Improving the Offer for SMEs Through Managing Internal Competency Gaps in Ecolabnet Project: The Case of Czestochowa University of Technology (Cut)

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Abstract: Proper knowledge management is of particular significance in all projects, and especially important in the case of international ones. Such projects involve actors from several countries, and thus, have to allow for considerable differences stemming from cultural differentiation, diverse work patterns, and various levels of competencies in the project's area. The latter ones seem to be most prone to changes, and improving the level of internal competencies in the case of one of the project partners can greatly contribute to a larger success of the project as a whole. To do so, it is crucial to analyse one's gaps of competencies and draw up a plan of introducing corrective measures in this respect. This has been done during the implementation of the Ecolabnet project, financed by Interreg, and implemented in the six partner countries: Finland, Denmark, Poland, Sweden, Estonia, Lithuania, in the years 2019-2021. All the project partners formed the project consortium, whose objective was to accelerate the development of eco-innovations in manufacturing enterprises from the SME sector in the Baltic Sea Region. One of the stages of knowledge management in the project constituted identification of own competency gasps and addressing this issue. The paper presents the process of managing the knowledge on own competency gaps, and the measures that were taken so as to eliminate them. Additionally, the authors present the results of the survey conducted among the SMEs in the project partner countries, which illustrates the needs of the said SMEs in the area of eco-innovations. The authors also describe the steps taken so as to eliminate own competency gaps and improve the quality of CUT's offer for SMEs based on the results of the survey.

Keywords: eco-innovations, internal competencies, competency gaps, SMEs

1. Introduction

The process of internal development that has been presented in the paper was conducted within the confines of implementing the international project ECOLABNET. The project was funded by Interreg Baltic Sea Region (Project #R077 ECOLABNET of Interreg Baltic Sea Region), and its objective was to create a collaborative network of service providers to stimulate development and implementation of eco-innovations in manufacturing Small and Medium-Sized Enterprises (SMEs) of the Baltic Sea Region (BSR). The project consortium ECOLABNET comprised scientific institutions and Research and Development Institutions (RDIs) from six Baltic Sea Region countries, and included the following: Design Centre MUOVA (Finland) – project leader, Centria University of Technology (Finland), Kaunas University of Technology (Lithuania), Vilnius University (Lithuania), University of Tartu (Estonia), Estrotech Ltd (Estonia), Lithuanian Business Confederation, Sustainable Innovation (Sweden), VIA University College (Denmark) and Czestochowa University of Technology (Poland) represented, among others, by the author of the present paper. The project was carried out in the years 2019-2021. The main actors involved in the project constituted Research and Development Units, Intermediary Organisations (IOs) and Small and Medium-Sized Enterprises. The creation of ECOLABNET network was an attempt to address the gap between the demand for expert knowledge on eco-innovations (including sustainable eco-innovations) on the side of SMEs from the BSR and the offer of RDIs in this area (ECOLABNET, 2021). It is believed that creativity and innovation constitute these important factors that allow an enterprise to face the competition pressure (Gede et al., 2019). More importantly, applying the network-based concept of developing innovations means that both organisations from the local community and from other geographies provide important tangible and intangible resources making such networks including non-local actors very effective in gaining and diffusing knowledge (Ferreiro and Lourenco, 2019).

The present paper constitutes a precious source of knowledge on the improvement of the process of knowledge management in the ECOLABNET project, and so in alike projects. It also highlights the relationships between utilisations of the potential of Research and Development Institutions and expert knowledge they provide to stimulate a wider implementation of eco-innovations in SMEs. With this in view the authors have formulated the objective of the present paper – an attempt to answer the following research question:

- RQ – Does internal development strategy formulation contribute to better knowledge management and improved quality of RDIs offer?

