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Innovation through Knowledge Transfer 2012

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Innovation through Knowledge Transfer 2012

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InnovationKT-2012 Preface

This volume represents the proceedings of the Fourth International Conference on Innovation through Knowledge Transfer, InnovationKT-2012, organised jointly by KES International and the Institute of Knowledge Transfer, in partnership with Bournemouth University.

Featuring world-class invited speakers and contributions from a range of backgrounds and countries, the InnovationKT-2012 Conference was an excellent opportunity to disseminate, share and discuss the impact of innovation, knowledge sharing, enterprise and entrepreneurship.

The Innovation through Knowledge Transfer conference series provides an opportunity for researchers and practitioners in the field to publish their work. It also fosters the development of a community from the diverse range of individuals practicing various aspects of knowledge exchange and related disciplines.

InnovationKT-2012 called for both short papers and full papers which were reviewed by experts in the field and orally presented at the conference.

The conference featured a workshop (chaired by Prof. Bogdan Gabrys and Dr. Katarzyna Musial) arising out INFER, a major EU-funded project involving academic and industrial partners from three European countries (Germany, Poland and United Kingdom). The programme offered participants the opportunity to move between sectors and country in order to provide, absorb and implement new knowledge in a professional industrial-academic environment, a classic example of knowledge sharing in practice.

Thanks are due to the many people who worked towards making the conference a success. We would like to thank the Professor Jim Roach, Head of School of Design, Engineering and Computing at Bournemouth University, and Sir Brian Fender of the IKT for opening the conference. We would also like to thank the invited keynote speakers, the members of the International Programme Committee, and all others who contributed to the organisation of the event.

We hope you find InnovationKT'2012 an interesting, informative and useful event. We intend that future conferences in the InnovationKT series will continue to serve the knowledge transfer community and act as a focus for its development.

Robert J. Howlett
Bogdan Gabrys
InnovationKT'2012 General Chairs

Organisation

General Conference Chairs

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Head of Smart Technology Research Centre, Bournemouth University, UK

Professor Robert J. Howlett
Executive Chair, KES International & Bournemouth University, UK

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Innovation through Knowledge Transfer is organised and managed by **KES International** in partnership with **the Institute of Knowledge Transfer**.

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Dr Paola Di Maio	University of Strathclyde, Scotland, UK
Ms Kim Dovell	Institute of Knowledge Transfer, UK
Ms Charlene Edwards	Melbourne, Australia
Sir Brian Fender	Institute of Knowledge Transfer, UK

Keynote Invited Speakers

Kelvin Pitman
Director of Open Innovation (recently retired)
Crown Packaging UL PLC

Working with Open Innovation Intermediaries

Abstract: Nearly ten years ago, Henry Chesbrough coined the term "Open Innovation". Even before it was given a name, many companies had been exploring what the concept meant for them. A key part of this has been the growth of both formal and informal networks to share and compare progress along the Open Innovation journey. Even more importantly, networks have been used to search for or offer technologies needed or being made available. Both types of network overlap, but in particularly the latter has relied heavily on the use of Intermediaries ranging in size from a single specialist consultants to some fairly large organisations. Kelvin Pitman, recently retired as Open Innovation Director for Crown Packaging Technology will outline a little of Crown's Open Innovation journey while case studying their use of an Intermediary. This will be illustrated by some of the academic work carried out in area mainly by Cambridge University Institute for Manufacturing in which Crown participated.

