

Institution: University of Bolton

Unit of assessment: 36

a. Context

The research activity described in this submission arises from activity undertaken in the area of business, management, and technology concerned with supporting SMEs largely within the North West Region of England. The activity was supported by European Regional Development Funding, the regional Development Agency and included some funding from Government Research Councils and took place between the years 2001 to 2009. The net outcome was direct support to 94 SMEs in the region resulting in the creation of 31 jobs and the generation of £4.9m income for the companies involved. This research and ranged from business assists through to feasibility studies which in many cases created the foundation for research projects and in some cases publications.

Importantly the work generated a model of collaborative working with industry based on the provision of support through research studentships, KTP's and directly funded research projects. As a result the research activity which now exists is more internationally focussed than research oriented. Whilst creating wealth for the economy in terms of jobs created and increased sales and turnover for those organisations involved the team have also focussed on the social dimension relating to new ways of working, for example, as a result of new ICT platforms and data management techniques. The activities which have arisen and either form the focus of this submission and or the platform for ongoing research can be summarised as follows:

- a. The establishment of a European Doctoral programme with the University of South Westphalia in Germany – to date this has produced over 15 PhD students jointly supervised by research staff in Germany and the UK. All of the projects concerned have focussed on industrial support either with industrial organisations or Government agencies. The work has resulted in a number of publications some of which are included in this submission.
- b. The establishment of a portfolio of KTP programmes with 5 companies resulting in £1.4m of increased sales and the creation of 12 new jobs. These outputs can be quantified by reference to the final reports submitted and the following evaluation by the KTP directorate. Reference to these reports can be found at the bottom of this page.
- c. The establishment of an African Doctoral programme currently operating in Malawi and planned to operate out of Zambia in 2014. The programme currently supports 24 PhD students 6 of which are expected to submit a thesis within the next 6 months. This particular project represents an important step in consolidating future potential impact in terms of increased economic growth, the creation of new jobs and most significantly social and environmental change for the people of those countries involved. As an example current projects are involved with
 - I. the management and sustainability of safe clean drinking water;
 - II. the development of defence and security systems on behalf of the nations armed forces;
 - III. knowledge management within the telecommunications industries;

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- IV. public sector procurement and the avoidance of corruption;
- V. organisational culture and international human resource management in international schools and public organisation;
- VI. use of bio-fuels for energy sustainability;
- VII. cultural and change management with health sector organisations

An underlying and generic theme within these projects has been the application of systems thinking and information technologies to facilitate problem solving and bring about high impact change.

b. Approach to impact

Much of the previous work referred to as forming the foundation for this work has spanned both technology and social systems research. An underlying theme has arisen from a systems thinking approach where our focus has been on holistic problem solving as opposed to narrow specific research. Within this context we have looked at solving widely focussed problems which have involved a range of research themes using information technology, data collection methods, and problem solving techniques to create solutions which have high impact socially and economically. In consequence our research portfolio is wide and varied and involves a range of techniques which in some Universities would be narrowly focussed research disciplines in their own right. In essence the focus has been on solving industrial, commercial or social problems with the research discipline being of secondary importance. It is testimony to the staff involved to have been able to focus their expertise and bring to bear, what are specific tools and techniques, to solve wide ranging economic and social problems. Examples include, systems modelling, simulation techniques, logistics modelling, optimisation techniques, and other technology based solutions for research into economic and social problems.

Our approach has, therefore, been based on working with partners to find problems and using our research skills to develop technological based solutions which span a number of discipline areas. This has been the strategy behind the development of our KTP portfolio and our international PhD programmes which have focussed on working with partners to quantify their problems and to develop unique cutting edge solutions.

c. Strategy and plans

The University encourages world class innovative research in collaboration with industry, commerce, public sector organisations and leading academic institutions, aiming at advanced and sustainable technological solutions to economic and social problems. This is in line with the University's commitment to deliver research-informed educational programmes which are professionally focussed and which address the needs of students and the society.

The University is committed to support knowledge transfer through proactive engagement with collaborative organisations at home and overseas. Funding from our knowledge transfer activity and our international collaborations support staff activity in a climate where traditional research funding is being increasingly difficult to obtain, particularly where research activity is so widely focussed as in our particular case.

The university's off campus division which supports collaborations both nationally and

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internationally focuses on developing partnerships which transcend the straightforward delivery of educational programmes by incorporating enterprise, research, and technology transfer into its partnerships. We currently have international partnerships in Germany, Malawi, Zambia, Vietnam, Malaysia, China, India, and Botswana. We have initially focussed our research activity with partners in Germany and Malawi where undergraduate and postgraduate taught programmes are also delivered. It is our intention to expand this model into other countries where taught programmes are also delivered. The strategy is to ensure that both University and partner staff have the research ethos and work in a problem solving environment which will add value and engender the applications focus of our taught research programmes. Our doctoral programmes currently operated in Germany and Malawi form the model for that development with the intention that longer term all off-campus programmes will have the requirement to collaborate with us in our research activity. The strategy is that an international network of research oriented staff will develop and deliver our taught programmes and will provide a focus for problem solving research within their local communities.

d. Relationship to case studies

The case studies presented demonstrate how we have developed our problem solving research strategy to bring about economic and social change. Case Study 1 which is largely concerned with supporting SMEs in the UK forms the basis for our problem solving approach which we are now using with our international partners. Whilst KTP funding is not feasible within the countries with which we are working, the support we get from companies and Government organisations within those countries provides an equivalent problem solving base which leads research which has the capability of generating economic and social outputs which contribute to economic growth and wellbeing within those countries. Case Study 2 details the impact of the OMLETTE project which encompasses the work of the Institute of Educational Cybernetics and its systems approach to improvements in interoperability systems and standards, at the heart of work on business improvement lies a fundamental reliance on technology, using web mashups and other technology fixes solutions deep seated problems in organisations can be redressed at a systemic level.