The paper constitutes a contribution to the literature by analysing one of the stages pertaining to the process of knowledge management in projects – internal development of organisations involved in the project. It has the following structure. Introduction includes basic information about the ECOLABNET project, its main actors, goals, and important role of RDIs in fostering development of eco-innovations in SMEs. Chapter 1 refers to the role and importance of strategy of internal development for better knowledge management. Chapter 2 presents the research sample and main findings pertaining to identified needs of SMEs from the Baltic Sea Region. In the third chapter the authors present the internal development plan for the partners. Chapter 4 focuses on the analysis pertaining to identification of own competency gaps and introducing corrective measures in this area by the CUT Partner. The last chapter concludes the paper and contains suggestions regarding further research works.

2. Literature review - role and significance of strategy of internal development

Organisation's internal development can be perceived as one of the crucial processes that improve organisation's efficiency of functioning and at the same time results in improved offer of products and services of a given organisation. In the opinion of Henry (2021), improved competencies resulting from learning within the organisation can be used for its internal benefit. In addition, there is no need to use valuable resources to manage various cultures (especially important in projects of international scope). No wonder then that much attention in the literature on the subject has been devoted to all the elements that contribute to a successful implementation of internal development strategy in organisations of various types. The process of drawing up an organisation's development strategy, including internal development strategy, involves such elements as planning the strategic activities to be performed, setting the goals to be achieved, formulating and defining strategy's implementation form. All of the abovementioned elements are supposed to ensure that the final strategy will improve organisational capacity in the scope of a given organisation's field of expertise. The literature on the subject is abundant in the examples demonstrating that these organisations that are able to define their strategic goals, plan the activities that ensure elimination of soft spots in the range of possessed competencies, and successfully implement the strategy in practice are more successful in their operations than the ones that fail to do so. Some of the examples have been presented below.

In their paper Elonen and colleagues (2002) examine projects of internal development and divide them into problem solving, utility, maintenance and research projects. The researchers state that the underlying goal of projects of internal development is typically performance improvements. Examples of these can include development of business processes, internal information technology development, organisational change or re-engineering – they pertain directly to learning and improved knowledge management.

George and colleagues (2019) point out the fact that it has been recognised in the goal-setting theory that organisations with clear set goals perform better. This stems from the fact that setting the goals translates into the focus on these activities and resources that pertain to core issues. What is also relevant, in this way employees understand the priorities of the organization as a whole. It can be stated then that application of goal-setting theory to strategy formulation makes it clear to the organization and its stakeholders what the organizational priorities are and how they are going to be addressed.

Bryson Crosby, and Bryson (2009) argue that critics of strategic planning usually present it to occur in the form of fairly rigid, mechanistically applied sequence of prescribed steps, completion of which is frequently impossible without involvement of huge amounts of information, power, and authority. They also tend to be separated from processes, methods, and mechanisms of implementation, therefore not contributing to learning within the organisation. However, according to these researchers it is necessary to stress the essentially uniform view of strategic planning, which is linking the process to context. In addition, what actually counts here is not specific steps nor information needs but how the process is used to promote strategic thinking, acting, learning and knowing, and also how to ensure that the right actors will be involved and stakeholders affected in the proper way.

Equally important issue is formulating internal development strategy. According to Brorström (2020), the process of strategy formulation itself can be more important than the actual content of the strategy. This means that as the process of formulating the strategy results in organisational changes and learning, then it can prove more beneficial and more important for the organisation that what has been included in the final document. Mitchel (2004) defines strategy formulation as the second phase in the strategic management process. In his

opinion this produces a clear set of recommendations, with supporting justification, that revise as necessary the mission and objectives of the organization, and supply the strategies for accomplishing them. Acur and Englyst point out to the fact that a strategy's effectiveness is frequently evaluated in retrospect, which is certainly valuable in determining the appropriateness of current ones. The authors stress the importance of assessing strategy formulation process rather then the resulting performance. According to them an effective strategy formulation process leads to a good strategy.

