

Empowering Industry with Advanced Computing: A guide to Strategy and Best practices in Stakeholder Engagement

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Abstract— In the digital era of large-scale multi-modal AI, HPC at exascale, Big Data analytics, Digital Twins and in-silico material/process design, integrating advanced computing in industry is becoming a necessity. The European Commission has invested in this endeavor through several vehicles such as the Network of National Competence Centres in HPC (EuroCC2), the European Digital Innovation Hubs and EIT Digital. At the heart of this mission is industrial and more generally stakeholder engagement. Expert personnel, such as Industrial Engagement Managers, are poised to act as the conduit through which advanced computing technologies are translated into tangible business value, driving innovation and collaboration across industry boundaries. This article aims to serve as a guide in this endeavour, laying out a strategic framework for this mission, including internal mapping, strategic thinking and sectorial landscaping as well as describing tools and tactics for effective engagement such as the art of pitching, leveraging events and networking strategies.

I. INTRODUCTION

Our digital era is characterized by unprecedented advancements in technology, marking a transformative period in how we interact with and harness digital tools for innovation and problem-solving. At the heart of this transformation is the emergence of advanced computing technologies such as large-scale multi-modal Artificial Intelligence (AI), High-Performance Computing (HPC) at the exascale, High-Performance Data analytics, Digital Twins, and in-silico material and industrial process design. HPC in particular, is a key enabling technology behind the greatest technological feats of the last decade. Supercomputing infrastructure has been instrumental in training Large Language Models (LLMs) powering ChatGPT, Bard, and Claude, which now play a mainstream role in our digital interactions. It has also facilitated the processing and analysis of vast amounts of genomic data, leading to the latest refinements in the human genome. Large-scale simulations powered by HPC have become crucial in developing Digital

Twins for aircraft designs, designing advanced and sustainable materials, and discovering and screening new pharmaceutical compounds.

In this digital era where technological advancements rapidly redefine the boundaries of possibility, the strategic integration of advanced computing technologies into the industrial sector emerges as a critical catalyst for innovation and competitive edge. At the heart of this mission is industrial and more generally stakeholder engagement of Advanced Computing Research Centres, National Competence Centres in HPC within the EuroCC2 network [1], European Centres of Excellence (CoEs) for High Performance Computing (HPC) applications [2], and the European Digital Innovation Hubs (EDIHs) [3]. Stakeholder engagement in this context has distinct nuances setting it apart from typical Business Development.

The objective of this guide is to share best practices relevant to Engagement Managers such as industry scouts, termed Industry Champions within EuroCC2 or Account Managers as per the EDIH terminology, technically-oriented business development managers working on introducing advanced technologies to enterprises. The short-hand notation EM for Engagement Manager will henceforth be used to refer to all these professionals. This paper specifically addresses the topic of industrial engagement, however similar principles can be followed in engaging with a variety of stakeholders such as governmental departments.

The insights summarized in this paper arise from working experience at the Computation-based Science and Technology Research Centre serving industrial engagement as Industry Champion at the National Competence Centre in HPC within EuroCC2 [4], Account Manager within DiGiNN, the local European Digital Innovation Hub of Cyprus coordinated by the Cyprus Institute [5], and as Industry Scout for the SimEA ERA Chair project on Simulations and Modelling for Engineering Applications [6].

II. STRATEGIC FRAMEWORK FOR INDUSTRIAL ENGAGEMENT

A. Industrial Engagement as a Strategic Activity

Industrial engagement is a strategic activity primarily because it enhances an organization's growth, innovation capacity, as well as visibility and reputation. This engagement is not just about building business partnerships; it's a way to position the organization at the forefront of technological innovation. By actively engaging with industries, an organization demonstrates its expertise, commitment to progress, and willingness to be a part of the broader conversation in advanced computing. This visibility fosters a reputation of being a leader and innovator in the field, attracting further partnerships, funding, and talent. Additionally, it allows for the exchange of ideas and insights, which can spur new developments and applications of technology, further cementing the organization's role as a pivotal player in the tech community.

B. The profile of an Industrial Engagement Manager

The Industry Engagement Manager (henceforth EM) serves as a pivotal bridge connecting the technical and

business worlds, embodying a unique blend of skills that cater to both domains. This role is inherently application-driven, with a strong emphasis on problem-solving from a perspective that marries technological capabilities with business needs. Effective communication stands at the core of this position, enabling the translation of complex technical concepts into strategic business advantages that resonate with stakeholders across the spectrum.

