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Contents

Section 1: Project Summary and Results

The Innovation Management Platform for Aeronautics (IMPA) is a collaborative wed-based software application that was designed to promote the development of breakthrough technologies and concepts in aviation by applying principles of systematic innovation, model-based idea generation, and the best practices in innovation management. Developed by Altran and FP7 consortium partners EADS Innovation Works, Cassidian Optronics (formerly Carl-Zeiss-Optronics), and Micos Engineering, the platform is built on a structured, workflow-based innovation process. Well-defined stages of idea generation and maturation, formal and informal reviews and feedback, lead to the selection of high-potential concepts for launch as formal projects. A continuous "technology watch" feature feeds and supports the idea development process. IMPA is designed to help generate, develop, and select novel concepts which can lead to disruptive/step-changes in aeronautics. The platform can equally be used to support and enhance incremental innovation.

The IMPA platform incorporates a structured, workflow based process ranging from capturing of raw ideas, to idea development and idea / concept selection with integrated informal and formal evaluations. Collaborative work is used throughout the process. The technology watch feature permits the systematic collection and monitoring of environmental and market changes, emerging technologies, and other information which can support idea development or the business strategy. Campaigns can be launched for organized calls for submission of ideas or technology watch items on specific topics to find solutions or identify new opportunities. Items are organized into clusters based on campaigns or automatic classification of spontaneous ideas whereby the classification is based on processing of key words and pre-defined categories. A Key Performance Indicator (KPI) and innovation management dashboard features permit top-down monitoring of innovation performance and alignment to the organisation's innovation strategy. Finally, innovation guidelines and creativity methods were incorporated into IMPA in order to help users apply a portfolio of systematic innovation methodologies throughout the idea development as well as assessment and selection process. The IMPA tool is adapted to the aeronautics industry by the application of pre-defined categories based on the ACARE Taxonomy for aeronautical research & technology.

The software was developed with proven Microsoft .Net / C# Framework, MS Sharepoint Foundation 2010 and SQL technologies for trouble-free management of large quantities of information. It was designed for easy implementation and compatibility with most corporate or academic IT infrastructures. Once installed on a networked infrastructure, it can be accessed via standard web browsers (Internet Explorer, Chrome) on PCs or tablets, allowing users to contribute ideas anywhere, any time. A mobile phone portal is currently under development as well.

The platform is founded on the principle that a well-defined innovation management process enhances an organisation's innovation performance. While most organisations have well–defined and structured processes for project management and industrialization, the front-end of innovation usually lacks structure and may even be chaotic. Process based approaches are used to ensure the quality and consistency of results across industries and are particularly relevant to the aviation industry where safety and reliability are of critical concern, therefore well-defined processes, standards and regulations are applied throughout the product development and product lifecycle.

Applying a structure to what is considered the "creative" phase prior to formal development may seem counter-intuitive, but this was supported by thorough review of literature conducted prior to and during the requirements definition phase of the project. Key factors identified by innovation surveys of leading organizations that led to significant improvements in innovation performance were the number of high quality ideas generated and collected at an early stage, and a well-defined process to refine, assess, and select the most promising ones. Assessment process was developed via clusters in order to allow for adequate relative comparisons / ranking.

Process models are important for achieving high performance, however they may also be difficult and time consuming to apply within organizations without a framework for implementation. The solution was therefore to apply the process model as a workflow based web-application. An easy to use interface which requires minimal training and guides the user through the process steps was a critical element in the design. Applying web-2 based collaborative and social networking concepts (including crowd sourcing capability) provides a familiar environment and encourages participation and discussions which stimulates the creation of new ideas. IMPA applies a structured approach to the pre-project-development phase of ideas into refined concepts. The structured model is analogous to other process models such as the Capability Maturity Model Integration (CMMI).

