Bournemouth University

Applications of knowledge transfer to small and medium-sized businesses

2008 edition

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Knowledge Transfer Partnerships
Applications of Knowledge Transfer to Small and Medium-Sized Businesses
2008 edition

This publication is for the purpose of training, education and dissemination.

Contents

Acknowledgements

Terminology used in this publication

Company Partner: Company, Charity or Social Enterprise.

Knowledge Base Partner: Bournemouth University.

KTP Associate: Graduate employed by the Knowledge Transfer Partnership.

Editorial

The primary delivery mechanism for Knowledge Transfer (KT) activities within BU remains the Knowledge Transfer Partnshership (KTP). KTP is Europe's leading programme for helping businesses to improve their competitiveness and productivity through the better use of the knowledge, technology and skills within the UK knowledge base (www. ktponline.org.uk). KTP brings together a company and a university that work together on a collaborative project of between 18 and 36 months duration. A recent graduate (KTP Associate) is employed by the University to undertake project work, with academic supervision of approximately half day per week. Projects must be of strategic importance to the Company and academically challenging for the University.

Since 1984, Bournemouth University has successfully delivered 75 KTP/TCS projects, which represents almost £8,000,000 of enterprise funding, and 87 graduates working in industry to undertake applied research projects.

A review of 43 recently completed Bournemouth University KTP projects indicated that the following significant benefits had been achieved:

- 32 postgraduate qualifications
- 53 journal/conference publications
- 33 graduate level jobs in industry
- £5.7M increase in Company profits

Each chapter within this volume is a case study based upon a KTP project completed during 2007 and clearly describes the initial objectives, process undertaken and benefits obtained from the Knowledge Transfer.

Professor Jim Roach and Dr Martyn Polkinghorne (Editors).

1. A Practical Example of System Integration

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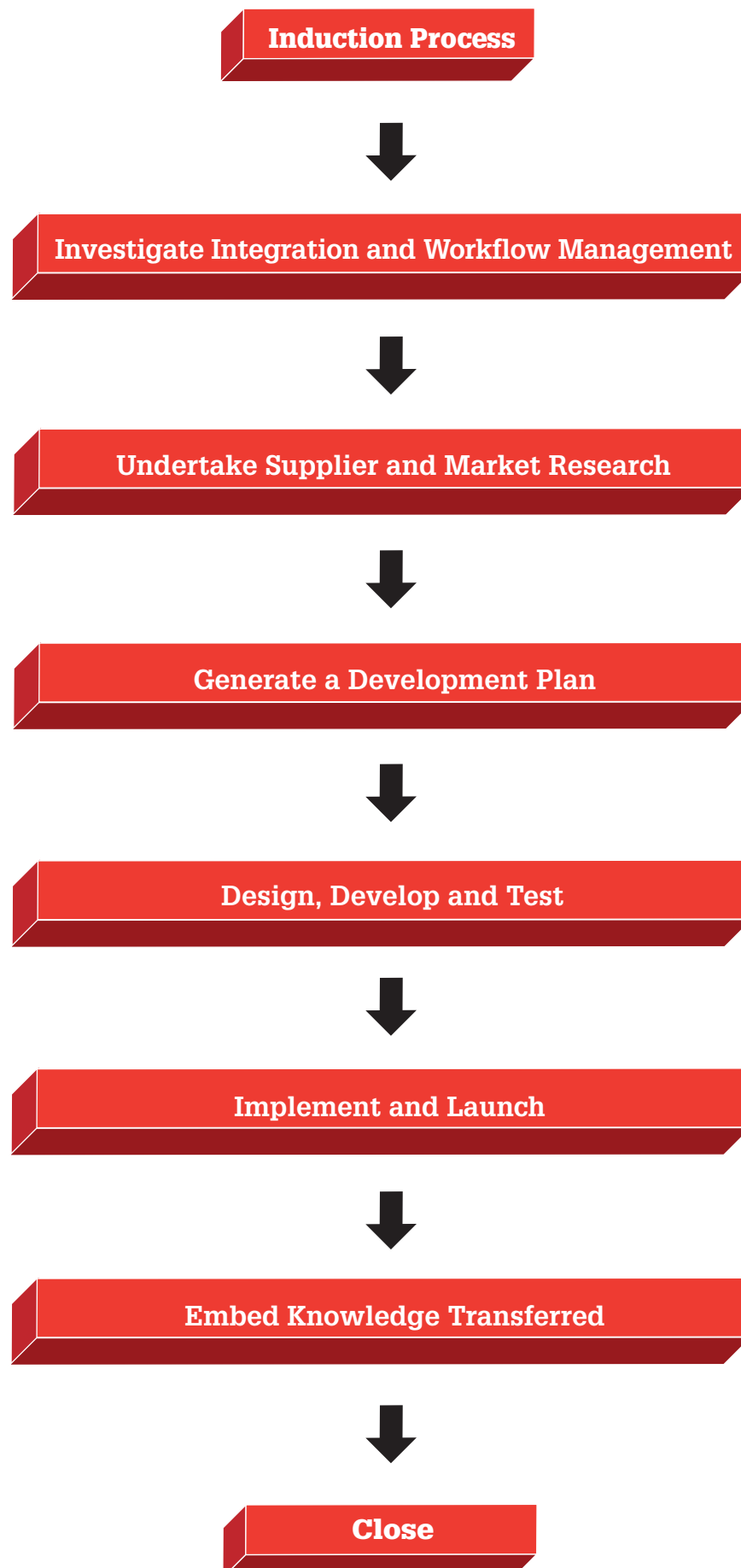Bournemouth University
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1.1   Introduction

1.1.1   This case study is based upon a Knowledge Transfer Partnership (KTP). The aim of the KTP was to implement Business Integration and Workflow Management procedures internally within a Company Partner, and to extend their Electronic Document Management systems by building upon enabling technologies.

1.1.2   The Company Partner was in the business of supplying and supporting office machinery and Electronic Document Management systems.

1.1.3   The Company Partner recognised the opportunity for introducing advanced business and ICT skills in order to use a model-based approach in the design of value-added Electronic Document Management software applications.

1.1.4   Furthermore, the Company identified that if it was to implement best-practice Business Integration and Workflow Management Procedures, it would enable it to respond more quickly and efficiently to customers' requests for business consultancy.

1.1.5   The ability to provide additional technical support would allow the company access to a market that would include all organisations that use and store paper, and that use electronic documentation, ie. a wide range of organisations from UK based micro-companies, right through to multi-nationals.

1.2   The Process of Knowledge Transfer

1.2.1   An investigation was undertaken into the Company's existing customers to determine their profiles, and to analyse use of their existing Electronic Document Management products.

1.2.2   Research was undertaken into the latest best practice, and a complete strategic overview undertaken of the internal procedures required to implement Business Integration and Workflow Management.

1.2.3   Reports were extracted from the Company's information system. These reports increased management visibility of business data, and so enabled more informed decision-making. In order to develop these reports, reverse-engineering part of the database was required.