3. Method of acquiring data on needs of SMEs from the Baltic Sea Region and main findings

The ECOLABNET project was implemented in the years 2019-2021 and it will be maintained for further five years, each year one of the partners taking over presidency. This is supposed to ensure that the results of the project will reach its main beneficiaries – SMEs from the BSR. The starting point of the project was the research aimed at recognising the level of knowledge about eco-innovations among the manufacturing SMEs from in the six partner countries of the project. The research was assumed to provide data on the current level of pro-environmental awareness, and also the level of pro-environmental activities already implemented by the investigated SMEs. Another issue investigated in the research was primary stimuli and barriers for implementing eco-innovative solutions signalled by the SMES. For this reason, the CAWI (Computer Assisted Web Interview) method was applied in the data gathering process. According to the definition by DJS Research (2008) in the CAWI method the survey appears in the browser in the form of a web-page that can be reached by the respondents in different ways. The survey respondents only see the questions to be answered on the screen while the processing of answers occurs in the background. The answers for the questionnaire are sent immediately to the main server, which allows for continuous tracking of data collection and the results.

The survey questionnaire used in the ECOLABNET research included 27 questions that were divided in five groups. The first group of 5 questions provided basic information about the surveyed enterprise and its profile of operation. The second group, questions 6 to 15, pertained purely to eco-innovations, in particular knowledge about eco-innovations, motivating factors and barriers to introducing eco-innovations in manufacturing SMEs of the BSR region. Questions 16 to 21 were supposed to investigate the knowledge of the surveyed SMEs with regard to 3D printing as an eco-friendly solution that can be applied in manufacturing processes and replace the previously used one that contribute to environmental degradation. Then, questions 23-24 were supposed to provide an answer to the question of how big the demand for expert knowledge was and if it could be satisfied by project partners. The questionnaire finished with the 3 questions concerning the possibility of future cooperation and address details. The research was conducted on the group of 298 enterprises located in the six partner countries: Estonia, Poland, Finland, Lithuania, Sweden, and Denmark. The data collected in the research was then processed and utilised at formulation of knowledge management strategy in the project. It also provided valuable knowledge on the needs of the investigated SMEs with regard to barriers that hinder their effort in introducing eco-innovations in their operations. During the survey its respondents were asked to assign scores from 1 to 5 to these barriers on the five-point Likert scale. Additionally, the weighted average has been used here to illustrate their significance. In this way the values that have been assigned greater values play a more important role in determining the weighted average than the values that have been assigned lower values. This data has been summarised in Table 1 below.

Table 1: Barriers related to knowledge according to the SMEs from the BSR (five-point scale, and weighted average)

Barriers related to knowledge	Score 1 (%)	Score2 (%)	Score 3 (%)	Score 4 (%)	Score 5 (%)	Weighted average (WA)
Lack of suitable tools and methods	6,99	20,96	28,82	25,76	18,78	WA – 3.26
Limited access to external knowledge	10,48	21,40	35,37	20,96	11,79	WA – 3.24
Lack of proven technologies	8,30	18,78	31,00	26,64	15,28	WA – 3.22
Lack of in-house expertise	9,17	17,90	30,57	27,51	14,85	WA – 3.21
Legislative demands	13,10	18,78	28,38	27,07	12,66	WA – 3.07

Total responses N=296, Answered: 229 Skipped: 67

(…) – number of indications

Source: Based on the research conducted in the ECOLABNET project

As Table 1 demonstrates, the main barriers related to knowledge that were signalled in the survey include in the first place the lack of suitable tools and methods. The surveyed SMEs also indicated limited access to external

knowledge, lack of proven technologies or in-house expertise as the barriers that hinder introduction of eco-innovations by them. Additionally, legislative demands with regard to frequently changing legal regulations were recognised as a barrier to a greater involvement in the concept of introducing eco-innovations by small and medium-sized enterprises in the six partner countries of the project.

4. Internal development plan of Project Partners

One of the primary objectives of all the project partners was to assess their competencies level in the scope of providing expert knowledge on eco-innovations, identify gaps of their competencies in this respect, and introduce corrective measures in this area. This was supposed to improve the range of services rendered in particular by RDIs, and ensure their better adjustment to the needs of manufacturing SMEs struggling to introduce eco-innovations in their operations. A particular role in expert knowledge transfer play universities. Certainly, the flows of knowledge to SMEs can occur from various directions and come from a range of actors.