Altran and partners used their considerable innovation expertise, together with reviews of best practice to define a structured innovation process to create, capture, and develop ideas through well-defined workflows. Ideas are systematically captured, developed and promoted to higher levels until they are ready for selection as projects and transferred to the organisation's product development process. Feedback loops and idea promotion / demotion concept were applied and modelled as well in the work-flow. In order to optimize usability, GUI workshops and usability reviews were performed in the early phases of the SW development that led to improved user friendliness.

The platform was devised to allow initial incomplete and unformed raw ideas that may be described in as little as few words to be easily captured and to allow users to develop them collaboratively in private spaces with other users who are specifically invited to participate. Only when ready, users make the ideas public to the community of users to discuss in forums and provide feedback comments and suggestions. A too formal and overly rigid early stage assessment in the process model was avoided; instead, a more informal early stage feedback and guidance approach is used. Once the ideas are developed to a higher stage of maturity, a consistent and transparent formal evaluation is performed using teams of cross-functional experts to assess specific valuation criteria which are given numerical scores. Individual comments on criteria scoring, as well as overall feedback, are provided. Rebuttals are permitted after each stage of review, since the overall goal is not to block ideas from progressing further, but to encourage discussion for resolving issues. An important factor is that no idea is ever killed, it is only marked "not ready" until information or a change in technology, the environment, or other factors permits its realization. For example, today a technology may be immature or cost may be prohibitive, but in one year the situation may change significantly. To avoid losing valuable sources of potentially disruptive innovation, the inclusion of feedback loops to periodically reassess ideas that are not ready and furthermore to automatically match new information from the technology watch or other ideas which can help in the idea realization.

Another important factor implemented was clustering of ideas into groups of similar items in order to encourage fair comparative evaluations and to establish communities of interest where similar ideas can be discussed, combined or used to support each other. This feature is very important, as are also features for automatic notifications (review and evaluation tasks / reminders) as well as detection of ideas that have been dwelling in the same state in the workflow (state machine) for too long time and require attention and some promote/demote action.

Prior to the software development, an analysis of existing idea and innovation management software products was conducted in order to assess and understand key features of these platforms and to add value by providing functionality to support innovation beyond what was commercially available.

Discussion with users of other SW products revealed that many platforms are complex and difficult to use, therefore user acceptance and the benefits of using such platforms was not as high as expected. In the early stage of the Graphic User Interface development, a thorough analysis of the usability aspects of the initial graphic pages was performed with usability experts. This resulted in a significant user-centric reorganization and enhancement of the pages layout to improve ease of use. During the software testing phases, individuals not involved in the software development phase were specifically used to gather further feedback, identify and correct usability and other issues.

The fully functional software tool was presented to the public in the beginning of 2013 in live demos and interactive sessions. User feedback during the dissemination workshops confirmed that the tool is easy to use and can have benefits for managing the early stage innovation process in any size organization, large or small. The software is available for distribution free of charge to members of the aeronautics community and academic institutions in Europe.

A maintenance and support process was setup and is available to interested enterprises that would like to install and use IMPA (pending licensing agreements). Implementation of some advanced IMPA features that was during this project deferred to a later stage can be undertaken as well at customer request.

Section 2: Benefits of the Innovation Management Platform for Aeronautics (IMPA) for the future

The Innovation management platform (IMPA) provides a concrete means of promoting innovation. Rather than merely a roadmap or other documents that provides guidance on how to better innovate, the IMPA provides an active, demonstrated, fully functional tool that can be used by organizations, large and small, to implement and manage a well-defined innovation process, as well as measure and improve their innovation performance. It also enables crowd-sourcing and exploitation of sustained self-momentum generated by user communities (power of user communities, see book by von Hippel [xx]). The fact that we have developed a tool in conjunction with partners of various sizes: EADS, Carl Zeiss, and Micos, is a demonstration of the shared vision of the importance of such a tool in any size organization. The IMPA tool is designed to promote and enhance innovation, therefore we will examine within this section the benefits of innovation and how the IMPA tool can lead to improved performance.