1.2.4   Visits to the Company Partner's clients were undertaken to discuss requirements for bespoke software functions.

1.2.5   The project also investigated other proprietary packages associated with document management and process management.

1.2.6   It was quickly identified that the primary task would be the successful development of a 'Generic Connector' that would enable documents to be scanned in and transferred (with controlling metadata) to a document control application running on a PC.

1.2.7   The system was developed so that it would be customisable enabling the screens on the Multi-Functional Device (MFD), controlling the entry of the information associated with the scanning of each type of document, to reflect user needs.

1.2.8   The system included an error-checking capability. which could also be configured, with any invalid inputs being reported. The system could process both single-sheet and multiple-page documents.

Figure 1: Knowledge Transfer Process Utilised

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                    Induction Process
                          ↓
       Investigate Integration and Workflow Management
                          ↓
          Undertake Supplier and Market Research
                          ↓
              Generate a Development Plan
                          ↓
                Design, Develop and Test
                          ↓
                 Implement and Launch
                          ↓
                Embed Knowledge Transferred
                          ↓
                        Close
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1.2.9   A 'Quick Connector' solution was then developed which could be edited and configured with minimal effort/skill, and that would allow scanning of a document into a folder (together with associated metadata) in such a manner that it could be understood by a wide range of other software applications.

1.2.10   In addition, a 'Mailshot System' was developed which consolidated email addresses from several sources and removed duplicates. Analysis of other possible applications were undertaken, including a remote meter reading system for MFDs, and the integration of third-party floor-plan software.

1.3   Benefits to the Knowledge Base Partner

1.3.1   The Academic Team gained valuable expertise in a number of key areas including the practical application of business integration and workflow management, and methods for overcoming the implementational difficulties that can occur.

1.3.2   Working on this KTP has provided the Academic Team with commercial exposure which will be reflected in future curriculum development. This will have a long-term impact upon teaching, and provide materials for practical case study examples that can be used to demonstrate the outputs and outcomes that can be achieved in real applications of business integration and workflow management.

1.3.3   Material from this project is also to be used as teaching aids when discussing and demonstrating the issues related to model-based design of architectures for system integration.

1.3.4   The Knowledge Base Partner has promoted the use of material developed to support this KTP project in additional case studies, including taught units on computing and electronics.

1.3.5   The results of this KTP project will feed into the postgraduate research to be undertaken by the Knowledge Base Partner into the effectiveness of Knowledge Transfer Partnerships working with local small and medium-sized businesses.

1.3.6   This project has developed foreground Intellectual Property (IP) with commercial potential.

1.3.7   The Company Partner intends to continue to exploit this IP for commercial benefit.

1.3.8   The IP agreement established at the start of the project allows for a percentage of this commercial benefit to be returned to the Knowledge Base Partner in recognition of its role in developing the foreground IP, and its provision of background IP.

1.4   Benefits to the Company Partner

1.4.1   Participating in this Knowledge Transfer Partnership improved the Company's operations through the development of software products that created the platform from which they could expand into new market sectors.

1.4.2   The Company Partner gained an improved understanding of how to develop bespoke document control applications.

1.4.3   The project has also led to culture change within the Company, ie. they started to embrace the importance and potential of IT solutions and applications.

1.4.4   As a result of this KTP, the Company Partner invested heavily in the provision of a wide range of IT services.

1.4.5   This included the formation of a new company that was to become the focus of the Company Partner's activities in this sector.

1.4.6   As the Company Partner continues to exploit the new products created, the KTP will have a significant impact upon the Company Partner's future financial position leading to increased competitiveness, profile, market security and profitability.

1.4.7   Through the Knowledge Transfer process, the Company Partner now has the new products that will ensure that their improved competitive position is sustainable in the long-term.

1.4.8   Their ability to develop subsequent versions of the new products will also ensure an effective long-term legacy from the KTP is established.

1.5   Conclusions

1.5.1   The project developed mechanisms that provided increased management visibility of business data. This had a positive effect on both their current market position, and also potential future market opportunities.

1.5.2   In addition to gaining an understanding of the benefits to be gained from working in partnership with a Knowledge Base organisation, the Company Partner also gained an understanding of the potential advantages of employing graduates to undertake specialist activities within a business environment.

1.5.3   As part of the knowledge transfer process, the Company Partner now has the ability to manage, modify and manipulate the new products developed. This will enable the Company Partner to maintain its performance in the future to ensure that the new products remain competitive.

1.5.4   The Company and the Knowledge Base Partners have worked well together on this project and both partners anticipate that opportunities will arise for future collaborations. Such collaborations are likely to be in the form of placement students, consultancy work and/or an enterprise activity.

1.5.5   Further investment will be required by the Company to achieve commercial exploitation of the products developed by this KTP, so that the true benefits can be fully achieved.

1.6   References

1.6.1   Knowledge Transfer Partnership Proposal – Reference 1097, DTI, 2005

1.6.2   Knowledge Transfer Partnership Final Report – Reference1097, DTI, 2007

2. Developing Technology to Improve Safety in Nursing and Care Homes

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2.1   Introduction

2.1.1   This case study is based upon a Knowledge Transfer Partnership (KTP) with the objective to develop a Personal Attack and Locator System for use in Nursing and Care Homes.

2.1.2   The Personal Attack and Locator System was to be aimed at organisations where staff work alone in remote or secure areas, and/or face potential attack from intruders/residents, and/or those who care for vulnerable patients/residents.

2.1.3   The Company Partner already undertook the assembly and sales of a Nurse Call System, consisting of up to ten modules.

2.1.4   It was identified that a market opportunity existed to develop a mobile Personal Attack and Locator System consisting of transmitting and receiving modules (Personnel Module, Door Receiver Module, Location Receiver Module and Activator Module) that would enable the customer to build a flexible system utilising a combination of these modules.

2.1.5   The system would be developed in response to both customer demand, and emerging legislation which is expected to decree the need for a complete solution to personal privacy and protection in multiple environments such as nursing homes, hospitals, schools and for lone workers.

2.2   The Process of Knowledge Transfer

2.2.1   A market survey was undertaken to establish user requirements and demand.

2.2.2   A review was undertaken into existing technologies and technical data relevant to this KTP.

2.2.3   Thorough research was then undertaken to investigate existing applications and competitors.

2.2.4   After detailed specification, a prototype system was designed and developed to prove theory and functionality. The prototype system would undertake the continuous monitoring of residents, and the monitoring of people leaving or entering pre-defined areas.

2.2.5   Automatic door locking was considered, together with pager alerts based upon resident's identification, location and activity.

2.2.6   The final product specification was developed for the complete system based upon the results of the market research.

2.2.7   Development was initiated for various separate modules that would be utilised to support the full system.

2.2.8   Both mains and battery operated Activator systems were completed and tested. Each Activator being an electronic device that contained unique location identification.

2.2.9   Personal electronic devices were developed and tested that also carried a unique person identification. These devices (called TAGs) were used to indicate people's visits and movements within the field of each Activator.