Biography
Kelvin Pitman recently retired as Director of Open Innovation for Crown working closely with Cambridge University Institute for Manufacturing, IXC, Industrial Research Institute (USA), NESTA and several other organisations to exploring how Crown Technology could exploit Open Innovation in a B2B situation. His career started after obtaining an honours degree in Polymer and Chemical Technology in 1974 when he joined Metalbox R&D in the UK. He progressed to Senior Scientist before taking on roles as Product Manager for beverage closures; then Commercial Office manager

covering plastic closures for food, pharmaceuticals, automotive and household products. Subsequently he became Market Development Manager for PET bottles and beverage closures at divisional level. In 1988 he accepted a position as Licensing Manager for Crown Obrist, a subsidiary of Crown Holdings in Switzerland, expanding their beverage closure production technology to Belgium, Germany and the USA. Followed a period as Corporate Customer Manager he became Technical Director responsible for quality, R&D, production, customer technical service and purchasing. When Crown acquired Caurnaud Metalbox in 1996, Kelvin accepted the role of Global Closure Development Director, managing teams in the USA, UK and Switzerland. More recently, following a period as Director of Global Licensing, Kelvin took up his final role as Director of Open Innovation.

Caroline Bishop
Managing Director, IXC UK Ltd

Developing Smarter Engagements between HEIs and Corporate Business

Abstract: The InnovationXchange (IXC) has been putting the theory of Open Innovation into practice since its inception in 2004. Connecting technology demands in business with the supply of knowledge and expertise in HEIs and small companies, IXC is well placed to identify new trends and ideas in innovation practice and the use of open innovation paradigm in particular.

In this presentation Caroline Bishop, IXC's Managing Director will provide two case studies from Unilever and Siemens illustrating how corporate business is looking to build new business models around multi party consortia that will lever better, faster value from its engagement with HEIs. What corporate business has learnt about how to set up and manage these complex relationships will then be used to set out some of the key questions and actions HEIs will need to address if they are to engage successfully with this new corporate business agenda.

Biography

Following an early career with the NHS, Caroline subsequently spent 20 years at the University of Birmingham, in a variety of progressively challenging roles all focused on finding innovative new ways of engaging the University with the private and public sectors and raising income through knowledge exchange. Highlights include setting up the School of Public Policy's MBA programme in Hong Kong and building the University's business engagement strategy that saw the establishment of a team of business engagement staff that raised £32.5 million of new funding over the five years between 2001 and 2006. Especially important in this period was the creation of the Medici idea and the establishment in 2002 of a five-university partnership across the East and West Midlands to deliver training in technology transfer to medical scientists. Caroline subsequently led the bid that won £2 million from the Universities funding body (HEFCE) to train and develop medical scientists to engage more effectively in business. Medici was cited by HEFCE as an exemplar of innovation and good practice in 2007 and continues to provide service today. In 2006 Caroline secured £3.6 million of grant funding for the establishment of IXC UK and changed direction in her career to become Director of Operations for this new start up operation of the University of Birmingham. Six years on IXC UK has now spun out from the University and is in its fourth independent trading year and Caroline has become the company's Managing Director. IXC UK Ltd is designed to offer an alternative and more effective way to enable corporates, SMEs and Universities to collaborate and innovate. It is a very exciting arena in which to work and a huge challenge, which Caroline is relishing. Linking Jaguar LandRover with a small company in the Aerospace sector to enable Jaguar

to develop a new hybrid engine based around gas turbines as opposed to the current industry approach with electric is a good example of what IXC enables its clients to do. The client base of IXC includes amongst others well known names such as, Crown Packaging, Jaguar Land Rover, Abbott Pharmaceuticals, Cadbury's, Smith and Nephew, Spriax Sacro, Kraft, PepsiCo, Dow Chemicals and MARS. Smaller companies such as Molecular Products, Phase Vision, Geotechnical Instruments, Cochlea and MiniFab also feature. The universities of La Trobe, Monash, Birmingham, Leeds, Manchester Metropolitan, Wolverhampton and Northumbria feature in the University client base whilst the Smith Family Foundation exemplify work in the social enterprise field and public sector.