In the context of aviation, for which this tool was designed, innovation improves the safety, reliability, convenience and ecological impact of air transportation. However, in a more general sense, innovation, and the tools which support it, have many economic and societal benefits such as:

- being drivers for economic growth and job creation,
- maintaining competitiveness in the face of global competition, and
- maintaining the health of businesses during difficult economic times.

We examine these benefits and more, in the following pages:

Innovation is the driver of job creation and growth

The current economic crisis is the worst the world has experienced since the Great Depression of the 1930s. It has affected the livelihoods of millions of people around the world, as company closures result in unprecedented job losses, and under increasing financial pressures, it calls into question governments' abilities to continue to adequately fund pensions, medical care and education in many countries. As many more people face the prospect of reduced quality of life and possible poverty, many question the reliance on austerity measures alone to respond to the problem. On the contrary, many studies see innovation as a key component of change, restoring growth and generating new jobs. Some of these studies are cited in the paragraphs below.

A study by The European Parliament's Special Committee on the Financial, Economic and Social Crisis[i] describes innovation as the central engine for job creation: "Innovation turns knowledge into added value, leads to new products and services and should become the main engine for a smarter growth with more and better jobs."

In 2012, World Economic Forum founder Klaus Schwab told delegates at the International Labour Conference in Geneva that a 'paradigm shift' toward entrepreneurship and innovation is needed to address the Global Jobs Crisis and the growing disparities between rich and poor.[ii] He also predicted that in the future, most jobs will be created by the workers, themselves. He stated that world needs "a paradigm shift" where "entrepreneurship is the driver of economic progress, but always has to be in service of society.

We can presume that such a bottom-up growth must have a significant contribution of ideas of employees, rather than top-down directives from high level management within corporate hierarchies. Clearly, a tool that supports the ideas of employees to be recognized, and that helps in the realization of ideas to innovative products or even businesses around them, can have a significant impact on job creation. A fundamental feature of the IMPA is capability of collecting ideas from all levels in organizations and giving these support and visibility through a well-defined process to encourage the launching of development new products or services based on these ideas.

The concept of bottom-up job creation, particularly through entrepreneurship, is supported by data. A survey by Ernst & Young highlighted that entrepreneurs are the engine of job creation.[iii] In a global survey of 8000 "entrepreneurs of the year", respondents increased their total workforce by an average of 16% in 2011. In the US, respondents grew personnel count by 18%, in Asia-Pacific by 16% and Europe by 12%. The positive factors cited as the main source of their hiring plans were an increase in the market-size for their products and services, and a desire to improve their technology or innovation.

The OECD issued a paper resulting from The 'Bologna +10' High Level Meeting On Lessons From The Global Crisis and the Way Forward to Job Creation and Growth, which identified new firms and innovative SMEs playing an increasing role as drivers of growth and job creation in the economy.[iv]

The OECD paper stated the following findings:

- "High growth enterprises play a disproportionate role in job creation. The 10 per cent most rapidly growing enterprises created between 50 and 60 per cent of gross employment gains over a 5 -10 year period in France, Italy, the Netherlands and Greece, while in Spain this was nearly 90 per cent (OECD, 2002). Nearly 50 per cent of these high-growth firms started as an SMEs."
- "A select group of innovative SMEs are initiators of breakthrough innovation. They are often but not always high-growth SMEs. New firms represent a significant proportion of all patents filed by businesses, but this share varies strongly by country. "
- "SMEs lost fewer jobs than large firms in past recessions, cushioning the impact of reduced output on unemployment levels."