2.2.10   An automatic door locking was designed and tested. The locks could be used to close down an area where problems were detected to stop people leaving the area. Alarms would also activate should an unauthorised person pass through a door.

Figure 2: Knowledge Transfer Process Utilised

Induction Process

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Research and Analyse Market Opportunities

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Investigate Potential Technological Solutions

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Design and Develop New Product

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Test and Validate New Product

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Implement and Launch New Product

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Embed Knowledge Transferred

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Close

2.2.11   Call logging application software was utilised that would enable the information from the door guards, personal devices and activator sensors to be collated and processed to provide an audit trail of events, and also up-to-the minute information regarding current activities.

2.3   Benefits to the Knowledge Base Partner

2.3.1   The results of this KTP were integrated within the Knowledge Base Partner's research in the areas of computing and electronics.

2.3.2   The KTP was also a source of information, data and understanding that will enhance future research undertaken by the Knowledge Base Partner, and will stimulate academic discovery that would otherwise not have occurred.

2.3.3   Working on this KTP provided the Academic Team with commercial exposure that has since been reflected in curriculum development.

2.3.4   This also had an impact upon teaching, and provided material for practical case study examples that were used to demonstrate the outputs and outcomes that could be achieved in real applications.

2.3.5   The Knowledge Base Partner promoted the use of material developed to support this KTP programme in additional case studies including taught units on computing and electronics.

2.3.6   This KTP proved to be a good lesson in how priorities in a Company Partner sometimes have to change based upon external factors beyond the control of the KTP itself.

2.3.7   Experience and knowledge was gained which was distilled to help the Knowledge Base Partner develop effective processes to support the development and conduct of new programmes, placing greater emphasis on teaching case studies, research opportunities, and publications.

2.3.8   The results of this KTP project were used to support postgraduate research undertaken by the Knowledge Base Partner into the effectiveness of Knowledge Transfer programmes working with local businesses.

2.3.9   Although the Associate did not register for a higher degree during the KTP itself due to the intensive nature of the project, it was intended that the Associate would register for an MPhil on a part-time basis after completion of the KTP, and with support and supervision from the Knowledge Base Partner.

2.3.10 The Company and the Knowledge Base Partners worked well together on this project and both anticipated that opportunities would arise for future collaborations.

2.3.11 Such collaborations are most likely to be in the form of placement students, consultancy work and/or further enterprise partnerships.

2.4   Benefits to the Company Partner

2.4.1   This Knowledge Transfer Partnership has improved the Company's operations through the development of core modules that could form the basis for a new product, which would secure their current market share and provide a platform from which they could expand into new market sectors.

2.4.2   From the work undertaken as part of this KTP, the Company Partner gained new knowledge and capabilities in several distinct areas including an understanding of the applicability of Fuzzy Logic, Radio Frequency Identification and Triangulation techniques to the design of their products.

2.4.3   This new knowledge will enable the Company to increase their future research and development activities in future product lines.

2.4.4   Improved communications engineering knowledge also enabled the company to further develop the new product range, and will support the design of any subsequent upgrades required.

2.4.5   The embedded understanding of using Ultra Wideband (UWB) on future products and systems will further enhance this future design and development potential, and will assist the Company to maintain product performance ensuring that it remains competitive as technologies advance, thereby ensuring an effective long-term legacy from the project is established.

2.4.6   As direct outputs from the KTP, new product modules and systems were developed that could be used in a modular basis, or combined into a single system offering complete Personal Attack and Locator System for use in Nursing and Care Homes and other similar organisations.

2.5   Conclusions

2.5.1   The KTP project has proven to be a valuable tool in assisting the Company Partner to research and develop a new product that has significant market potential.

2.5.2   The Company Partner is now in a position to continue development work, and to both take this new product to market, and also to modify it in the future to ensure that it remains competitive.

2.5.3   It is therefore envisaged that as a direct result of the work undertaken as part of this KTP, both Company turnover and profitability will be increased.

2.5.4   The KTP developed foreground IP and the Company Partner intends to exploit this IP for commercial benefit.

2.6   References

2.6.1   Knowledge Transfer Partnership Proposal – Reference 0641, DTI, 2004

2.6.2   Knowledge Transfer Partnership Final Report – Reference 0641, DTI, 2007

3. Developing a System to Capture Patient Meal Orders

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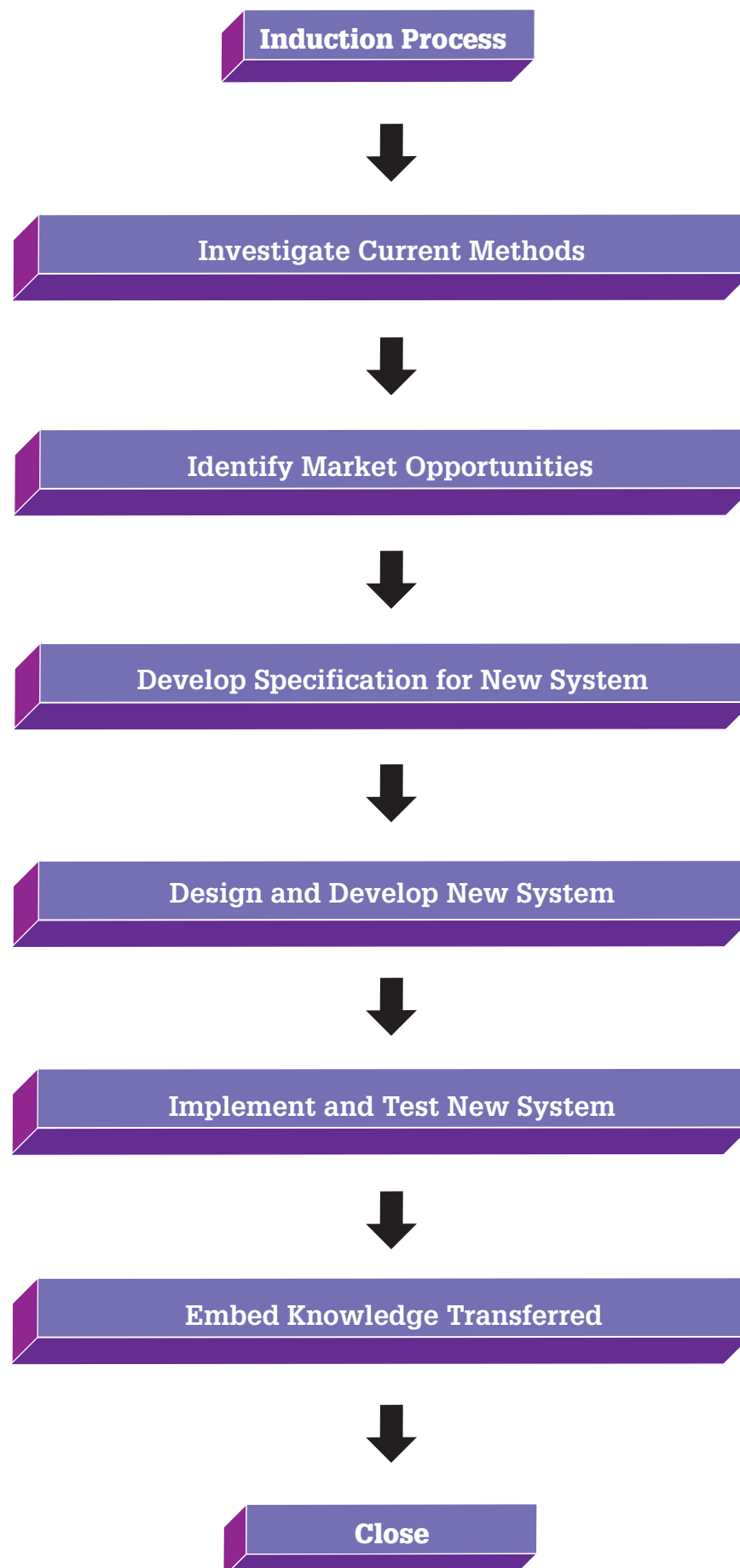Bournemouth University
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3.1   Introduction