Yet, as the research by Etzkowitz and Zhou (2006), and Jones and de Zubielqui (2017) shows, universities have long been considered to be key sources of knowledge in knowledge-based societies. In addition, more recently they have been thought to be also knowledge source for eco-innovations and Sustainably-Oriented Innovations (SOI) in SMEs. In general, the competencies of the network included: knowledge in additive manufacturing, bio-based materials, product-service system design, eco-branding, value chain assessment, business model development, legislation, customer insights, certifications and life cycle assessment. Having analyses the possessed gaps of competencies the project partners introduced internal development strategies that included plans of actions aimed at elimination of the identified competency gaps. The expected result of the process of internal development was better management of knowledge and expertise by the partners, which would translate into a better tailoring of their service offer to the needs signalled by the target SMEs in the BSR. As these enterprises are frequently not involved in their own Research and Development (R&D) activity, they report the lack of access to expert knowledge on eco-innovations to be one of the crucial factors that impedes their innovativeness (Kucęba and Chmielarz, 2020). As a result, they find it difficult to meet the criteria set out in the Europe 2020 strategy and are unable to increase the competitiveness of their offer. Therefore, the process of internal development of the project partners seems to be of particular significance, as better knowledge management with regard to the expectations of the targeted SMEs would boost their eco-innovative development (Penttinen et al., 2021). As the partners of the project consortium were striving at adjustment of their offer to the particular needs signalled by the survey respondents one of the subsequent stages of knowledge management process was an analysis of own competency gaps. This was part of the development activities planned in the project. According to the guidelines of the Project Leader all the project partners were supposed to develop required organisational competencies for creating better access to their facilities and competencies. Within this task the partners had to first identify the gaps of competencies in their own organisations so as to comply with the needs of SMEs. In the first step each of the RDI partners established a development team. The task of the development team was to create a development program including strategic objectives, at least 3 development activities as well as an action plan and steps necessary to implement it. To assist the RDI partners in identifying own gaps of competencies the Project Leader drew up a template to be filled in by them. The template has been presented in the graphic form in Table 2 below.

Table 2: Template for establishing own competency gaps

Competencies and expertise in specific expertise areas within the partnership		
Partner name	Competencies and expertise in Solving Barriers issues of SMEs	
	What do we need here?: We listed the main barriers that the SMEs identified in the surveys. We ask every partner to think (and write down!) if (and how) they would be able to help the SME's to overcome each of these issues. Familiarising with the Reports would be beneficial for delivering this task ---------->	SMEs report
		IO report
Lack of capital	counselling in the scope of acquiring external resources, facilitating access to information, who can ensure financial resources for SMEs, venture capital, business angels	
Lack of alternative materials	cooperation with research centres, institutes, development centres, technology transfer centres, developing alternative materials; enabling contact with for SMEs with partners	
Lack of knowledge/experience	counselling in the scope of benchmarking, direct support in the scope of eco-innovations, bio-degradability, recycling, prosumer energy, low emission reduction , energy savings, waste treatment	

Competencies and expertise in specific expertise areas within the partnership		
Certification costs	counselling in the scope of diversifying costs related to implementing innovations among a group of recipients	
Uncertain return on eco-investments	counselling in the scope of preparing business plans and innovations, identifying risks and methods of limiting them	
Limited access to external knowledge	Rendering direct services in the scope of information and knowledge, transfer of Partner's expert knowledge, assistance in access to external knowledge, search for and matching external experts and SMEs that need knowledge in a given scope (e.g. in the scope of eco-innovations, bio-degradability, recycling, prosumer energy, low emission reduction, energy savings, waste treatment)	

Source: Based on the internal materials of the ECOLABNET project

As one can observe based on the content of Table 2 the barriers included in the template had been previously indicated by the investigated SMEs. They basically concentrated on six reasons behind these barriers' occurrence, namely: lack of capital, lack of alternative materials, lack of knowledge/experience, certification costs, uncertain costs of return on eco-investments, limited access to external knowledge. While developing their internal development plans the project partners were supposed to address their gaps of competencies in assisting SMEs in overcoming these particular barriers. This was based on two surveys – the SMEs survey and the Intermediary Organisations survey (third column of Table 2).