The fact that SMEs can be more innovative than their larger counterparts, particularly with respect to breakthrough innovation, does not mean that larger organizations are not as innovative. Certainly we all recognize large companies that have been the source of breakthrough innovation, however the general trend is that small companies can be more disruptive. With the advantage that they can be more nimble and focused, small companies can move ideas to products to market at a faster pace. Communication, and particularly the dissemination of ideas, flows quickly through personal connections, rather than through a complex hierarchy of communication. Large companies are hampered by their size and organizational structures making communication and changes slower. When large companies are locked-into existing profitable products and business models, they are reluctant to change. Why fix something that isn't broken? Small companies, on the other hand are looking to create new markets and disrupt the status-quo.

What we should encourage in any company, is the type of entrepreneurial (or intrapreneurial activity within a large company) to more quickly identify, communicate good ideas and bring opportunities to fruition in a systematic way. What we then need are the means to break-through corporate silos and establish communities of interest within large organizations. This goal can be effectively

supported by the IMPA. As an on-line platform, it can enhance communication across organizational or geographic boundaries. Users are more at ease informally discussing initial ideas in an online platform and getting feedback from their peers and colleagues, who can also help reformulate and mature the ideas and prepare them for later evaluation, rather than proposing early, un-refined ideas face to face to their boss and getting immediate rejection that might be subjective and wrong, since not thought-through and not allowing for feedback / rebuttal process. Once ideas are submitted to IMPA, they remain in the database as inspiration to others. As the pool of ideas grows, so do the informal user-interest groups, who follow and support the development of the ideas. With a larger interaction of individuals and a greater number of ideas contributed and developed, we can identify some that have a higher potential for step change or disruptive innovation. In such a way, a large organization can create an entrepreneurial spirit among people who would not otherwise have a chance to meet face to face. The IMPA is specifically designed to stimulate the development of breakthrough technologies and concepts enabling step changes in aviation. In this sense, its goal is aligned with the vision of many SMEs to change the status quo through disruptive innovation although it supports incremental innovation as well.

Innovation and growth is not limited to SMEs. According to a Thomson Reuters survey of the top 100 global innovators, which include some of the world's largest and most recognized companies, innovation is the cornerstone of economic growth and success, for both the companies that innovate and their respective countries. [v]

Innovative companies are more likely to survive and prosper in difficult economic times.

During the difficult economic environment of the past few years, some statistics listed below stand out for demonstrating impressive performance.

The top 100 Global Innovator companies identified in the Thomson Reuters survey:

- added over 400,000 new jobs in 2010, a greater percent increase over 2009 than was experienced by the S&P 500,
- increased their Market Cap Weighted Average revenue by 12.9 percent, more than five percent more than the S&P 500 (2010 vs. 2009),
- more than doubled the R&D spending of their S&P counterparts, and
- 74.2 percent of the publicly-traded Top 100 innovator companies increased their stock price over the previous year.

A Boston Consulting group survey identified a strong majority of respondents (84%) consider innovation important or extremely important for positioning their company to benefit from an economic recovery.[vi]

Another survey published by Booz & Co. stated that in 2011, corporate spending among the Global Innovation 1000 increased 9.6 percent over the previous year, slightly more than the 9.3 percent gain in 2010 while corporate revenues grew by a healthy 13 percent in 2011, even faster than the year before.[vii]

It is important to emphasize that the above mentioned gains by the top innovation performers were realized during challenging global economic times when many companies were facing reduced profits, cutbacks, or closure.

Innovation has a far reaching impact beyond the innovator company

Top innovators will not only generate growth and jobs for themselves, but there is a further benefit of creating environments for innovation that benefits customers, suppliers, and partners. Apple, a company that has been consistently near or at the top of lists of top innovators for over 7 years (and has often been awarded as "the most innovative company"), claims on its website to have created or supported nearly 600,000 jobs for U.S. workers including approximately 50,000 jobs at Apple, 250,000 at other companies, in fields that include: the development and manufacturing of components, materials, and equipment, professional, scientific, and technical services, consumer sales, transportation, business sales, healthcare and another 291,000 jobs generated by the app economy.[viii]