3.1.1   The objective of this KTP programme was to design and develop a system to capture patient meal orders at the hospital bedside using mobile computing devices, and to transmit those orders to a hospital's catering department.

3.1.2   The Company Partner supply management information software systems for catering and retail outlets. These solutions include patient food ordering for the NHS.

3.1.3   Reports from the Better Hospital Food Initiative, the Audit Commission, and the Patient Charter encouraged the Company Partner to recognise the commercial, and political, pressures for improving their existing system to provide one that would address the need for hospitals to reduce food wastage, while also providing improved patient care.

3.1.4   Such a system would need to be compatible with existing hospital equipment and provide mobile data input functionality within wards, to enable hospital staff to enter data at the patient's bedside. Food and patient data would be stored in a central database.

3.1.5   There was no other known product providing on-ward ordering in this way at the time, and it was recognised that the resulting system would provide increased sales in the Company Partner's core market, together with the opportunity to diversify into other hospitality markets.

3.2   The Process of Knowledge Transfer

3.2.1   The knowledge transfer process was commenced by examining the current methods of processing patient meal orders, and then identifying key market opportunities within the sector.

3.2.2   A specification was developed for an on-ward meal ordering system which was designed in principle, and simulated using software to ensure functionality.

3.2.3   Both the back and front office aspects for the system were then developed.

3.2.4   Knowledge transferred to the Company Partner included expertise in architectural approaches to developing systems, improved communications engineering knowledge and an understanding of the optimisation methods for real time functions.

3.2.5   Live trials were undertaken using beta versions of the new product to determine operational performance and functionality.

3.2.6   Further system refinements were then undertaken to address minor issues, and the final version was ready for launch.

3.2.7   The required system was designed and developed as planned and is now being implemented in UK hospitals on a commercial basis.

3.2.8   The KTP Associate joined the Company Partner at the end of this project and has continued the work of implementing this new product to ensure that the benefits for the Company Partner are fully exploited.

Figure 3: Knowledge Transfer Process Utilised

Induction Process

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Investigate Current Methods

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Identify Market Opportunities

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Develop Specification for New System

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Design and Develop New System

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Implement and Test New System

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Embed Knowledge Transferred

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Close

3.3 Benefits to the Knowledge Base Partner

3.3.1   The Academic Team gained valuable expertise in a number of key areas, including the practical application of computer networking and electronic/communications technologies.

3.3.2   This experience had a significant impact upon teaching, and provided the materials for both publications, and also a practical case study that demonstrated the outputs and outcomes that can be achieved from real applications.

3.3.3   The results of this KTP have been used to support the Knowledge Base Partner's research in the areas of Communications, Computer Networking, Multi-service Networking and Multimedia Communications.

3.3.4   It was not considered appropriate to support this KTP with students during the lifetime of the KTP due to the small size of the company, and the sensitive nature of the work. However, there is every intention of the Knowledge Base Partner supporting the company with placements students in the future.

3.3.5   This KTP programme has created opportunities for research and consultancy collaborations between the Company and the University partners. For example, the Knowledge Base Partner was able to observe 'future user' trials which provided multi-disciplinary research benefits into the effectiveness of this type of product in an end-user environment.

3.3.6   Working on this KTP brought other very useful practical experience into the University. This experience will be reflected in future teaching and research activities and other case study material will be developed as appropriate.

3.3.7   The Knowledge Base Partner developed a PR case study and exhibition stand based upon this KTP to use it as an example of best practice to promote the University's Knowledge Transfer agenda.

3.4 Benefits to the Company Partner

3.4.1   The KTP has provided the Company Partner with the new product that it required to consolidate its position in the NHS market, and to enable it to open up a new market of approximately 200 private UK hospitals. The Company Partner has already secured potential sales for the new product.

3.4.2   The expected increase in annual net profit resulting from this intervention in new markets is of major significance in the context of the Company Partner being a small company.

3.4.3   The Company will continue to increase its market penetration by exploiting the new product developed within the new market sectors that it has opened up, and by finding alternative applications for the technology in diverse markets and sectors.

3.4.4   As such, the KTP will make a significant impact on the Company Partner's current and future financial position in the form of:

- Increased competitiveness
- Increased profile

- Increased market security
- Increased profitability

- Increased market share
- Increased turnover

3.4.5   The KTP has developed foreground IP with commercial potential. The Company Partner intends to exploit this IP for commercial benefit.

3.4.6   The IP agreement established at the start of the KTP allows for a percentage of this commercial benefit to be returned to the Knowledge Base Partner in recognition of its role in developing the foreground IP and its provision of background IP.

3.4.7   Through the Knowledge Transfer process, the Company Partner now also has the ability to manage, manipulate and modify their new product in the future to ensure that their improved competitive position is sustainable in the long-term.

3.4.8   The Company Partner now has the ability to develop subsequent versions of the new product to ensure an effective legacy from the KTP is established.

3.5   Conclusions

3.5.1   This KTP has successfully designed and developed a new product that will improve patient meal ordering within UK hospitals.

3.5.2   For the Company Partner, the new product will ensure its improved competitive position is sustainable in the long term.

3.5.3   Following successful trials in several hospitals, the new product is now available for widespread implementation across both private and NHS sectors.

3.5.4   The KTP was extremely successful and the new product developed will enhance the experience for hospital patients; also importantly, it should reduce waste from unwanted food.

3.5.5   Subsequent to the completion of the KTP, further investment was required from the Company Partner to continue the implementation and commercial exploitation of the product developed.

3.5.6   The Company Partner employed a graduate from the Knowledge Base Partner to complete the remaining tasks and to undertake product implementation.

3.5.7   Transfer of knowledge has been achieved to ensure that the benefits of this successful KTP are fully embedded within the Company Partner.