Dr Piero P.Bonissone
Chief Scientist, Coolidge Fellow
General Electric Global Research, USA

Soft Computing in Prognostics and Health Management (PHM) Applications

Abstract: Soft Computing (SC) is a term that has evolved, since its inception in 1991, to represent a methodology and a set of techniques covering the aspects of data-driven models design, domain knowledge integration, model generation, and model tuning. We distinguish between offline Meta-heuristics (MH's), used for model design and tuning, and online MH's, used for models selection or aggregation. This view suggests the use of hybrid SC at each MH's level as well as at the object level. We manage model complexity by finding the best model architecture to support problem decomposition, generate local models with high- performance in focused applicability regions, provide smooth interpolations among local models, and increase robustness to imperfect data by aggregating diverse models.

Within the broad spectrum of Soft Computing (SC) applications, we will focus on Prognostics & Health Management (PHM) for assets such as locomotives, medical scanners, aircraft engines, etc. The main goal of PHM is to maintain these assets' operational performance over time, improving their utilization while minimizing their maintenance cost. This tradeoff is typical of long-term service agreements offered by OEM's to their valued customers. Typical PHM functions range from anomaly detection, to anomaly identification, failure mode analysis (diagnostics), estimation of remaining useful life (prognostics), on- board control, and off board logistics actions.

We illustrate this concept with a case study in anomaly detection for a fleet of physical assets (such as an aircraft engines or a gas turbines.) Anomaly detection typically uses unsupervised learning techniques to extract the underlying structural information from the data, define normal structures and regions, and identify departures from such regions. We focus on one of the most common causes for anomalies: the inadequate accuracy of the anomaly detection models, which are prone to create false alarms. To address this issue, we propose a hybrid approach based on a fuzzy supervisory system and an ensemble of locally trained auto associative neural networks (AANN's.) The design and tuning of this hierarchical model is performed using evolutionary algorithms. In our approach we interpolate among the outputs of the local models (AANN's) to assure smoothness in operating regime transition and provide continuous condition monitoring to the system. Experiments on simulated data from a high bypass, turbofan aircraft engine model demonstrated promising results.

Biography

A Chief Scientist at GE Global Research, Dr. Bonissone has been a pioneer in the field of fuzzy logic, AI, soft computing, and approximate reasoning systems applications since 1979. His current interests are the development of multi-criteria decision making systems for PHM and the automation of intelligent systems lifecycle to

create, deploy, and maintain SC-based systems, providing customized performance while adapting to avoid obsolescence. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), of the Association for the Advancement of Artificial Intelligence (AAAI), of the International Fuzzy Systems Association (IFSA), and a Coolidge Fellow at GE Global Research. He is the recipient of the 2012 Fuzzy Systems Pioneer Award from the IEEE Computational Intelligence Society. Since 2010, he is the President of the Scientific Committee of the European Centre of Soft Computing. In 2008 he received the II Cajastur International Prize for Soft Computing from the European Centre of Soft Computing. In 2005 he received the Meritorious Service Award from the IEEE Computational Intelligence Society. He has received two Dushman Awards from GE Global Research. He served as Editor in Chief of the International Journal of Approximate Reasoning for 13 years. He is in the editorial board of five technical journals and is Editor-at-Large of the IEEE Computational Intelligence Magazine. He has co-edited six books and has over 150 publications in refereed journals, book chapters, and conference proceedings, with an H-Index of 27 (by Google Scholar). He received 61 patents issued from the US Patent Office (plus 50 pending patents). From 1982 until 2005 he has been an Adjunct Professor at Rensselaer Polytechnic Institute, in Troy NY, where he has supervised 5 PhD theses and 33 Master theses. He has co-chaired 12 scientific conferences and symposia focused on Multi-Criteria Decision-Making, Fuzzy sets, Diagnostics, Prognostics, and Uncertainty Management in AI. Dr. Bonissone is very active in the IEEE, where is has been a member of the Fellow Evaluation Committee from 2007 to 2009. In 2002, while serving as President of the IEEE Neural Networks Society (now CIS) he was also a member of the IEEE Technical Board Activities (TAB). He has been an Executive Committee member of NNC/NNS/CIS society since 1993 and an IEEE CIS Distinguished Lecturer since 2004.

