

Impact case study (REF3b)

Institution:	University of Northumbria at Newcastle
Unit of Assessment:	19 - Business and Management Studies
Title of case study: The impact of systems integration research on business improvement: the creation of a strategic management information database	
<p>1. Summary of the impact</p> <p>Building on research in integrated information systems and their impact on organisational culture, Newcastle Business School (NBS), via a two-year Knowledge Transfer Partnership (KTP 8193), assisted Inpipe Products (IPP) to increase its operational efficiency and turnover. IPP is a world leading company in the design, manufacture, supply and rental of pipeline maintenance equipment for the global oil and gas industry. The KTP explored and developed the cultural environment for successful implementation of an integrated information system. The result for the company is improved operational efficiency, with the processing time for products from sales to engineered drawings reduced from five hours to 15 minutes, a reduction in late deliveries due to better information on product specification and a 14% reduction in rejected products. Product sales turnover has increased from £5.5 million to £6 million per year.</p>	
<p>2. Underpinning research</p> <p>This case study captures the research of Waring (Senior Lecturer 1990-1999 and Professor 2007-date) developed during two distinct periods working at Northumbria University. The first of these covers the period 1990-1999 when, working as a Senior Lecturer, her research focused on developing innovative socio-technical approaches to computer based systems integration within the context of medium sized healthcare organisations. The second dates from her return to Northumbria as a Professor in 2007 when the emphasis of her research shifted to exploring the impact on organisations of changing culture within a systems integration environment.</p> <p>Researchers at the Business School have a history of working with SMEs on business improvement that dates back to the work of the Centre for Business Excellence (CBE) (1998-2004). In addition to Waring, members included - amongst others - Yarrow (1989-2004, Principal Lecturer); O’Kane (1999-2007, Principal Lecturer) and Wainwright (1987-1997 and 2002-date, Principal Lecturer and Professor respectively). The Centre established research partnerships that led to a number of key research insights and publications. These insights included best practice in particular aspects of business process management as well as the need to adopt a more socio-technical approach when acquiring new technological innovations. Partner organisations included London Business School (collaborator was Professor Chris Voss), the Confederation of British Industry and the consultancy company Comparison International Ltd. Existing academic research in the field had centred mainly on large organisations, thus the work of the Centre advanced knowledge specifically in relation to organisational benchmarking, strategic planning and information systems within SMEs.</p> <p>Early in 2000 the work of the CBE was re-focused with greater emphasis on Waring’s work on information systems research (e.g. Waring and Wainwright, 2000). A major area of research was the work on integrated information systems developed by Waring and Wainwright (2002). This seminal piece made a significant contribution to our knowledge, developing a theoretical framework to support the implementation of integrated information systems informed by critical social theory and presenting empirical evidence to support the use of critical social theory in practice.</p> <p>Waring’s integrated systems research was built upon by O’Kane who pursued a more technical focus based upon simulation techniques to inform a KTP undertaken in collaboration with PSI Global Ltd (KTP 005690). The objective of this project was to design and simulate new working practices which would enable better use of company resources and lead to a reduced time to market for new products. The project developed new simulation models which had the potential to be used in other contexts, and a number of publications emerged that allowed dissemination of the research and the impact created within PSI at academic conferences and in journal articles.</p>	

Impact case study (REF3b)

The most recent research by Waring that was fundamental to the success of this impact case study (Waring and Skoumpopoulou, 2012 a,b,c) (Skoumpopoulou, 2008-date, Senior Lecturer) has focused on the cultural aspects of Enterprise Resource Planning implementation. This research was informed by earlier work on integrated systems carried out within the context of the NHS (Waring and Wainwright, 2000; Waring and Wainwright, 2002). In the case of this SME impact study, research aimed to investigate the changing nature of organisational culture during the two years that the KTP was running. By undertaking a cultural analysis of the organisation at the start of the research we were able to advise the company on cultural issues during the change process as well as map the emergence of the cultural change over the research period.

More recently the research on systems integration has been extended into the context of the NHS through South Tyneside Foundation Trust (2011 to date). Here Waring has been working on the implementation of an integrated patient flow and bed management system. The work has used action research to explore cultural issues around the use of new systems by professional bodies and has involved many organisational stakeholders. Some of this work has been published (Waring et al., 2013) but will be developed further in future publications.