3.5.8   The Company Partner intends to exploit the IP developed by this KTP for commercial benefit which it will be shared with the Knowledge Base Partner.

3.5.9   The KTP has proven to be a good lesson in how to realise and maximise benefits for all partners.

3.5.10   The experience and knowledge gained has resulted in more effective processes for the development and conduct of new enterprise programmes.

3.5.11   The Knowledge Base Partner has established a new high-quality relationship with the Company, and the healthcare sector will benefit from a genuinely effective new product that will have a positive impact upon the quality of experience for patients.

3.6   References

3.6.1   Knowledge Transfer Partnership Proposal – Reference 0171, SEEDA, 2003

3.6.2   Knowledge Transfer Partnership Final Report – Reference 0171, SEEDA, 2007

4. Developing the Tools to Enable Business Growth and Development

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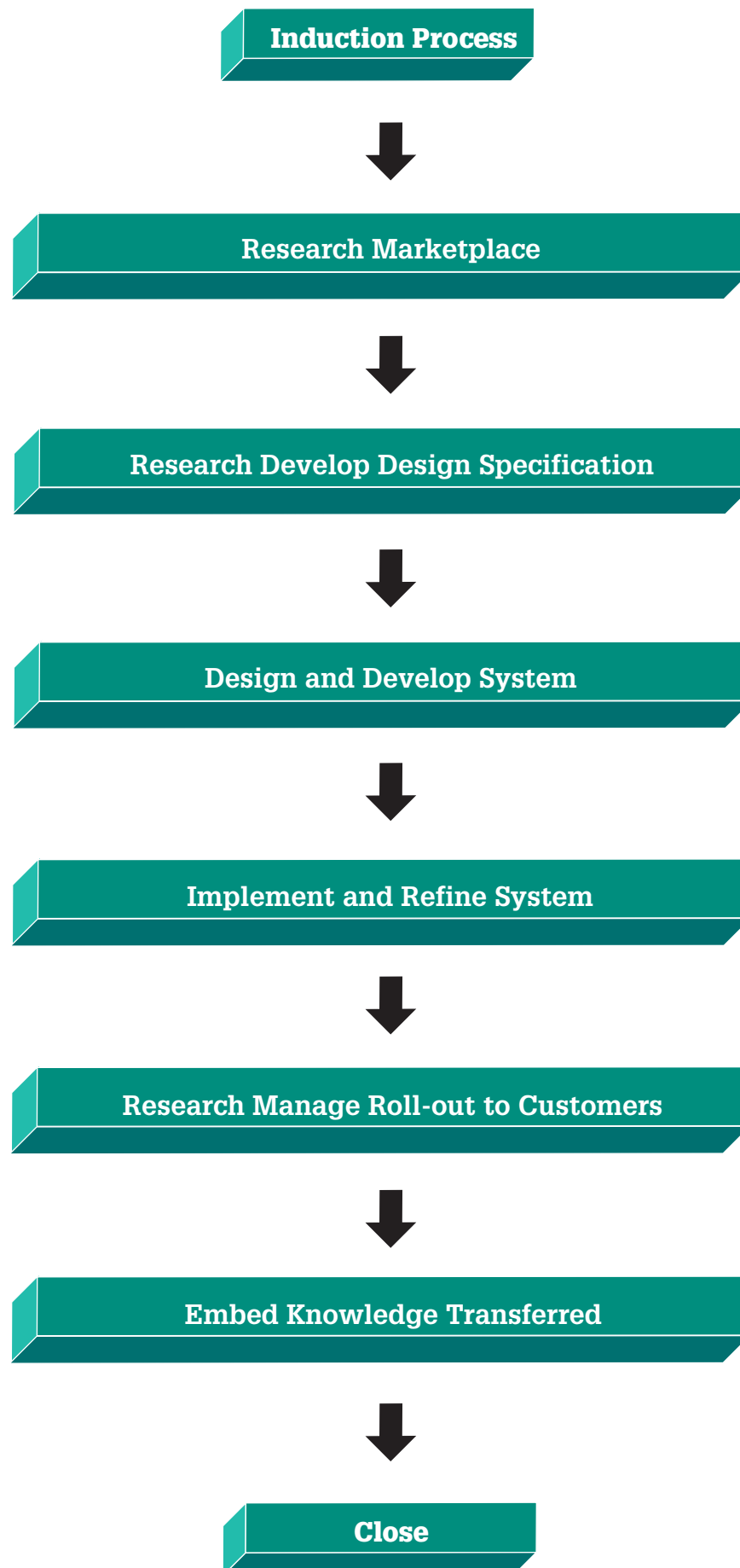Bournemouth University
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4.1   Introduction

4.1.1   This case study is based upon a Knowledge Transfer Partnership (KTP) with the objective to develop an Integrated Marketing Communication plan and to enhance brand strategy for the Company Partner.

4.1.2   This work was to be supported by the development and implementation of a Customer Relationship Management System, and the embedding of a new product development process.

4.1.3   The Company Partner manufactures, distributes and sells olives and fine foods. It imports raw materials (olives) and uses a unique manufacturing process to produce a quality product.

4.1.4   The Company's aim was for its olives to be not simply a premium product, but to be the standard product and to set the benchmark against which all other olives are judged.

4.1.5   Olives are currently exported by the Company to France under franchise, and further overseas franchise opportunities are being explored.

4.1.6   It was recognised that the Company did not have sufficient in-house marketing expertise to realise its full potential as it was much more sales-driven than marketing-focused.

4.2   The Process of Knowledge Transfer

4.2.1   A review was undertaken of the Company Partner's internal communications. This resulted in the development of a 12-month sales and marketing plan.

4.2.2   An external communications review was also undertaken, which included a marketing audit that generated recommendations for the budget planning process, and a review of the on-site shop to determine its commercial opportunities.

4.2.3   Segmenting and understanding the current market sectors was achieved through customer analysis, customer identification and primary market research, assessing buyer behaviour and the factors impacting upon their buying decisions.

4.2.4   This information was to form the foundations upon which the Customer Relationship Management system would function.

4.2.5   An extensive review of Customer Relationship Management (CRM) systems was undertaken to identify best practice and to provide the information necessary to specify company requirements.

4.2.6   Work was also undertaken on an Integrated Marketing Communications Plan, and as the two project areas were inextricably linked, they were developed in parallel.

4.2.7   Following the initial work, and based upon the perceived requirements of the Company Partner, the direction of the work was adjusted to focus upon the creation and development of a bespoke Management Information System (MIS) to support internal and external communications providing accurate, timely and relevant information so that efficient business decisions could be made.

4.2.8   Development of the Integrated Marketing Communications plan was continued with key focus on developing communication of the brand, and the house style, which supported the MIS.

Figure 4: Knowledge Transfer Process Utilised

Induction Process

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Research Marketplace

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Research Develop Design Specification

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Design and Develop System

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Implement and Refine System

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Research Manage Roll-out to Customers

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Embed Knowledge Transferred

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Close

4.3 Benefits to the Knowledge Base Partner

4.3.1   The Academic Team gained valuable expertise in a number of key areas including the practical issues associated with brand development and food marketing.