Mike Smith
Pro-Vice Chancellor Research
Sheffield Hallam University, UK

Co-creation of Innovation

Abstract: This presentation will propose that the concept of the co-creation of innovation will be an important paradigm for the development of innovation in the future. In the recent past there have been debate about whether knowledge exchange is a more appropriate descriptor than knowledge transfer, for the activities undertaken by organisations such as Universities which contribute to the innovation agenda. It will be argued that the requirement for innovation to have a greater impact on economic transformation in the short, medium and long-term, requires an improvement in the quality and relevance of innovation, which may not be able to be delivered by either knowledge transfer or knowledge exchange alone.

The value of multidisciplinary collaboration in research is widely recognised, and the concept of the co-creation of innovation is an extension of the principle to the joint development of innovation between universities and the commercial sector. An improvement in the quality and relevance of the innovation will increase the likelihood of its implementation and, as a consequence, its impact. Mechanisms to achieve co-creation of innovation will be discussed in the context of different international models.

The importance of trust, and its associated influence on risk, will be discussed and a model will be proposed which describes the route-map for the co-creation of innovation between public sector organisations such as Universities or the NHS and the commercial sector. A number of examples will be presented from the author's experience including product development and the provision of higher skills training in areas such as advanced manufacturing, healthcare and business and management. Implications for Universities will be discussed, and the barriers to progress will be outlined.

Biography

Professor Mike Smith has a long experience of working in the University, NHS and commercial sectors and has a wide network of international links. Among his previous posts, he was dean of research for the Faculty of Medicine, Dentistry, Psychology and Health at the University of Leeds; director of R&D for the Leeds Teaching Hospitals Trust; chair of medical physics and head of the University and NHS Departments of Medical Physics at the University of Leeds and Leeds Acute Hospitals; director of medical physics and clinical engineering at Guys Hospital and the University of London as well as being medical scientist at the University of Edinburgh.

Mike also has a long track record in research, supporting educational developments as well as commercialising research and innovations. This includes publishing

patents, licensing research developments, forming start-up and spin-out companies and creating private sector vehicles to commercialise research output.

He holds a number of non-executive directorships in the commercial and NHS sectors. In addition, Mike has over 20 years experience of serving on major professional and governmental national committees, contributing at a national level on policy and funding issues. Examples include the HEFCE Research Assessment Exercise, MRC Medical Advisory Board, NHS Central Research and Development Committee, DTI Foresight Taskforces on Biotechnology, Pharmaceuticals and Medical Devices and president of the British Institute of Radiology in its Centenary Year. While Deputy Vice-Chancellor, Research and Enterprise at the University of Teesside, he has played a major role, working with the Regional Development Agency in putting together the Digital City Project and securing a £10m building for the University to support this initiative.

Anne Snowdon
Professor, Management Science
Odette School of Business, University of Windsor, Canada
Chair, International Centre for Health Innovation
Richard Ivey School of Business

Issues in International Health Innovation

Abstract: Innovation is widely viewed in many sectors as a strategy for stimulating economic growth and prosperity in countries around the world. In particular, knowledge-intensive sectors such as finance, manufacturing, information systems and automotive all rely on innovation to remain viable and competitive in global markets. However, innovation has been slow and limited in achieving similar gains in productivity, efficiency and sustainability in the health sector. This presentation will examine the unique challenges health systems experience in achieving innovation adoption. Evidence of the importance of innovation adoption in health care will be presented through the profiles of developed countries globally. Opportunities to stimulate innovation adoption in health systems using an integrated knowledge translation approach will be profiled and discussed, including the key factors that support innovation adoption in health care system. Health innovation projects that use an integrated knowledge translation approach will be presented, including opportunities for using this approach to engage key stakeholders such as health professionals, health consumers, private sector partners and health system leaders in driving innovation adoption in health systems.

Biography
Dr. Anne Snowdon is Chair of the International Centre for Health Innovation at the Richard Ivey School of Business. Located within The University of Western Ontario in Canada, the Centre's mandate is to build health system leadership capacity to support and drive innovation adoption of technologies, systems and processes that our health systems need in order to be sustainable.

