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Developing workplace research skills to bridge the innovation gap between University and Industry

Dr. Ileana Hamburg
Institut Arbeit und Technik,
WH Gelsenkirchen, Munscheidstr. 14,
D-45886 Gelsenkirchen, Germany

Dr. Gabriel Vladut
IPA CIFATT Craiova, Stefan cel Mare str. 12,
200130, Craiova, Romania

ABSTRACT

Cooperation between university and industry/business for innovation and education is important particularly due to uncertainty in economies, increase competitive global markets and low growing prospects. There is necessaryto look what are most important topics that, practitioners, policymakers and researchers need to advance in the next years, why these topics are important and which approaches are needed to address these topics.In this paper one of such topics is addressed within cooperation with Small and medium sized companies (SMEs) which are drivers of Europe's economycompanies.This paper will explore how to enhance the ability of SMEs to become more innovative by exploiting researchskills and knowledge being created in third level institutes.

Keywords: Cooperation, University, Industry, Entrepreneurship, Research skills

INTRODUCTION

It is widely recognized that the cooperation between university and industry/business for innovation and education is important particularly due to uncertainty in economies, increase competitive global markets and low growing prospects. There are many programmes which significant amounts of funds for strengthening such cooperation. However, there is a need to look what are most important topics that, practitioners, policymakers and researchers need to advance in the next years, why these topics are important and which approaches are needed to address these topics.

In this paper one of such topics is addressed within cooperation with companies.

Small and medium sized companies (SMEs) are drivers of Europe's economy, assuring economic growth and employment. (EUROSTAT 2015) Some of them have not survived the financial crisis; others have had to innovate to be competitive (European Commission, 2014). 'Innovation in SMEs' is an important driver for growth, employment and reducing financial barriers. However, many SME owner/managers are concerned about the day to day survival of the firm and find it difficult to continue to be as innovative as in the initial start-up stages (Garland et al, 1984).

Furthermore, this problem is exasperated by the shortage of skilled labour (Muller et al, 2017). To address such issues SMEs, need to leverage from external sources of innovation and skills to enable them to grow. Third level institutes are providers of such services however EU policy

has expressed concern regarding the high-quality research being produced by our third level institutes but not been applied in practice. (EU 2009).

This paper will explore how to enhance the ability of SMEs to become more innovative byexploiting the skills and knowledge being created in third level institutes.

IMPORTANCE OF UNIVERSITY INDUSTRY COLLABORATION

Innovation involves the utilisation of new knowledge or a new use or combination of existing knowledge. New knowledge may either be generated by the firm during its innovation activities (i.e. through intramural R&D) or acquired externally through various channels (e.g. purchase of new technology). The use of new knowledge or the combination of existing knowledge requires innovative efforts that can be distinguished from standardised routines". (OECD, 2005)

Education providers have long been channels of this knowledge that can take the form of research partners, contract researchers, skills providers, informal interaction, technology transfer, equipment, resources and scientific publications (Perkmann and Walsh, 2007). However, there are two main issues.

Firstly, university industry collaborations are wrought with challenges such as trust, different incentives for conducting research, time constraints and project management issues (Cyert and Goodman, 1997; Plewa and Quester, 2006). To overcome these issues a phase of pre-collaboration was proposed by UK government's LINK programme in 2000.

In addition, the innovation voucher scheme in Ireland and the Netherlands is focused on building pre-collaboration however often SMEs are not aware of such initiatives or do not have the time to search for relevant staff which are dispersed in different Higher Education Institutes (HEIs) and research institutes nationally.

Secondly HEIs produce 'general research' and an internal capacity is required to allow them to companies to adapt this research to their business (Soh and Subramanian, 2014). However, SMEs often do not have this internal research capacity due to limited resources and skills shortages. They therefore need to enhance their ability to leverage from external sources of knowledge such as that produced by universities. To do this it is important for them to develop an absorptive capacity. "Absorptive capacity is a dynamic capability which creates new firm resources by searching, acquiring, assimilating, transforming and exploiting external knowledge with internal resources" (Patterson and Ambrosini, 2015)

Studies have proven that the greater the internal research and development of the organisation the higher their ability is to collaborate and exploit external research conducted by higher educations (Bercovitz and Feldman, 2007 and Fabrizio, 2009).

The lack of research on how to enhance a firm'sabsorptive capacity is evident. Lane, Koka, & Pathak, 2006argue that a combination of exploratory learning, transformative learning and exploitative learning is key. (Lane, Koka, & Pathak, 2006). It requires individuals in companies to be continuously seeking and evaluating new research ideas. Where ideas are sourced it requires them to transform this knowledge into a format that can be exploited and used.

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purchase of new technology, utilization of IT resources) or as result of the collaboration with Universities. The use of new knowledge requires "innovative efforts that can be distinguished from standardized routines". (OECD, 2005).