4.3.2   This experience had a significant impact upon teaching, and provided the materials for practical case studies that can be used to demonstrate the outcomes that can be achieved in real situations.

4.3.3   The Knowledge Base Partner is undertaking research into the needs and issues facing SMEs in the region and the ability of knowledge transfer programmes to address these needs. The experience and lessons learnt from this KTP will feed into this research to enhance its quality and scope, and to demonstrate salient problems and issues.

4.3.4   The results of this KTP will also feed into the Knowledge Base Partner's research in the areas of marketing communications, strategic marketing, food marketing and new product development.

4.3.5   Knowledge transfer processes behind this KTP have provided key data to support additional post graduate research being undertaken by the Academic Supervisor.

4.3.6   The KTP has influenced the teaching of the Knowledge Base Partner, and the curriculum of both undergraduate/postgraduate taught courses in the subject areas of marketing communications, strategic marketing, food marketing and new product development.

4.3.7   This KTP also has proven to be a good lesson in the problems associated with organisational change within an SME, and the complexities of leadership/management that can develop.

4.4 Benefits to the Company Partner

4.4.1   The Company Partner has benefited greatly from the lessons learnt during the entire KTP process.

4.4.2   From the outset, the Company was required to look in depth at its operations, style and culture which led to some highly useful insights that have helped to shape the development and growth of the organisation.

4.4.3   The knowledge gained included a far greater understanding of CRM, and the pitfalls of trying to develop an integrated CRM system without sufficient effort being placed on the implementation of such a system.

4.4.4   A principle lesson learnt was that a fully integrated and successfully implemented CRM remains beyond the reach of many organisations (both large and small). Instead, it is often more suitable to concentrate on developing systems that can achieve between 85% and 90% of the desired outcomes, with the remaining requirements being manually applied.

4.4.5   The Company Partner has increased its capabilities to learn from its mistakes, and has now commenced work on a systems audit to streamline business processes allowing for a simpler form of both CRM and IMC to be designed and implemented.

4.4.6   The Company Partner is considered to have gained an improved understanding of their customer base, together with increased knowledge concerning their market sectors (both current and potential). Knowledge of how to extend product range without diminishing brand probity has also been successfully transferred to the Company Partner, and the basis for required management information systems has been provided.

4.4.7   The necessity for accurate, timely and relevant information to support business decisions has been instilled within the Company's culture which will support future improved communications (both internal and external).

4.4.8   In addition, the work on the Integrated Marketing Communications plan improved the flow of information, brand awareness and the Company's response times to customer enquiries.

4.4.9   The KTP has also supported the Company to enter new markets and to increase its penetration of existing markets. As a result it has contributed to a predicted £5m increase in turnover.

4.5 Conclusions

4.5.1 The KTP project has assisted the Company Partner to understand its internal and external communications issues, and key market sector factors.

4.5.2 This information has been used to support the development of a bespoke Management Information System (MIS) and also the development of the Integrated Marketing Communications plan (IMC).

4.5.3 The Company now has an improved ability to respond to customer needs, and market changes, through the provision of accurate information relating to sales and marketing activities.

4.5.4 From the work of this project, the Company now has developed an enhanced brand and demonstrates improved brand management.

4.5.5 Importantly the Company has improved its relationships with its customers and suppliers, and now has the ability to proactively respond to market changes instead of being reactive to customer demands.

4.5.6 As a direct result of the intervention achieved by this KTP, both Company turnover and profitability is expected to rise.

4.5.7 Lessons learnt through the KTP, and work undertaken by the Academic Team, enabled the Company to examine their strategy and growth opportunities, leading to a refinement of Company strategy, and the vision to target areas for growth and future direction.

4.5.8 The Company feels more able to face the challenges of growth than it was before the KTP commenced. This is partly due to the organic growth already in process before the KTP started, and partly because of the thought processes required to keep the KTP on track during its progress.

4.5.9 Without the KTP, it is acknowledged that the Company Partner would not have been able to have developed to the degree where they were able to face the future with such a dynamic and positive outlook.

4.6 References

4.6.1 Knowledge Transfer Partnership Proposal – Reference 0112, DTI, 2003

4.6.2 Knowledge Transfer Partnership Final Report – Reference 0112, DTI, 2006

5. Commercial Application of Computational Intelligence

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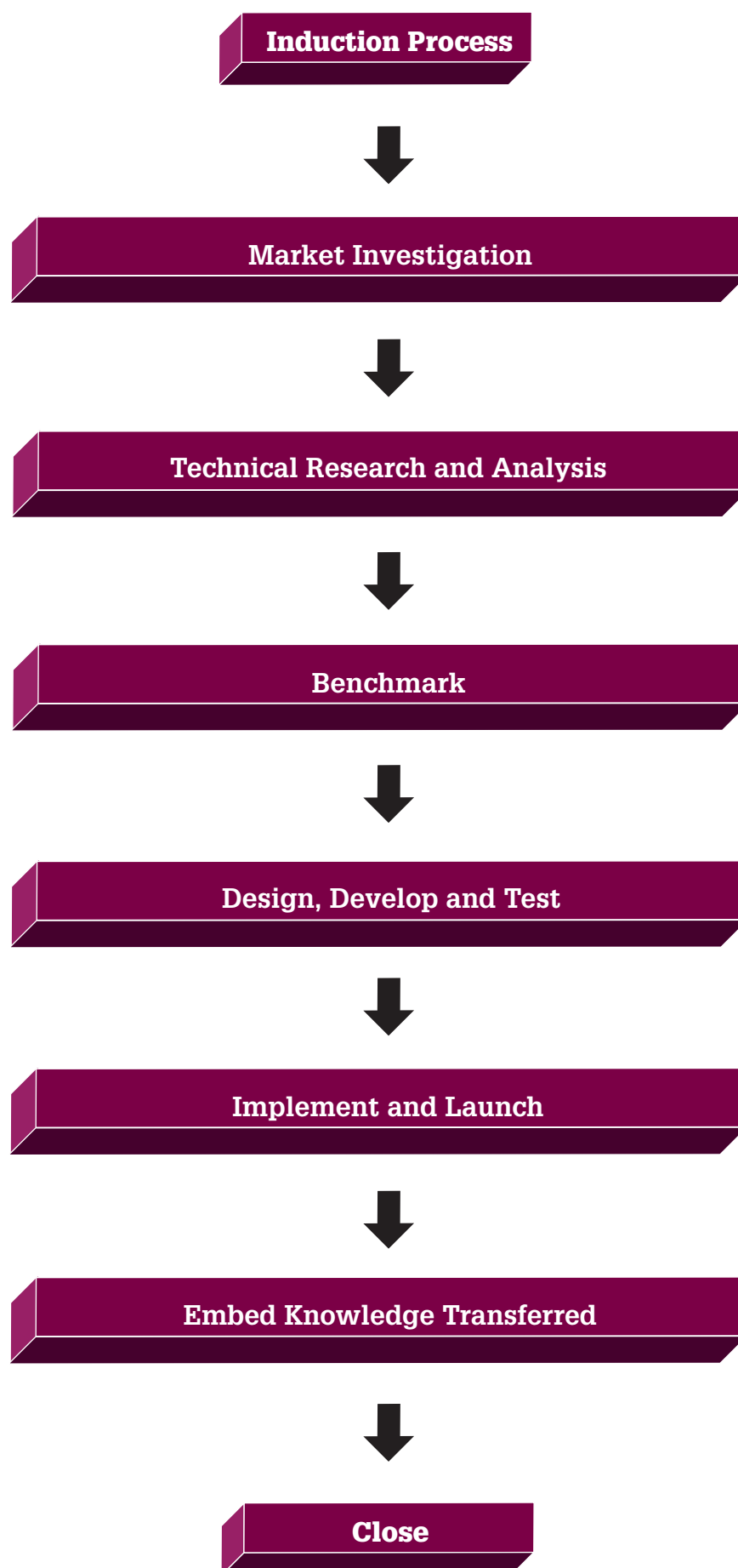Bournemouth University
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5.1   Introduction