Dr. Snowdon is an Adjunct Faculty member at Ivey and holds an Adjunct appointment in the School of Nursing at McGill University in Montreal. She is also a Professor at the Odette School of Business and is cross-appointed to the Faculty of Engineering at the University of Windsor.

Dr. Snowdon holds a Bachelor of Science in Nursing from The University of Western Ontario, a Master of Science from McGill University and a PhD in Nursing from the University of Michigan. She is a Fulbright Scholar and was awarded the Social Sciences and Humanities Research Council Doctoral Fellowship for her research on parenting during childhood hospitalization. Dr. Snowdon is also the Theme Coordinator for Automotive Health and Safety for Canada's automotive research program,

AUTO21 Network of Centres of Excellence, and has commercialized innovative new safety seat products for occupants in vehicles as a result of this research program.

In addition to her expertise in health system leadership and innovation, Dr. Snowdon's research also looks at the role of engaged consumers as agents of change and reform to health systems.

Jim Roach
Professor & Dean, School of Design, Engineering and Computing
Bournemouth University

Industry Engagement: Barriers and How to Overcome Them

Abstract: This presentation covers the research we have done to identify the problems industry face when trying to interact with the University. The findings of focus groups and face to face interviews with companies that have an existing relationship with the University and those companies that have no relationship with the University but would like to engage. Discussion will enquire what sort of interactions does the University want and how is it promoting them. Then from our findings we propose a "tool kit" for Universities to build successful relationships with Industry.

Biography

Professor Jim Roach took up his post of Dean of the School of Design, Engineering and Computing in September 2008 having previously served as Deputy Dean (Education) in the School.

Professor Roach has great experience of working with Industry and Commerce linking with Academia. In 2001 Professor Roach was awarded one of only twelve National Business Fellowships in recognition of the collaborative work undertaken between the University and Industry. Through his work with Industry over twenty collaborative programmes (Teaching Company Schemes now Knowledge Transfer Partnerships) have been carried out. These have resulted in many new products and improved processes for local companies. Research interests are in simulation and modelling of electronic circuits, programmable electronics, electronic product generation, protecting Design Rights and Intellectual Property and the management and development of engineering innovation. Currently Professor Roach is collaborating with a local company developing an intelligent temperature monitoring instrument for use in the power industry.

Professor Roach has a strong connection with the Royal School of Signals, Blandford and was instrumental in obtaining accreditation for a number of military courses allowing them to attract civilian qualifications. The MSc in Communications and Information Systems Management has run since 1999 and this has been followed by a BSc(Hons) Telecommunication Systems Engineering and most recently a FdSc Management of Military Information Systems and a FdSc in Communications Systems engineering

Contents

INFER Project: Challenges in Transfer of Knowledge to Industry Chairs: Prof Bogdan Gabrys (Bournemouth University) and Dr Katarzyna Musial (Kings College London)

Next - Practice in University Research Based Open Innovation Chair: Jens Rønnow Lønholdt (Technical University of Denmark)

Social Innovation and Related Paradigms Chair: Jarmilla Davies (Wales Assembly Government)

Engagement with Industry and Commerce Chair: Prof. Anne Snowden (University of Windsor, Canada)

Knowledge Exchange Chair: Prof Jim Roach (Bournemouth University)

Understanding the Other Side – The Inside Story of the INFER Project

Katarzyna Musial[1], Marcin Budka[2], and Wieslaw Blysz[3]

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Abstract. In the last few years, the collaboration between research institutions and industry has become a well established process. Transfer of Knowledge (ToK) is required to accelerate the development of both sides and to enable them to unlock their full potential. European Commission within the Marie Curie Industry and Academia Partnerships & Pathways (IAPP) programme supports the cooperation between these two sectors at the international scale by funding research projects that as one of the objectives aim at enhancing human mobility. IAPP projects offer people from different institutions the possibility to move sector and country in order to provide, absorb and implement new knowledge in a professional industrial-academic environment. In this paper, one of such projects is presented and both academia and industry perspectives in regard to opportunities and challenges in Transfer of Knowledge are described. Computational Intelligence Platform for Evolving and Robust Predictive Systems (INFER)[1] is the IAPP project that serves as a case study for this paper.