The transition from an industrial to a knowledge-based society and the short-time adjustment of knowledge, competences and skills for new business should change also entrepreneurship education.

Changes in work and living conditions, digitalization progress and societal change require adapted education forms, life-long learning new concepts and models, providing more and more short-termed, and new structural answers.

Besides different approaches to modernize and improve EE, social innovation is becoming prominent in policy, scientific and public debates in Europe and global. For a fair and accurate analysis of how to develop the concept of digitization in companies and in society, how to form the new utilizations, we needed to know the initial situation.

a. Technological change has a strong impact on daily work
b. Manufacturing processes change rapidly
c. The networking of systems and applications is increasing
d. Teams are increasingly working virtually
e. Higher customer requirements (new business models/service offers, personalization of products (batch size 1), short delivery times)
f. Results of the study "vocational training trends in Germany 2017" show:
    - Digitalization has reached companies at all levels of qualification.
    - In order to be prepared for the digital transformation, companies need employees with versatile digital skills.
    - Training portfolios in companies are still far from meeting digital requirements

This paper explores the innovation barriers faced by small companies, challenges they face when collaborating with universities and it explores if workplace research skills can potentially offer a method to enhance the absorptive capacity of small companies. Research skills empower the employee to identify and gather the most appropriate material to their learning needs; as a result it encourages a 'learning to learn approach'. The approach will allow employees to learn the skills to gather data in a systematic manner to fill knowledge gaps in their organisation. These skills can be applied to a wide variety of contexts, disciplines and professions.

The paper relates to current EU policy emphasising the need for workplace learning and transferable skills to empowercitizens to become employable and adaptable (EU, 2010). Furthermore, it argues that in addition to absorptive capacity workplace research skills foster entrepreneurial mindset, they encourage inquiry based learning (Craig and Bielenberg, 2014) by promoting the exploration of new opportunities, examining new ways of doing business and exploiting these using existing resources. These competencies align to the ENTRECOMP framework (Bacigalupo et al, 2016)

METHODOLOGY

In November 2016 a survey conducted by the consortium with 142 SMEs from Greece, Spain, Ireland, Germany, Romania and Lithuania regarding the barriers to innovation they face, challenges with collaborating with Higher Education Institutes (HEIs) and how these could be overcome.

A random sample of companies with between 1 and 250 employees were targeted. Of the responses 90% were from companies with less than 100 employees.

RESULTS

Ninety seven percent of SMEs said they would like to be more innovative.The survey has illustrated that SMEs which are not in the initial stages of start-up or growth feel that they are currently not supported in terms of innovation. For them to become more innovative an extensive investment in such resources is required.

However, it is difficult for the SME to identify the resources required to become more innovate also receiving a return on this investment can take time and create cashflow problems.

SMEs due to their small scale have limited resources and in the survey cited time (48%), money (49%), equipment (60%) and expertise (38%) as barriers to innovation.

Leveraging from external resources during periods where SMEs are facing innovation challenges can allow them to grow without having to make large initial investments until their business is sustained.

HEIs have a huge body resources which SMEs can avail of, equipment and specialised knowledge is readily available. However,fifty one percent of SMEs work internally to address innovation challenges, with only one third of SMEs approaching higher education institutes. This expertiseis often difficult to avail of, over 48% of companies felt that HEIs do not understand their business needs.

As a result, research outputs and educational programmes are not contextualised to the needs of the company and the HEIs. To adapt this lot of time and effort is required on behalf of the company which is limited within SMEs.

Further challenges in collaborating with HEIs weretaking too long to implement ideas (41%), lack of incentive (25%) and cultural differences (20%) In the survey many companies felt that HEIs were inaccessible to small companies for example *"Scale of the projects will not get the support required i.e. too low on the ladder"* and "*We believe the company is too small to avail of substantial funding"*

When queried regarding the internal research capacity of their companies, 52% reported that they do not use research methods when innovating. Most SMEs (81%) see research skills as important to make their company more innovative.

Despite their importance 62% of SMEs do not have research skills. In general (54%) SMEs highlighted that current educational programs do not provide the relevant research skills to assist them to conduct research.

Entrepreneurship is the art of to be able to turn ideas into action. This implies creativity, innovation, risk taking, and the competence to plan and manage projects in order to achieve proposed objectives.

The entrepreneurship competence is relevant not only for those who would like to start/ carry up a business but for all who would like to be competitive and efficient, to support changes in individual, collective, economic and social environments.

It is necessary to consider formation, education, entrepreneurial culture, digitalization and personal formation, on each stage of development of eco-innovation models.

The development models should work in innovative eco-systems, and functional complex that creates competitiveness, efficiency and added value. Entrepreneurial training and digitization are not two different components of the road to competitiveness but complementary components, which should be approached unitarily in the process of creating an efficient entrepreneurial culture.