5.1.1   The objective of this KTP programme was to apply computational intelligence to a Company's pattern-matching software modules to improve performance and functionality, and to provide a basis for developing foreign language support.

5.1.2   The Company Partner was a Value Added Reseller (VAR) of third-party Customer Relationship Management (CRM) software, and a provider of value added services.

5.1.3   They also developed their own software products and had a data pattern matching module that provided the underpinning technology for their data-matching product.

5.1.4   Due to the limitations of the algorithms used in the Company's data pattern matching module, its data matching product had room for improvement of both functionality and performance. The Company Partner therefore wished to improve its data matching product by using computational intelligence techniques in order to create new and expand existing market opportunities.

5.2   The Process of Knowledge Transfer

5.2.1   After familiarisation with the Company's products and services, to place the project into context as part of the Company's overall strategic development, an investigation was undertaken into the use of data in the business environment.

5.2.2   Examination of data validation, migration, extraction, cleansing, purging, matching, referencing, and pricing issues was completed, and different approaches for data quality analysis reviewed.

5.2.3   The Company was provided with a report which benchmarked customers, competition and market activities.

5.2.4   Market research was undertaken to establish characteristics, size and growth of potential market sectors. Customer selection and competitor price evaluation were also achieved.

5.2.5   A marketing strategy was determined, and technical research commenced to develop a product to meet the optimal business opportunity. From this work it was identified that competitor companies were forming strategic alliances with data providers to provide a total data management solution as a complete package.

5.2.6   Technical research considered various heuristics and algorithms available for solving data quality problems that would offer enhanced levels of performance without compromising the Company Partner's existing pattern matching products.

5.2.7   The design and implementation of a framework for analysing and testing various clustering techniques was completed with the aim of discovering the optimal parameters to use when designing and implementing clustering pre-processing.

5.2.8   The design and development was completed for a 'dirty data' generator, to provide benchmarking data in a realistic and statistically controlled manner, which could be used to test and explore both the Company Partner's existing products, and also the new modules being developed.

5.2.9   Using this data as a reference, the project was able to develop a library of common errors/anomalies found within data sets, and the data matching techniques required to resolve each error. This information was added as referential data in a module of the data-matching product's dictionary.

Figure 5: Knowledge Transfer Process Utilised

Induction Process

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Market Investigation

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Technical Research and Analysis

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Benchmark

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Design, Develop and Test

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Implement and Launch

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Embed Knowledge Transferred

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Close

5.2.10   A software requirements specification was developed for a data-matching system. The prototype data matching system was designed and implemented. Benchmarking data was expanded to incorporate all CRM elements, eg. names, companies, addresses, etc.

5.2.11   Data used was transferred from CSV flat files to an SQL database, and programming in visual basic (VB. Net) undertaken to create a demonstration system that used an exact-match (or a fuzzy-match) approach to determine data duplication.

5.2.12   Further work was then undertaken to complete a repository of data matching algorithms, with technical documentation developed to facilitate the embedding and understanding of the new knowledge within the Company so that they could continue to manage and modify the final system created in the future.

5.3   Benefits to the Knowledge Base Partner

5.3.1   The Academic Team developed their experience of working on commercial projects. This experience is now reflected in curriculum development.

5.3.2   Practical case study examples to demonstrate the outputs and outcomes that can be achieved in real applications will be utilised as future teaching aids.

5.3.3   The results of this project have already been integrated into the Knowledge Base Partner's research in the area of computational intelligence.

5.3.4   The research undertaken into common errors/anomalies, and the data-matching techniques required for resolution, were of particular interest and will be used to inform future research activities.

5.3.5   The project has also been the source of information, data and understanding regarding data matching techniques that will enhance future research undertaken by the Knowledge Base Partner, and will stimulate academic discovery that would otherwise not have occurred.

5.3.6   The Knowledge Base Partner is also currently undertaking research into the needs and issues facing small and medium-sized businesses in the region, and the ability of knowledge transfer programmes to address these needs. The experience and lessons learnt from this project will feed into this research.

5.3.7   Foreground Intellectual Property (IP) has been developed with commercial potential.

5.3.8   The graduate working on the project has shared best practice and experiences with other University-based researchers.

5.3.9   As a direct result of this project, academic papers have been written and published at international conferences and workshops.

5.4   Benefits to the Company Partner

5.4.1   The Company Partner has gained an improved understanding of data quality analysis, with the technical skills embedded to develop future systems appropriately

5.4.2   Heuristics and algorithms for solving data quality issues, including a library of common errors/anomalies, and the data matching techniques required to address each issue, were developed.

5.4.3   A benchmarking and demonstration system was developed.

5.4.4   The Knowledge Base Partner has supported the Company Partner with a patent application.

5.4.5   Increased market knowledge has provided the Company with an understanding of the characteristics for potential new market sectors.

5.4.6   Crucial market intelligence that strategic alliances were being formed by key competitors has been gained by the Company Partner.

5.4.7   Continued development and exploitation of the new product modules created will have a significant impact on the Company Partner's future financial position due to potential increased sales and profitability based upon both current and new markets.

5.5   Conclusions

5.5.1   Key background market research was undertaken to identify opportunities.

5.5.2   The project then successfully researched, developed and tested crucial modules that could be integrated within the Company's existing products to provide added value.

5.5.3   The Company is now in a position to exploit these developments on a commercial basis.

5.5.4   The project has developed protectable intellectual property which can now be protected through the filing of a patent application.

5.5.5   The Company Partner also has the knowledge, experience and understanding to undertake research and development of this product as and when demanded by future market and/or technological changes.

5.5.6   The Knowledge Base and Company Partners have formed a close relationship that will continue after the formal end of this project in the form of research, consultancy and student placements.

