Publishable summary

Description of project contents and objectives

The primary objective of the INNVIN project is to engage the large transnational partnership of KMM-VIN AISBL in the process of transforming it into an organization with a more effective strategy towards the industry. This should in turn enhance the financial viability of KMM-VIN AISBL and boost its statutory activities of which the most important one is the jointly conducted application oriented research on advanced materials. A set of measures has been proposed to reach this objective, including i.a. a survey of technology needs in Transport, Energy and Biomedical sectors, update of the contents and enhancement of functionalities of the members expertise and equipment database, dissemination campaign of KMM-VIN research, infrastructure and training potential and recruitment of new KMM-VIN members from the industry.

Description of the work performed and the main results achieved so far

One of first actions in line with the INNVIN objectives was an expansion of the KMM-VIN activities towards a new industry sector. When KMM-VIN emerged from the KMM-NoE FP6 project it was originally oriented at Transport (automotive and aerospace) and Biomedical sectors. Due to the fact that many classes of KMM structural and functional materials are also relevant for the energy applications, it was natural to expand KMM-VIN towards the Energy sector. Since 2012 the KMM-VIN partnership is focused on Transport, Energy and Biomedical (TEB) sectors. In these sectors the joint expertise of KMM-VIN members have reached a critical mass. To better serve the needs of these three industry sectors the KMM-VIN research structure has been transformed from the initial academic setting based on the advanced materials classes (Intermetallics, Composites, Bio-FGMs) into the new one with the Working Groups focused on the three industry sectors, i.e.: WG1. Materials for Transport, WG2. Materials for Energy, WG3. Biomaterials and complemented by a horizontal one - WG4. Modelling.

So far the implementation of the strategic plans developed within the INNVIN project have resulted in a number of deliverables such as the identification of the materials related needs in the TEB sectors within the thematic scope of KMM-VIN, enhancement of the functionalities and update of records of the expertise and research infrastructure database of KMM-VIN partnership, restructuring of the Materials Toolkit database and populating it with new or updated data on KMM materials, restructuring and redesigning of the KMM-VIN website, expansion of the KMM-VIN partnership by 30+ new members (of whom 20 are industrial companies from the Energy sector) and holding the 1st KMM-VIN Industrial Workshop on “Materials for Energy”. The KMM-VIN potential in research education and services has been disseminated on a number of international conferences, workshops and other events, through the KMM-VIN website, and the newsletter released semi-annually. A particular way of presentation of KMM-VIN potential to the industry were the individual visits of the INNVIN project partners to the companies.

The results of the INNVIN questionnaire on technological needs in KMM field in companies and SMEs from Transport, Energy and Biomedical sectors gave us a flavour of the general technology areas that companies are interested in but there was no clear indication of large numbers of companies interested in discrete technology. Interest in analysis, characterisation and testing was apparent, as was the use of external service organisations to assist in advancing company knowledge and the use of materials. In terms of interest in identified materials technologies relevant to polymers, metals and ceramics, the mostly picked material class were the composite materials. The other main technology areas of interest were: standardisation and design, price and availability of materials, advanced manufacturing techniques. Of the responses from suppliers in the Biomedical sector, there was broad interest in drug release materials, biosensor materials, antimicrobial materials and coatings, implant materials, biocompatible / biomimetic materials and coatings. In terms of interest in identified coatings technologies, the most important areas were: coatings materials properties, analysis, characterisation and testing, deposition technologies, and environmental issues. In terms of future expectations: 87% of respondees considered that a greater emphasis would be placed by their company on modelling components and/or materials, 60% considered that over the next 5–10 years specifications for the working environments that their products would be expected to operate under would become more challenging, and 75% thought that their company would place a greater emphasis at the product design stage on materials use issues such as life cycle analysis, energy audits and ecological sustainability. The results of this survey indicated a receptive climate for the scope of KMM-VIN collective research, given the correct strategy for identification of appropriate topics and identification/engagement with appropriate companies. Besides the INNVIN questionnaire the technological needs have been drawn from the analysis of Strategic Research Agendas of relevant European Technology Platforms and national professional organizations in Transport, Energy and Biomedical sectors.