Innovation is critical for maintaining competitiveness

Innovation is essential for maintaining competitiveness. Globalization, communication and modern transportation has not only facilitated, but also accelerated the transfer of knowledge and work to any areas of the world. We have seen in the last decades the rapid pace of changes where manually intensive manufacturing jobs have been transferred to the low cost emerging economies, particularly in Asia. There is also a risk of falling behind in the knowledge intensive economy if strategies of sustaining and improving upon innovation performance are not followed. In order to maintain competitiveness with the lower cost countries, Europe must rely on value creation through innovation, and employ systematic ways of increasing its innovation potential. Thus, IMPA is a very important tool also from this perspective !

According to Thomson Reuters survey of the 100 most innovative companies in 2011, the geographic breakdown of the top innovators is as follows: 40% in North America, 31% in Asia and 29% in Europe.

Pascal Lamy, Director-General of the WTO indicated in a speech in 2012 that 90% of global economic growth by 2015 is expected to be generated outside Europe, a third of it in China alone.[ix] He indicated that maintaining the competitiveness of European industry in world markets relates to the need for smart domestic, but also European policies. "First, Europe needs to pay closer attention to education, training, qualifications, skills transfer, and innovation. "

Within aerospace and defense, R&D intensity for companies in the EU is above average at 5.8% compared to 3.0% for the US and the overall sector intensity of 3.9%, but lags slightly behind Japan with an intensity of 6.3%.[x] Europe is performing above average in R&D investment according to this data, however we do not have figures for China, which has a consumer aviation market growing at an annual rate of 21% since 1996, the highest in the world, but at the same time very little domestic manufacturing of its own[xi]. China currently relies on a model of foreign aircraft parts manufacturing, or assembly within China (e.g. Airbus A320 assembly line and Boeing composite parts plants located in Tianjin). China has also made manufacturing of aircraft and related aeronautical systems a key part of its strategic industry plan.[xii] Though it will take years to catch up, in the future China intends to be a formidable competitor to Europe and the US in the aviation sector. However, R&D spending has been found not to strongly (directly) correlate to innovation success (see several studies, also by Booz and Co).

Europe will not only need to maintain its investment in Aviation R&D, but also ensure a high return on innovation investment. The outcome of R&D is highly dependent on the pipeline of early stage ideas that feeds the development process. The IMPA is designed to provide a systematic way of

generating, developing and identifying the most promising ideas so they can be launched as development projects. An underlying goal is to foster innovation in aviation that can lead to step changes, which will have a significant impact in maintaining Europe's competitiveness in the industry.

Key factors influencing innovation and performance:

Through the previously mentioned examples, the benefits of innovation should be evident. However what is generally less well understood are the contributing factors and how to improve innovation performance.

A Pricewaterhouse Coopers study[xiii] of top innovators indicates that they can generate over 75% of their revenue from products and services that were not in existence five years ago. The corresponding proportion is 10% or less for the poorest performers. According to the study, 3 underlying capabilities were identified that contribute to the success and set the leading companies apart from their competitors:

1- The top 20% in the survey turn their ideas into action via a well-defined idea management process.
2- They bring the idea management process to life by creating a climate which encourages ideas to flow freely through the business.
3- They employ an effective balance between leaders and followers to sustain an innovative working environment.

Furthermore, Pricewaterhouse Coopers described the characteristics of the idea management processes which:

- seek and gather ideas and knowledge widely, from customers, suppliers, employees, other industries and competitors
- allow ideas and knowledge captured from the environment to be shared, stored in user-friendly form, and made freely accessible
- actively encourage diversity of viewpoint, talent and expertise
- delay the premature evaluation of new ideas by giving managers considerable discretion to pursue ideas without subjecting them to a formal appraisal

The IMPA achieves the first characteristic of the process through a web-based platform that can permit idea collection and discussions among customers, suppliers and employees, while organisations can use the Technology Watch feature to monitor developments in other industries as well as competitors.