5.6   References

5.6.1   Knowledge Transfer Partnership Proposal – Reference 0487, SEEDA, 2004

5.6.2   Knowledge Transfer Partnership Final Report – Reference 0487, SEEDA, 2007

6. Developing an Export Marketing Strategy

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6.1   Introduction

6.1.1   The Company Partner for this knowledge transfer project manufacture and distribute metal storage units and out-buildings, aimed primarily for use outdoors on campsites, mobile home parks and gardens for the safe storage of gas bottles, barbecue items, bicycles, and garden equipment.

6.1.2   The Company had already established its product in the UK market, but lacked the knowledge and language capability to market products in Europe (France and Spain), where it recognised there was the potential for significant new sales.

6.1.3   The aim of this Knowledge Transfer Partnership (KTP) was therefore to develop and implement an export strategy that enabled the Company Partner to build upon its UK success in order to increase future sales and profitability.

6.2   The Process of Knowledge Transfer

6.2.1   An investigation to understand the size and range of Company's products, and also its strengths and weaknesses was undertaken.

6.2.2   This information formed the foundations of research into the competitiveness of the Company, and provided crucial information that would direct the main body of the knowledge transfer research.

6.2.3   Several exhibitions were attended (including La Rochelle, Montpellier, Paris and Birmingham) to establish knowledge of the industry and to develop a feel for the market.

6.2.4   Growth areas in the French market were researched and an investigation was undertaken to determine the scope of the marketplace, eg. for campsites, mobile homes, bicycles, DIY etc.

6.2.5   Alternative packaging and distribution methods were investigated since fast and accurate quotations would be required for products being exported to France.

6.2.6   Logistical arrangements for delivery of the product to France were also considered, together with the role of distributors and warehousing issues.

6.2.7   Warehouse visits were undertaken and cost-effective options proposed for distribution, eg. various price bands and zones.

6.2.8   A database of campsite contacts was purchased, and a list of potential importers and distributors of garden and leisure equipment obtained.

6.2.9   To support the market research being undertaken, mailshot letters were sent out accompanied by brochures and prices.

6.2.10   Marketing material used (website, brochures, posters and magazine articles) was designed to take into account the cultural differences in both style and content between France and the UK.

6.2.11   Initial marketing efforts demonstrated promise and two potential distributors were identified (one for France and another for Spain) that were interested in including Company products into their next catalogues.

6.2.12   The Associate developed a detailed Customer Feedback Report which considered the market response to the product (design, price, function), information from calls, campsite ratings, visitors to exhibitions, interested potential clients and details of contacts (and responses).

Figure 6: Knowledge Transfer Process Utilised

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│    Induction Process     │
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┌─────────────────────────────────────┐
│    Analyse Company Competitiveness   │
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│      Review Export Diagnostics       │
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│     Appraise Market Opportunities    │
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│    Undertake Detailed Market Research│
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┌─────────────────────────────────────┐
│   Develop Export Marketing Strategy  │
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│          Close           │
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6.2.13 A placement student was employed to support the market research activities.

6.2.14 An extensive handover document was developed that brought together the key elements of the work undertaken,

6.2.15 This work included export diagnostics, a summary of previous export effort in France, internal procedures, campsite market study, retail and distance selling markets, garden market, DIY market, cycling market, logistics, communication support, prices/sale, and future actions.

6.2.16 These reports were then combined into the first draft of the required export marketing strategy.

6.2.17 The Company established a Euro account to facilitate the receipt of payments for export sales.

6.2.18 A second placement student was then employed to carry on the work after the conclusion of the project, with a suitable handover period to ensure successful knowledge transfer could occur. A further two placement students have been appointed by the Company to implement and extend the benefits of the work.

6.3   Benefits to the Knowledge Base Partner

6.3.1   The Academic Team gained valuable expertise in a number of key areas, including small business management, exporting to France and cultural issues related to marketing and marketing communications.

6.3.2   This KTP has had an impact upon teaching, and will provide the material for practical case studies that can be used to demonstrate some of the problems and issues associated with developing and implementing export strategies for SMEs.

6.3.3   This project has provided learning and research material relating to the cultural differences between SMEs, larger organisations and universities. Specifically, the Company Partner's forthright style of operation, which current research indicates is not unusual in SMEs, provides a stark contrast with the more collegiate approach undertaken by the Knowledge Base Partner.

6.3.4   This has led to notions of organisational gender which are currently being explored, and has included the impact of these cultural differences on management style, leadership, modes of operation and knowledge transfer.

6.3.5   This Knowledge Transfer Project has created opportunities for research and consultancy collaborations between the Company and the University Partners.

63.6   Marketing consultancy work has already been undertaken to support this KTP and the results of this project will feed into the doctoral research being undertaken by the Academic Supervisor.

6.4   Benefits to the Company Partner

6.4.1   The Company Partner now has an improved knowledge of key target markets and associated networks/distribution channels required to generate sufficient order volumes required to keep pricing competitive in the light of increased logistical costs.

6.4.2   Understanding of the strategic approach to marketing, and the dedicated resource requirements to identify and sustain a presence in key, identified target markets has been achieved by the Company.

6.4.3   Understanding and awareness of language and cultural trading differences between the UK and France is now recognised by the Company as being a key barrier to working in both France and Spain, and that they will have to work hard to overcome these issues.

6.4.4   From a conceptual perspective, the Company Partner now understand the key issues that need to be addressed for the successful implementation of an international marketing strategy.

6.4.5   Work on the international marketing strategy has also provided constructive insights into the Company's current domestic marketing activities.

6.4.6   The methodical construction of the market extension strategy has reinforced to the Company the need for clear internal management data.

6.4.7   Market research work was undertaken and summarised in the form of a detailed Customer Feedback Report.

6.5   Conclusions

6.5.1   The Company Partner now has the foundation knowledge and export marketing strategy required to enable them to move forward and implement the necessary steps to maximise the opportunity of selling their product range in France.

6.5.2   They also have an improved ability to capitalise on consumer interest (demonstrated at international trade shows) based upon improved understanding and awareness of language and cultural trading differences using marketing materials (website, brochures, posters and magazine articles) tailored to the French market.

6.5.3   The Company is now in a position to move forward with exports to France directed by key knowledge and information relating to markets, logistics and distributors.

6.5.4   Significant levels of further investment will be required to fully implement the export marketing strategy.

6.5.5   This investment will probably be undertaken in small steps, continually expanding the level of Company activity and commitment to the French market, while maintaining control of both risk and uncertainty.

6.5.6   Through the Knowledge Transfer process, the Company Partner has been able to develop the core information that will enable it to undertake it export marketing activities based upon academically-sound knowledge and data, thereby ensuring that their improved competitive position is both achievable, and also sustainable in the long-term.

6.6   References

6.6.1   Knowledge Transfer Partnership Proposal – Reference 0781, ESF, 2005

6.6.2   Knowledge Transfer Partnership Final Report – Reference 0781, ESF, 2007