For this reasons, the partnership business environment – Universities is a key point strategy to bridge the innovation gap between University and Industry, to realize the necessary entrepreneurial culture and vision.

RECOMMENDATIONS

The survey indicated the need to inform SMEs that universities are open to collaboration. It also highlighted the importance of building relationships and trust and educating academics on business needs. Furthermore, the importance of research skills was highlighted. As a result, some recommendations have been made.

Recommendation 1: Reinnovate- A Programme in Workplace research skills

Reinnovate is aimed at providing employees in companies with workplace research skills to assist them to become entrepreneurial by systematically seeking business opportunities, identifying initiatives and implementing these.

With the increasing pace of change employees need to continuously adopt new technologies and methods of doing business to satisfy increasing customer demands. Research skills are a prime way of providing learners with the capacity to gather new knowledge to enable them to adopt new methods.

To reflect the use of research skills to allow learners to adapt to new business demands the programme title ***Smart Research as a 21st Century Skill for Business*** was agreed.

Research skills will allow employees in the workplace to adapt to these changes by proactively seeking new opportunities for their company, making data driven decisions to implement these opportunities and evaluating the impact of this on the business performance. The student will also be required to manage the implementation of the workplace research project by leveraging from internal and external resources readily available to them.

They will have to evaluate the value of the project to their organisation from a financial, social and cultural perspective. They will also have to identify future opportunities for their organisation.

At the end of the programme the employee will have designed, managed and implemented a small-scale research project in their organisation, determined its impact on the organisation and explored future avenues for research. The programme will comprise of four modules which will align to the skills needs identified by SMEs in the need's analysis, skills needs identified in the literature and will map to the ENTRECOMP framework

Module 1: Using research to identify future opportunities

Within this module the participants learn to conceive and explore the feasibility of different business opportunities. Different forms of learning will be used.Employees from SMEs should have the ability to identify and assess new opportunities in their workplace.

The business model they must develop should fit in the business environment of the company and when it is ready it should get closer to the business goal chosen by the learner.

Module2: Smart methods to gather and analyse data

This module will enable learners to gather and analyze relevant data to allow them to implement a business opportunity or an innovative idea. Learners will design and implement new ideas in a data driven manner.

Module 3: Managing your research project

Every participant should manage a research project – alone or in a team, identify objectives and communicate the results. The students will learn how to manage internal resources to bring the business opportunity ideas developed in previous modules.

Module 4: Evaluating success and future opportunities

The module should help the students to do a critical reflection on order to assess it for learning (reflective learning) and to improve practice (reflective practice). Reflective learning improves the professionalism and critical thinking.

The evaluation proposed to be used within this module relates to two main types of learning: learning within the project and generalized learning about the implementation of quality improvements

The project Reinnovate will develop several different elements to allow the model to be put into practice.

Firstly, a pedagogical framework for the delivery of workplace research skills using an inquiry-based learning approach will be developed. It can be argued that this type of pedagogical approach facilities explorative learning by encouraging the learner to seek ideas and opportunities.

It also enables transformative learning by encouraging the learner to contextualise such opportunities to the organisations needs and exploitive learning, in that the learner applies the ideas to the business to allow them to be exploited.

This may correlate to the framework developed by Lane et al, 2006.

The inquiry-based learning approach stems from problem-based learning which was adopted by a previous project Archimedes.Problem Based Learning (PBL) is a form of inquiry-based learning which in Archimedes provided several benefits to SMEs like immediate return on investment, low cost, on the job training, thus the learning is highly contextualised and situated, practical and related to the SME's needs and sustains the organisation's competitive advantages (Hamburg, 2015).

It encouraged innovation, both individual and cooperative work and thinking, a greater understanding of a topic due to active learning, engaging in the material. PBL increases motivation to learn thus developing a learning culture, developing skills in critical thinking,

leadership, communication, problem solving. PBL has roots in inquiry-based learning and so similar benefits are expected from using this pedagogical approach in the Reinnovate project.

Secondly, an ICT collaborative platform to facilitate interorganisational and collaborative research will be developed. This will enhance the University industry relationship by allowing both parties to work on research simultaneously building trust and collaboration by communicating results.

Thirdly, an online programme will be created. This will develop workplace research skills which will enhance the absorptive capacity of SMEs by encouraging employees to source new ideas and opportunities and apply them to their organisation

Fourthly, empirical research will be conducted to determine if the absorptive capacity of the organisation has been enhanced as well as the overall impact of research skills on the entrepreneurial culture and performance of the organisation.

Recommendation 2: Formalising the provision of services to companies

To strengthen the "**knowledge triangle", which links education, research, and innovation**a central hub where SMEs can determine the services and expertise offered by all HEIs in Europe should be developed. SMEs should be able to use an ICT platform to record the type of innovation they need.