5. Development and implementation of internal development strategy by CUT

In order to bring the internal development plan into effect the Team of Czestochowa University of Technology, following the guidelines of the Project Leader, drew up a strategy of internal development. The strategy included details of the actions that needed to be undertaken so as to identify the gaps of own competency and address them in the subsequent steps. It needs to be stressed that the template of the internal development strategy developed by CUT was used by all the remaining Project Partners to assist them in the process of identifying own gaps of competencies. Particular stages of the strategy for the internal development have been summarized in Table 3.

Table 3: Stages of Internal Development Strategy for the CUT Partner

Stage	Stage description
1. Identifying or creating a team in charge of internal development. The team responsible for the collaboration with SMEs in the given organisation	The conducted analysis showed that at the CUT there was not a unit responsible for collaboration with SMEs strictly in the scope of developing eco-innovative initiatives. Therefore, a decision was made to appoint a team for collaboration with SMEs in the scope of developing eco-innovative initiatives. The team includes employees of two departments of Czestochowa University of Technology: Faculty of Infrastructure and Environment and Faculty of Management.
2. Determining by the identified/created team the priorities and strategic actions in the context of collaboration and support for SMEs	The following major priorities and strategic actions were defined in relation to collaboration with the SME sector: 1.Stressing the importance of eco-innovations and eco-innovative activity as key sources of SME sector enterprises competitiveness. 2. Supporting technological research in the aspect of early validation of products and services, including so called first production. 3. Promoting investments of enterprises into research and development of eco-innovations in synergy with R&D centres and higher education sectors. 4. Creating networks of knowledge and technology transfer. 5. Developing competencies in the scope of designing and creating eco-innovations through investments in knowledge and skills.
3. Identifying by the internal development team the needs of SMEs in the scope of eco-innovative actions (including the needs identified in the survey conducted among SMEs in partner BSR countries).	The needs of SMEs in the scope of eco-innovative solutions were identified based on the conducted survey and direct interview with the use of survey questionnaire.
4. Identifying competence gaps in particular areas of knowledge within the partnership (in the scope of theoretical and practical	The Internal Development Team identified gaps of competence in particular areas of knowledge within the partnership (in the scope of theoretical and practical knowledge, know-how, skills; providing

knowledge; know-how; skills; providing services; support in the scope of information, technology, and infrastructure; consulting, eco-innovative, project actions; etc.).	services, information, technological and infrastructural support; consulting, eco-innovative, project activities, etc.).
5. Determining lines of actions so as to eliminate competence gaps.	The following actions were to be undertaken to eliminate competence gaps in the context of the needs of SMEs: • determining development objectives and identification of external factors that influence the occurring problems; • determining the current level of competencies and knowledge in the scope of innovations; • recognising development needs in the scope of eco-innovative initiatives.
6. Drawing up development strategy with regard to determined primary lines of actions	The underlying objective of the strategy is to strengthen the competencies of the team for collaboration with SMEs in the scope of developing eco-innovative initiatives and strengthen its internal development at Czestochowa University of Technology.
7. Decomposing strategic objectives	With reference to the strategic objectives distinguished in pt. 6 , the Internal Development Team defined 8 specific objectives to be achieved in this area.
8. Indication of key development actions/activities - min. 3 activities (please specify activities):	Identification of key development actions/activities in the scope of eco-innovative solutions has been conducted based on the survey and direct interview with the use of a survey questionnaire and in the context of the adopted strategy of internal development. It was established that in the case of the CUT Team three primary development area concerned: ▪ development of research infrastructure ▪ developing the network of contacts ▪ designing, drawing up and developing the portfolio of services for the SME sector
9. Establishing an action plan and tasks implementation within the developed strategy.	The CUT Team members drew up an action plan regarding the tasks to be performed within the developed strategy.
10. Determining implementation steps/stages in the scope of strategy implementation	Defining stages for the strategy implementation within the established action plan.
11. Monitoring the progress of undertaken actions (periodical check-up of tasks implementation progress, applying corrective measures if necessary).	Monitoring the level of performing tasks - based on the adopted strategy of the team regarding collaboration with SMEs in the scope of developing eco-innovative initiatives.
12. Developing and accepting benchmarks of internal development evaluation	To evaluate the internal development of the CUT Team a set of ratios was developed to measure the progress of the team's internal development.
13. Evaluating strategy implementation	It was established by the Infernal Development Team that to evaluate the strategy implementation periodical checks would be performed ending with conclusions about the need or lack of need to revise/change the strategy or its part.

