to evaluate the level and effectiveness of university–industry relationships. Increasingly detailed measures (many based on statistical analysis of outputs) have been developed and large-scale surveys have been carried out, providing useful evidence of the continuing increase in and changing nature of university–industry interactions (e.g. Howells et al., 1998; OECD, 2002). These studies do not however represent the entire picture as they fail to map (for example) informal relationships, knowledge flows ('tacit' benefits) and the intellectual nature of relationships between industrialists and academics.

Empirical studies evaluating the effectiveness of (specifically) industry–academia collaborations have tended to focus on issues of technology transfer (Siegel et al., 2003), knowledge transfer (Etzkowitz and Leydesdorff, 1997) the role of social networks (Davidson and Lamb, 2000), organizational factors (Mora-Valentin et al., 2004) and the promotion of collaboration within certain countries or regions (Nelson, 1993; Inzelt, 2004). More recently, attention has also focused on complementarities between expectations and the experience of collaboration (Tan et al., 2004). The field is also typified by studies of narrowly defined fields of research or technology (often via case studies), which consider the contribution of university research to knowledge production and studies which focus on specific objectives of interaction (particularly commercialisation activities) (Schartinger et al., 2002). Because of the wide range of collaboration types and outputs from these activities, it is perhaps understandable that no single metric is fully able to capture the whole range of benefits which accrue from industry–academia collaborations.

The reasons that many companies collaborate with universities are a lot broader than just the development of well defined new products. Access to a wider range of ideas, facilities, expertise and know how are all desirable features of collaborative endeavours. As knowledge transfer from universities to industry is a lot more complex than the undertaking of individual projects with specific results in mind, measurement of the outcome of such relationships is consequently problematic. The way the effectiveness of an industry–academia relationship is measured therefore depends on how 'success' or 'efficiency' is defined either by the investigating team or by the participants involved in collaboration (industrialists, academics and government), and on the type of relationship being observed. Measures of success which rely on tangible products can generate an incomplete picture of achievement and fail to capture many (experiential) outcomes which may influence future collaboration intents or behaviour. The challenges faced by those seeking empirically derived evidence of collaboration success in this field have been highlighted many times. The authors of the benchmarking project mentioned above (Polt et al., 2001) committed a good deal of space to expounding the difficulties of evaluating and measuring the effectiveness and efficiency of the various linkages between society and science for knowledge exchange and therefore innovation. Others have drawn