1 Introduction

Transfer of Knowledge (ToK) is one of the concepts that are self-explanatory. It is transferring the knowledge from one entity (person, group or a whole institution) to another one.

Some of the definitions of ToK can be found on the websites of Knowledge Transfer Centres. For example, Knowledge Transfer Centre from University of St Andrews defines ToK as "the systems and process by which research institutions interact with businesses, the public and other organisations to enable knowledge and expertise to be utilised leading to innovative, profitable and social improvements" (Knowledge Transfer Centre from University of St Andrews, 2011).

[1] For more information please see http://www.infer.eu

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Innovation through Knowledge Transfer organisation provides more detailed explanation of what Knowledge Transfer is from their perspective: "We define knowledge transfer as the means by which expertise, knowledge, skills and capabilities are transferred from the knowledge-base (for example, a university or college, a research centre or a research technology organisation) to those in need of that knowledge (for example a company, social enterprise or not-for-profit organisation). Hence, knowledge transfer involves the interface between universities and business, and involves the commercialisation of skills and expertise possessed by higher education. The purpose of knowledge transfer is to catalyse and facilitate innovation" (InnovationKT, 2011)".

Another definition was proposed by the Knowledge Transfer Centre from Queens University Belfast: "Knowledge Transfer Partnerships are based on partnerships between academic groups and companies who need access to skills and knowledge in order to innovate."[2]

Note, that all of the definitions point out that the purpose of Knowledge Transfer is to facilitate innovation. ToK is a very challenging task as the knowledge is not tangible and usually defragmented across the organisation. The organisational knowledge is tactic or hard to articulate (Nonaka and Takeuch, 1995). In addition, there are a lot of sources of knowledge, e.g. people employed in the organisation, tools used across the company, groups within the organisation and tasks assigned to people (Argote and Ingram, 2000).

As it will be presented, the perception and importance of ToK process is different for people with different backgrounds, positions in the company, and from different sectors. Author's experience shows that factors influencing the success of Knowledge Transfer are among others: (i) commitment level of both top management and teams involved in project, (ii) resources available for ToK activities or (iii) type and quality of prepared ToK activities.

The motivation to write this paper was to make aware people who want to undertake large projects where ToK activities are one of the main focuses that the ToK process can be well implemented but it requires a lot of planning and preparation. ToK can be successful only if the working environment is set up in a way that sites understand and respect each other. It should be emphasized that people are inseparable part of the transfer of knowledge. They should be made aware of the importance of ToK activities. The whole process will perform smoothly if people are committed and know what is expected from them and what they can expect from other team members.

This is experience-based study prepared by people who were and are actively involved in the Knowledge Transfer in the INFER project. First part of the article presents the INFER project and different types of Transfer of Knowledge activities that are implemented as part of the work programme. The next part is devoted to describe the industry and research perspectives of people participating in the project. Finally, both the opportunities arising from Knowledge Transfer and challenges that need to be overcome to enable successful ToK are outlined and discussed.

[2] There exists many more Transfer of Knowledge Centres. The presented definitions aim at providing general idea about ToK.

2 INFER Project

As it was mentioned before, INFER stands for Computational Intelligence Platform for Evolving and Robust Predictive Systems and is a project funded by the European Commission (EC) within the Marie Curie Industry and Academia Partnerships & Pathways (IAPP) programme, with a runtime from July 2010 until June 2014. The programme will offer involved people the possibility to move sector and country in order to provide, absorb and implement new knowledge in a professional industrial-academic environment.