Source: Based on the internal materials of the ECOLABNET project

As one can observe based on Table 3, the strategy of internal development for the CUT Partner included carefully planned stages. These began with creation of the team responsible for drawing up the strategy. In the next steps the newly-formed team analysed the needs of the SMEs from the BSR with regard to eco-innovative initiatives and identified its own gaps of competency in this area. Having done so, the team addressed the issue of eliminating own competency gaps by determining actions to be carried out in this respect. This in turn led to formulation of the strategy, which included strategic objectives and an action plan with the details of actions and tasks to be performed in the course of the strategy implementation. Finally, benchmarks of internal development were developed to measure the level of strategy implementation and also to evaluate the team's internal development. A measurable output of defining the stages of internal development for the CUT Team in the drawn-up strategy was improved knowledge on the needs of SMEs pertaining to eco-innovative actions. This in turn allowed the team to analyse own gaps of competencies in this respect and introduce corrective measures. It can be stated that the formulation of the strategy contributed greatly to the further improvement of the CUT's offer for SMEs and motivated the entire team to develop their knowledge in the areas its lack was observed. Therefore, in the light of the above, it can be stated that the research question *RQ – Does internal development*

strategy formulation contribute to better knowledge management and improved quality of RDIs offer? has been answered positively.

6. Conclusion

To sum up, internal development can be defined as the process of key importance with regard to its impact on organisation's efficiency of functioning. The process of internal development was also one of the key areas of knowledge management in the ECOLABNET project. It provided an opportunity for all the partners involved in the project to analyse their capabilities and seek for one's gaps of competencies that needed to be eliminated to support the targeted SMEs better in their eco-innovative development. The process of eliminating the gaps of competency was based on the research that had been conducted among SMEs from the Baltic Sea Region, in particular barriers and needs with respect to eco-innovations. These were supposed to be addressed by all the project partners while developing their internal development plans so as to assist the SMEs in overcoming them. For this reason the CUT Team developed the strategy for internal development that aggregated and ordered all the indispensable stages and steps that ultimately led to the implementation of the strategy and internal development of the team. A template of the internal development strategy was sent to all the project partners to assist them in the process of developing their own ones. The template included 13 stages of the process of internal development accompanied by details of setting and achieving the objectives of each stage. As universities are believed a special role in dissemination of expert knowledge, including the knowledge on eco-innovations, it was considered vital for the CUT partner to improve its offer of RDI services. The members of the internal development team eagerly participated in defining the framework of the strategy, and implementing the set objectives in the team's operations. It turned out that the process of formulating the strategy itself, concentration on own deficiencies, and an attempt to address the needs of SMEs from the BSR identified based on the survey conducted in the first stage of the project, allowed the CUT Team to improve their competencies in the scope of offered expert knowledge and eco-innovative services. This confirms the findings of the literature study conducted by the authors, where a number of researchers stress the importance of a properly defined strategy, pointing out that drawing up a development strategy contributes to learning within an organisation. The research pertaining to the implementation of internal development strategies of the Project Partners constitutes a separate paper of the authors, submitted for this year's edition of the conference.

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