The second characteristic is achieved via the user-friendly graphic interface that allows users to contribute to and access the database of ideas and technology watch items at all levels within organizations.

The third characteristic, diversity, is also achieved by providing access to ideas and technology watch items to individuals at all levels of an organization. Any user, employee or manager can contribute any idea or technology watch item on any topic they wish. Anyone is free to vote on and discuss ideas and technology watch items contributed by users in discussion forums. The skills and experience of individuals with different backgrounds are specifically employed in the multi-disciplinary evaluation process.

The fourth characteristic is also a key feature designed into the platform. The IMPA idea development cycle includes multiple stages where the ideas are captured in a raw form and systematically refined and enhanced through the process. In the early stage, referred to as reformulation, there is no formal evaluation. Individuals submitting an idea may share it with their selected group of contributors to help enhance the idea and, when ready, can make the idea visible to all users of the platform to allow informal discussion and voting. A first pre-assessment is not so much a formal evaluation (there is no scoring of ideas at this stage), but more of a coaching by an expert to help bring the idea to a higher state of development. However, by promotion / demotion possibilities it allows fair feedback / rebuttal actions and is very important for further maturation and development. In fact, the evaluations always allow for rebuttal, so that if a user receives feedback that the user feels is not representative, they can have a dialogue with the reviewers and provide additional information to support their case. An important aspect is that no idea is ever killed. Ideas that have technical or other limitations are identified as not ready and the platform incorporates a feedback loop to link "not ready" ideas to new or existing information in the database (technology watch or other ideas) to find workarounds or solutions that that to overcome the blocking points. Other users are of course encouraged to also contribute ideas to overcome roadblocks. Only in the later stages, when an idea is sufficiently matured, it is formally evaluated according to pre-defined criteria.

According to AT Kearney, companies that systematically employ innovation management techniques have significantly higher success rates in converting ideas into marketable products, are twice as profitable and grow significantly faster than their competitors with no innovation management system.[xiv] AT Kearney also states that a key to successful innovation is a focus on the early stages of innovation: innovation leaders invest three times more effort in the beginning stages of the innovation process than do the followers. The leaders also consider a larger percentage of submitted ideas than followers do, but effectively filter and select the best ideas to bring fewer to the concept stage. They focus their resources on the most promising ideas and take well-considered risks, rather than leaving success to chance.[xv]

According to a study by Booz & Co., there is often the misconception that the way companies generate or find good ideas is vague, fuzzy, or highly variable between different companies. [xvi] Their survey of over 700 leading companies revealed that the most successful innovators in all industries used a variety of consistent, manageable ideation practices that are well aligned with their innovation strategies. The leaders also tend to depend on a consistent set of principles and processes when moving ideas into the development stage. The study claimed that few companies succeed at innovation without ensuring that adequate processes are in place to generate new ideas, and that those processes are followed in a disciplined fashion.

According to Booz & Co., most companies that described themselves as highly effective in the early stages of innovation reported that they outperformed on key performance metrics such as revenue growth, market cap growth, and earnings as a percentage of revenue. The results also show that effectiveness at idea conversion is more important to financial success than idea generation. Even more critical to a company's innovation success than is the ideation stage is the process of choosing which ideas to convert to full-scale product development. According to many innovation experts, the most value is added in the stage in the process where ideas are selected as a "go" or a "no go".

Booz & Co. claims any company in any industry can take advantage of these tools and processes to generate the most value out of the money they spend on innovation.

The literature reviewed in the preceding paragraphs is in agreement: a structured innovation management process like the one supported by IMPA is a key factor defining innovation success. Furthermore, focusing efforts on the early stages of innovation with an effective filtering and assessment process that identifies the highest potential ideas and considers the risks leads to significantly improved innovation performance.