The research undertaken by the CBE and Waring, in particular, has underpinned an early and continuing strategic emphasis on KTPs as one of the pathways to impact. The key findings from this work that informed this KTP were:

- the need to involve stakeholders in any change process;
- socio-technical methods of doing this that are underpinned by critical social theory;
- Approaches to cultural analysis within the context of systems integration.

3. References to the research

Waring T.S., Alexander, M. and Casey, R. (2013) 'Bringing about innovative change: The case of a patient flow management system in an NHS Trust. Grand Successes and Failures' in *IT private and public sector. IFIP Advances in information and communication technology*. Divedi, Y., Henriksen, H.Z., Wastell, D and de Gross (Eds.). DOI: 10.1007/978-3-642-38862-0_11.

Waring T.S. and Skoumpopoulou, D. (2012a) 'Emergent Cultural Change: Unintended Consequences of a Strategic Information Technology Services Implementation in a United Kingdom University', *Studies in Higher Education*, 39(4), pp1-17.
<http://dx.doi.org/10.1080/03075079.2011.625495>

Waring T.S. and Skoumpopoulou, D. (2012b) 'Through the Kaleidoscope: Perspectives on Cultural Change within an Integrated Information Systems Environment', *International Journal of Information Management*, 32, pp513-522. <http://dx.doi.org/10.1016/j.ijinfomgt.2012.04.007>

Waring T.S. and Skoumpopoulou, D. (2012c) 'An Enterprise Resource Planning System Innovation and its influence on organisational culture'. *Prometheus*, 30(4), pp427-447. DOI: 10.1080/08109028.2012.754572.

Waring, T.S. and Wainwright, D.W. (2002) 'Communicating the Complexity of Computer-Integrated Operations: An Innovative use of Process Modelling in a North East Hospital Trust', *International Journal of Operations and Production Management*, 22(4), pp394-411.
<http://dx.doi.org/10.1108/01443570210420403>

Waring T.S. and Wainwright D.W. (2000) 'Interpreting integration with respect to Information Systems in Organisations - Image, Theory and Reality'. *Journal of Information Technology*, 15, pp131-148. 2000. DOI: 10.1080/026839600344320. Available at: <http://www.palgrave-journals.com/jit/journal/v15/n2/abs/1990116a.html>

Research Grant

KTP Grant 8193 between Northumbria University (Newcastle Business School) and Inpipe

Impact case study (REF3b)

Products, funded by the Technology Strategy Board. October 2010 to October 2012.
Total project budget = £121,197 (Inpipe Products contributed £39,996).
PI Professor Teresa Waring, Company supervisor was Shari Thompson (IPP).

4. Details of the impact

SMEs have traditionally found it difficult to access universities and research. Working between October 2010 and October 2012 with IPP, a company that specialises in process cleaning for the oil and gas industry, the KTP project brought to the organisation resources which it otherwise would not have been able to access, including a KTP Associate and two academics.

The underpinning research on integrated information systems provided research insights in terms of best practice and informed the company on issues which may have led to prior failures. Examples included: a culture which encouraged individualism at the expense of the company, inefficient business processes and islands of technology that in some cases were not being used but were costing the company money. The project addressed these issues and delivered in two key areas: (a) improvements in business process management and (b) implementation of a strategic management information system. Inpipe's Business Development Manager stated in the final KTP report to the TSB: *"The KTP project has exceeded expectations... The support of the university staff has been invaluable in achieving the outcomes....Culturally we are a more open, transparent organization in terms of decision-making."* (Source 1 and 3, p4-6).

The original aim of the IPP KTP was to redesign the business processes and information systems in order to provide strategic management information to support future growth and development within IPP. Following this redesign, the company would purchase an enterprise resource planning system (ERP) and the academics would lead on its implementation. However, early on in the project the company began to experience serious financial challenges due to the global recession. Throughout this period the academics and company continued to work together but cash flow issues in IPP prevented the company from purchasing an ERP and the project plan had to be amended. The result was the development of a bespoke integrated system enabling data flows from order, through to design and then production; increased participation of key stakeholders; and training and development of staff in the new business processes and computerised system.