INFER involves employees from organisations from three different countries. This includes Evonik Industries from Germany, one of the world's leading companies in the process industry; Research & Engineering Center (REC) from Poland, a highly innovative software engineering company and the Smart Technology Research Centre of Bournemouth University (BU) in the UK, an interdisciplinary and integrative centre conducting research in the field of automated intelligent technologies.

The area of the project is pervasively adaptive software systems for the development of an open modular platform applicable in various commercial settings and industries. The main innovation of the project is a novel type of environment in which the "fittest" predictive model for whatever purpose will emerge – either autonomously or by user high-level goal-related assistance and feedback. Such system is beneficial for businesses relying on accurate ahead predictions of any type (e.g. customer behaviour, market conditions) and, at the same time, requiring an automated ability to react to changes in market or operational conditions. As the project is funded by EC under the IAPP programme one of its main objectives is the continuous knowledge transfer.

During the preparation of the project proposal all parties discussed the expertise that each partner brings to the project and how others can benefit from this knowledge. The identified transfer of knowledge opportunities were presented in the proposal from two perspectives: industry and academia.

a) **The industrial partners (REC nad Evonik)** can benefit from the latest research developments deriving from the academic sector and helps to ensure their fast and cost-effective validation and application at industrial scale. Early Stage Researchers (ESR) and Experienced Researchers (ER) from industry have the opportunity to gain knowledge about innovative approaches and to build the basis for a successful employment of these methods in practice.
b) **The academic partner (BU)** has the opportunity to (i) gain experience in an industrial environment, (ii) adapt and prove their concepts, (iii) develop more expertise in real industrial application and (iv) gain knowledge and experience in organising, realisation and managing complex, multi-site and multi-vendor projects as well as transferring successful research into commercial software products.

In order to be able to realise those identified opportunities the detailed plan of activities that would be undertaken was needed. The set of ToK activities that was planned as a part of the INFER project are presented in the next section.

3 Transfer of Knowledge Activities

The activities connected with the ToK concept are organised around: (i) providing, (ii) absorbing and (iii) implementing new knowledge in an organization. ToK activities can be divided into internal and external events. The former are those where only people involved in the project are included and they are usually more focused on a specific topic directly connected with the developed project. The external actions aim to share knowledge and experience at the bigger scale and because of that they tend to be more general but equally valid as the internal ones. Common activities that are associated with Transfer of Knowledge are (i) conferences and workshops, (ii) trainings and tutorials, (iii) discussions and brainstorming sessions, etc. A very interesting mechanism of a growing importance is the idea of *secondments* that enables people to work at the partner site and to gather knowledge about what and how the processes are used by the partner as well as to gain understanding about partner's know-how.

There is also a part of Transfer of Knowledge that is not and cannot be done by means of planned and organised events. For example a brief chat with a person from another sector about work-related issues can be seen as the Knowledge Transfer activity. This type of activity is not planned in advance. However, what should be emphasized, the environment that enables these two people to meet has to be set up beforehand.

The mechanism implemented in the project that to a great extent facilitates ToK is the *secondment* of staff. All research activities and platform implementation were organised and schedule around the secondment plan.

Transfer of Knowledge activities that take place within the INFER project for both project participants and also external community are:

a) **Presentations of seconded staff** – a mechanism that supports exchanging knowledge and experience. All researchers who go for the secondments need to prepare three presentations: (i) upon arrival at the host organisation: on the latest developments at their home organisations, (ii) at the end of their stay: on the progress made during their stays, and (iii) upon their return to home organisation: on knowledge gained during their stays at the host organisations.
b) **Tailored short courses** that are delivered by more experienced researchers from each partner (for the list of short courses within INFER procect see Table 1).
c) **Invited lectures, workshops, and conferences** that enable to present the project to external community. For example workshop on Smart Adaptive Systems that is organised annually by BU.
d) **Meetings with all partners** (and all researchers involved) organised once a year in order to discuss progress made and to exchange ideas for future activities.
e) **Activities that are part of the standard educational and staff development programs of the host organisations** are made available to the seconded researchers.
f) **Both formal and informal research meetings, discussions etc.**