Improving upon innovation performance

Despite the impressive performance of top innovators, many companies claim they are not good enough at it. According to Booz & Co's survey, just 43 percent of respondents claimed their efforts to generate new ideas were highly effective, and only 36 percent considered their efforts to convert ideas to product development project effective. Only 25 percent of all respondents indicated that their organizations were highly effective at both. Although top performers are adept at applying a structured process, more can be done at most companies to make it accessible to all and easier to use. User- friendly tools such as IMPA can help significantly in this respect.

A study by Boston Consulting Group, a large majority of companies (76%) consider innovation a top strategic priority.[xvii] Another study indicated that, although the majority of senior executives and decision makers are satisfied with their return on innovation spending, only 36 percent of employees are satisfied. [xviii] This discrepancy between employees and top management perceptions suggests an opportunity to empower employees in the innovation process. Perhaps they seek a way to voice, share and discuss ideas, and a way to be recognized and supported by management. The IMPA platform provides such a vehicle.

Social networking, open innovation, and crowd sourcing

The recent emergence of social networking has been a revolution in personal communications over the internet. It has provided a way of sharing ideas, experiences, and information without being constrained by the boundaries of location and time. The global usage of social media is estimated at 1.43 billion users in 2012.[xix] The rapid growth attests to the ease of use and willingness of people to use such online platforms for social purposes, and increasingly for business as well. The common features of these social platforms are that they allow a large number of people to form communities around shared interests and to interact and exchange information.

The IMPA has been implemented using principles of social networking. As a web-based platform with a user-friendly interface, the layout and features will be familiar to users of social media. IMPA is based on participatory innovation, incorporating discussion forums that allow users to exchange information in an informal way with an underlying structured process that facilitates the development of ideas through collaboration. It also incorporates the function of allowing users to vote on ideas, and other items through the "Like" feature common in social media platforms.

Through the features of voting, equal access to submit and share content and be visible at all levels of an organization, the IMPA can be considered as a means of "democratizing the innovation process" [xx]. Users' voting on ideas raises the visibility of good ideas which cannot be ignored by management. Users at any level of an organization can contribute ideas, content and discussions, giving a voice to people that might not otherwise be heard. Regardless of an individual's position within the corporate hierarchy, the ideas they contribute are evaluated according to their own merits

through a transparent process with well-defined evaluation criteria. The fact that the process is transparent encourages users to participate in a system they see as fair, especially when they can monitor the progression of ideas throughout the process and are permitted rebuttals, visible to other members of the community, when evaluations are performed. Users are also free to connect and discuss with any other users of the platform that share common interests around the topics maintained in the database, thereby breaking through corporate silos. This leads to the use of "law of large numbers", a so-called crowd sourcing process that is very powerful and proven factor in disruptive innovation [xx].

The IMPA is a tool designed to bring a structure into the front end of innovation. As a web-based tool, it can support a very large user base. Organizations can decide whether to use it as an internal tool to generate, develop and select ideas for development, or on a larger scale, as a way of collaborating with partners, suppliers, customers. By expanding its network of users to external stakeholders, organizations can profit from the principles of "open innovation" by soliciting ideas from customers for example via its feature of idea campaigns. Similarly, companies can collaborate on ideas with partners and suppliers on developments of new ideas to bring forth greater value than they may be able to achieve individually.

IMPA can support both approaches, even within the same organization as both an internal and external tool. Together with its incorporated innovation guidelines, it provides a means to promote the generation and collection of a large number of ideas, which can be enhanced and developed by the community of users, then to identify and select the most promising to be launched as development projects. As demonstrated by the superior performance of innovation leaders that follow this approach described in the literature mentioned above, the IMPA can help any company achieve increased innovation performance and return on innovation investment.

Aeronautics and beyond

The issue of maximizing R&D investments, getting more output per investment spent, is a concern of most organizations. The IMPA has been specifically configured for Aeronautics industry due to the categorizations incorporated within the tool. However, aside from the categorizations which can be adapted for any industry, the principles applied within the tool to improve innovation performance are applicable in any industry. During the dissemination phase of the project, companies outside of the aeronautics industry that have had a chance to preview the IMPA have expressed much interest in the tool as well. The benefits of this tool can therefore go much beyond the original intended audience.