Improvements in Business Process Management

Waring, together with the academic supervisor and KTP associate conducted a major analysis of the processes ranging from customer enquiry through to design, production and despatch. The new system delivered the following impacts (Source 1):

- £60,000 per annum saving through removing duplication of effort leading to a 25% reduction in sales staff achieved through natural wastage. This allowed for recruitment of three additional staff, one each in marketing, production and quality management.
- £24,000 per annum saving on an expired software lease in the design department.
- £9,000 per annum saving on licence fees for unneeded IT support package.

Implementation of a Strategic Management Information System

By extensive and detailed modelling of products' dimensions, volumes, raw material costs and profit margins, the team worked on developing accurate business information, particularly around the company's most significant export product range; foam pigs and bi-directional pigs (pigs are products that are used to remove detritus from building up on the inside of oil and gas pipelines). This delivered the following impacts (Source 1):

- Embedding of knowledge within IPP through the employment of the KTP Associate and the training and development of a number of their staff. Time for processing sales of the bi-directional(Bi-di) pigs has been reduced by 50%.
- Implementation of improved processes and systematic working with standardised product information and engineering drawing packs reducing processing time for the foam pigs from five hours to 15 minutes, representing a saving of £118.75 per order without loss of quality.
- Reduction in errors by 14%. For the bi-di pigs alone, this is a saving of £146,106 worth of (previously) rejected products each year. This is a direct result of improvements to processes and information flows, validation and accessibility of information, and rejected

Impact case study (REF3b)

products at inspection stage.

- Associated improvement in delivery times: In June 2012, 71% of the bi-di pig orders were delivered late. By September 2012, this was down to 40%. This reduced financial penalties related to late order deliveries, saving £3,240 per year

In addition to the above, the project team have left the company with a bespoke strategic decision support system which facilitates real time integration of data from customer order to design and production as well as producing management information reports to support the strategic operations of the company. This is now in operation within IPP.

The Regional KTP advisor stated at a regional KTP event held at Northumbria University on 13 September, 2013: *“The support given to Inpipe Products by Teresa Waring and the academic supervisor... in extremely difficult company circumstances over the two years that the KTP ran was exceptional. The experience of these individuals in terms of their research and ability to work with company partners through the vehicle of a KTP has impacted on the company by delivering bespoke integration of systems and has helped to underpin growth in sales. They have also helped improve organizational culture, quality and remove wastage that may not have been discovered without the KTP.”* (Source 2).

The company KTP supervisor (the Business Development Manager), who herself had been a former KTP Associate, was very positive about the impact KTPs have on organisations and their value in helping to improve the productivity of SMEs: *“My experience of KTPs as an associate and as a company supervisor within IPP has been fantastic. Working with the Northumbria team on this project has allowed me to use their expertise and research knowledge to take the company forward in terms of increased sales, reduction in re-work and waste and to facilitate a change in company culture. I will be able to take the knowledge I have gained into other similar projects in other companies.”* (Source 4).

The impacts from this project have also been transferred into the NHS:

“We have conducted research with Teresa Waring and colleagues and it has helped us greatly. We have not had a great track record in implementing new systems or realising the benefits from them. The approach that has been taken on the bed management project has brought to light many issues and has made us aware of the impact of action research and academic theory. The new system rolled out onto the medical wards was a great success and we have rolled it out onto the surgical wards. To date the research project has saved the Trust £400,000 through our management of patient flow and not needing to open a ‘winter overflow ward’ from December 2012 to February 2013.” (Source 5).

5. Sources to corroborate the impact

1. The company Managing Director from International Pipeline Products Ltd. can be contacted to provide evidence to corroborate impacts for the organisation.
2. The project was rated ‘good’ by the Technology Strategy Board. This can be verified by contacting the Regional KTP advisor in the North East of England.
3. Final KTP Report for partnership 8193, approved by the Technology Strategy Board, can be provided by Research and Business Services at Northumbria University.
4. The company KTP supervisor (2010-2012) at International Pipeline Products Ltd. can be contacted with regard to the success of the KTP.
5. The Director of Information Services, South Tyneside Hospital Foundation Trust can be contacted to provide evidence that the KTP has also benefitted the NHS.