The partnership has developed and is steadily improving two databases based on the records delivered by the members: the Expert-Infra database and the Materials Toolkit. The Expert-Infra is focused on the members' expertise in different areas of technology within the thematic scope of KMM-VIN. The Materials Toolkit contains information on the materials processed in the labs of KMM-VIN members (properties, manufacturing methods, modelling results, …). These databases are useful when identifying members with know-how and/or research infrastructure necessary to perform R&D orders from the external customers. These databases are also useful for the KMM-VIN internal research activities conducted as multi-partner projects within the Working Groups. Within this INNVIN project the structure and functionalities of the Expert-Infra and Materials Toolkit databases have been reconsidered and upgraded to make it a powerful tool for data storage with advanced searching and matching functionalities. The KMM-VIN webpage has been rebuilt and implemented in the new CMS platform (Context Management System), which allows to extend the functionalities of the databases, to simplify access and searching system.

The INNVIN strategy for the KMM-VIN training activities for industry includes two forms of activities: industrial workshops and specialised training courses. The KMM-VIN Industrial Workshops are events devoted to the themes relevant for Transport, Energy and Biomedical sectors. It is to be recalled that the Working Groups of KMM-VIN have been reorganized to better focus their research

and related activities on the targeted industries. The concept of KMM-VIN Industrial Workshops is such that KMM-VIN members, mostly academic and RTOs, present their current research results that are of relevance and interest for the industry. Potential topics for the Industrial Workshops are proposed by the KMM-VIN partnership and presented to the industrial partners from KMM-VIN AISBL and from outside for evaluation according to their preferences. Using this selection mechanism the programme of oral presentations is collectively worked out, whilst the remaining proposers are invited to present their contributions as posters.

The 1st KMM-VIN Industrial Workshop on "Materials for Energy" (IW1) was held on July 10, 2013 at lnstituto Nacional de Técnica Aeroespacial (INTA, KMM-VIN core member), Torrejón de Ardoz (Madrid), Spain. The programme of IW1 included 12 oral presentations and 19 posters. With this workshop the KMM-VIN partnership has launched a series of educational events for the Energy, Biomedicine and Transport sectors. The IW1 gathered over 60 participants many of whom represented large industry and SME's from the Energy sector. Preparations to the next KMM-VIN Industrial Workshops are in progress: IW2 on Biomaterials (organizer: Fraunhofer-IFAM, Bremen, May 2014,) and IW3 on Materials for Transport (organizer: Fraunhofer-IFAM-DD, Dresden, July 2014).

The approach to the specialized courses, which are another form of training activities for the industry had to be adapted to the current budget restrictions at companies for travelling and *extra mural* trainings, which are due to the economic crisis. The INNVIN response to this hurdle was the idea of specialised courses delivered directly on the company premises and the e-learning organized remotely by a KMM-VIN member(s) for the interested companies. The KMM-VIN specialised on-premises courses and e-learning are still in the development phase. Whilst the list of proposed topics has been established, the consortium is still making efforts to find the companies and SMEs interested in such offers.

Presentation of KMM-VIN strategy for industry on the website, various KMM-VIN dissemination activities at conferences and printed materials of KMM-VIN expertise and research infrastructure, direct visits at companies to present KMM-VIN strategy and activities, and efforts to attract new companies to join KMM-VIN partnership are the core of the INNVIN strategy of the expansion towards the industry. Despite a number of visits of the INNVIN partners at the companies across Europe the expected impact of these visits on the viability of KMM-VIN has not yet been achieved. This activity will be intensified in the 2nd half of the project.

The INNVIN consortium was very successful in bringing new members to KMM-VIN AISBL. Over 30 new institutions have joined KMM-VIN in 2012, of which 20 were companies, mainly from the energy sector. This is not only an enlargement of the Partnership but also an expansion of the thematic scope of KMM-VIN towards the energy sector, which was not present in KMM-VIN before. It became evident that the most interesting aspect of KMM-VIN for the industry is the networking of members for the purpose of doing joint research in the Working Groups. KMM-VIN has developed a system of internal research projects that bind members together and the Research Fellowship programme for young researchers that supports the joint research activities in the WGs.

Expected final results and their potential impact and use

The expected final result of the INNVIN project is bringing the KMM-VIN partnership closer to the industry from Transport, Energy and Biomedical sectors, either in the form of R&D and non-R&D contracts for the KMM-VIN members with the external customers, or through the accession of new members from the industry to KMM-VIN AISBL. In both ways the financial viability of KMM-VIN, which is in line with the Call objectives, will inherently be included in the related actions.

The expansion and proper coordination of joint R&D activities within the Working Groups with active participation of the industry members will remain one of the priorities for KMM-VIN because it attracts new industry members to apply for membership in KMM-VIN. This in turn will strengthen the integration of the KMM-VIN partnership and boost the research activities. On a broader scale a contribution of KMM-VIN partnership to a better structuring of the European Research Area and to technological development and innovation in the field of advanced materials for Transport, Energy and Biomedical sectors is to be expected.

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