References

[i] European Parliament's Special Committee on the Financial, Economic And Social Crisis, 2010
How Can Europe Create Jobs?
http://www.europarl.europa.eu/committees/en/cris/studiesdownload.html?languageDocument=EN&file=30571

[ii] International Labour Organisation, 'Innovation' and a completely new approach to job creation are needed to solve the jobs crisis, WEF's Klaus Schwab tells ILC delegates, 11 June 2012
http://www.ilo.org/global/about-the-ilo/multimedia/video/WCMS_182836/lang--en/index.htm

[iii] Ernst & Young, Entrepreneurs are an engine of job creation, 2011
http://www.ey.com/GL/en/Services/Strategic-Growth-Markets/Center-for-Entrepreneurship-and-Innovation---Entrepreneurs-are-an-engine-of-job-creation

[iv] 'Bologna+10' High-Level Meeting on Lessons From The Global Crisis and The Way Forward to Job Creation and Growth, Nov 2010 http://www.oecd.org/cfe/smes/46404350.pdf

[v] THOMSON REUTERS 2011 TOP 100 GLOBAL INNOVATORS, http://top100innovators.com/

[vi] Boston Consulting Group Report, Innovation 2010, A return to Prominence- and the Emergence of a New World Order
http://www.bcg.com/expertise_impact/capabilities/innovation/publicationdetails.aspx?id=tcm:12-42622

[vii] Booz & Co. Strategy & business Issue 69 Winter 2012: THE GLOBAL INNOVATION 1000 Making Ideas Work.
http://www.booz.com/media/uploads/BoozCo_The-2012-Global-Innovation-1000-Study.pdf

[viii] http://www.apple.com/about/job-creation/

[ix] WTO NEWS: SPEECHES — DG PASCAL LAMY, 20 October 2012, Lamy urges "smart policies" to maintain European competitiveness http://www.wto.org/english/news_e/sppl_e/sppl255_e.htm

[x] The 2010 EU Industrial R&D Investment SCOREBOARD, http://ftp.jrc.es/EURdoc/JRC61230.pdf

[xi] U.S. CONSULATE GENERAL SHANGHAI,The General Aviation Industry in China 2012
http://export.gov/china/build/groups/public/@eg_cn/documents/webcontent/eg_cn_047964.pdf

[xii] The Financial Times, 4 Aug 2011, China to Take a Shot at Aircraft Duopoly
http://www.ft.com/cms/s/0/f0aab712-be81-11e0-ab21-00144feabdc0.html#axzz2Mkte1OQ5

[xiii] F Milton - PriceWaterhouse, London, 2003 innovation Survey

[xiv] AT Kearney, 2007, Innovation Management Assessment, Superior Innovation Capabilities Enable Profitable Growth.

[xv] https://www.atkearney.com/documents/10192/23b911ad-0067-4c30-8fc0-c57ac7d1eef5

[xvi] Booz & Co. Strategy & business Issue 69 Winter 2012: THE GLOBAL INNOVATION 1000 Making Ideas Work.
http://www.booz.com/media/uploads/BoozCo_The-2012-Global-Innovation-1000-Study.pdf

[xvii] The Boston Consulting Group, The Most Innovative Companies 2012.
https://www.bcgperspectives.com/content/articles/growth_innovation_the_most_innovative_companies_2012/

[xviii] Boston Consulting Group Report, Innovation 2010, A return to Prominence- and the Emergence of a New World Order

[xix] http://www.emarketer.com/Article/Facebook-Helps-One-Five-People-Worldwide-Socializing-on-Online-Networks/1008903

[xx] von Hippel Eric: Democratizing Innovation. 2005. The MIT Press.