The center can then refer them to the relevant European HEI with the expertise to assist them. By recording the innovation needs of SMEs it can provide reports to academics on the innovation needs of SMEs and allow them to adapt their research to these needs, bridging the knowledge gap. (see figure 1)

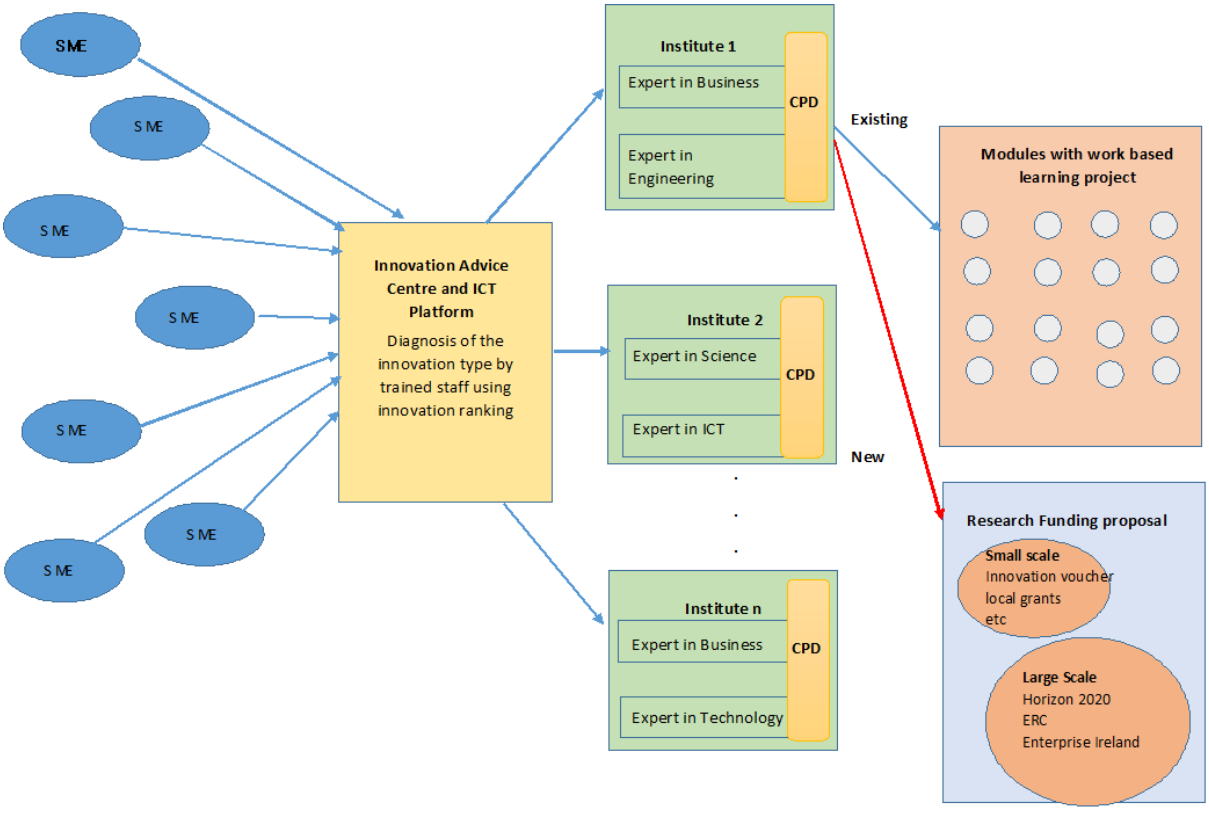

Figure 1: A Formal University Service to SMEs

Furthermore, the service could provide a Continuous Professional Development (CPD) andcareer progression in which academics are rewarded for engaging in collaborative research with small businesses. This would develop 'entrepreneurial academics' and allow them to modernise their teaching to ensure it reflects the latest developments on the application of cutting edge research in companies.

Currently in HEIs academics are rewarded for partaking in teaching and learning CPD programmes which are widely available in most HEIs. Currently there are few programmes which give widespread recognition for CPD concerning industry research collaboration.

CONCLUSIONS AND FUTURE WORK

The research interests of university and industry are often quite different but there exist opportunities to produce good academic research that can help industry.

First, it is important to understand industry needs that are sometimes difficult because industry does not know/express what it wants or does not understand the research process.

It is necessary to identify research gaps and ask industry if they are interested in this process. Work together with industry bodies to identify research gaps is one strategic measure. The research process should be explained and the results.

It is important to produce results in a form that can be used by industry i.e. research reports, barometers, background papers, media releases, workshops.

It can be helpful to produce outputs first as industry material and then an academic version.

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