An industry scout embodies a critical link between the forefront of computational technologies and their practical applications in various industries. This role demands a **solid foundation in technical expertise**, encompassing a deep understanding of advanced computing technologies such as High-Performance Computing (HPC), Artificial Intelligence (AI), High-Performance Data Analytics (HPDA) and Engineering Simulations such as Computational Fluid Dynamics (CFD), Finite Element Methods (FEM) and Molecular Dynamics (MD). The scout should be in place to explain what each of the technologies are, their relevance and applications in an industrial context and give examples to actors with various backgrounds and technological awareness levels. Technical knowledge enables the scout to recognize and articulate how advanced computing can address specific industry challenges, transforming technical capabilities into tangible business solutions. In an ever-evolving field like advanced computing and AI, adaptability and a commitment to continuous learning are indispensable, ensuring the scout remains at the cutting edge of technology and industry needs.

Beyond technical know-how, a successful EM must be equipped with robust business acumen and exceptional communication skills. An acute understanding of market trends, business strategies, and the economic landscape allows the scout to navigate business models and strategic planning effectively. Coupled with the ability to communicate complex technical concepts in a language that resonates with non-specialists, these skills ensure that potential industry partners grasp the value of integrating advanced computing into their operations. The EMs must be well-versed in business strategy concepts [7], enabling them to adjust their language and approach when engaging with executives. Training in innovation and entrepreneurship [8-11], alongside refined communication skills and marketing knowledge, further equips them to navigate and leverage the commercial landscape effectively. Networking abilities are at the core of the EM's role, facilitating the building of meaningful relationships within the industry and identifying potential collaboration opportunities. The role also encompasses project management, negotiation, and a keen awareness of legal and ethical considerations, including intellectual property rights and data handling practices. Together, these competencies enable an EM to effectively forge collaborations that drive innovation and solve real-world problems, making them an invaluable asset to any advanced computing centre.

C. Main Concepts in Business Strategy

Why and Overview: Given the importance of Industrial Engagement, an EM needs to proceed with care in choosing

partners wisely. There are thousands of possible stakeholders that one could approach about introducing these advanced technologies, and given that EuroCC/EDIH projects offer free services, this greatly broadens the set of possible beneficiaries. As such, placing a strategic, methodical and targeted approach in industrial engagement is necessary. In order to establish such a comprehensive framework one can greatly benefit by adapting main Concepts in Business Strategy [7,10]. These include aligning with the Vision & Mission of the Centre or even the Country as a whole (especially given the National Leadership of NCCs), performing a SWOT Analysis, formulating the value proposition and analysing the Competitive Advantage that corporations would obtain from leveraging advanced computing, targeting specific sectors, actors and stakeholders in a Market Segmentation approach, keeping in mind Sustainability & Social Responsibility, ie ESG alignment.

Ultimately, the EM needs to formulate a value proposition to communicate the answer to the basic question: What value/benefit will the Centre's expertise bring to the stakeholder? This value proposition should highlight how the Centre's resources and expertise can solve specific industry problems or contribute to advancements in specific fields. This comes into two parts: A) What kind of expertise is the Centre providing, and B) how this is relevant to the specific stakeholder that the EM is interacting with. In the following sub-sections we will analyse the methodology that the EM can follow to address both of these concepts, and in this process the aforementioned Business Strategy concepts will naturally arise. Addressing item A involves undertaking an internal capacity mapping to understand areas of expertise, applications and what the Centre's vision and mission are. Addressing item B involves market segmentation and targeting, sectorial landscaping and strategic thinking. Designing bespoke strategies for market segmentation allows the scout to target specific industry actors effectively. This involves identifying and focusing efforts on segments where the Centre's capabilities are most needed and can make the most significant impact, ensuring that engagement efforts are both strategic and efficient. We will finish with proposing effective networking strategies and practical tools in delivering and communicating this value proposition to specific stakeholders in the next section.

D. Internal Mapping

Despite its extrovert character, the work of industrial scouting should begin with a thorough **internal mapping of capacity**, existing partnerships and areas of interest. Firstly, understanding the **vision and mission** of the Centre, its goals and objectives sets the foundation of any engagement activity. This ensures that all engagement efforts contribute meaningfully to the Centre's overarching goals, such as promoting innovation in HPC or advancing scientific research through technological solutions. A thorough **SWOT analysis** of the Centre helps the scout understand its strengths, cutting-edge research capabilities, as well as potential weaknesses such as missing expertise, opportunities in emerging tech markets and sectors. For a Centre in advanced computing this includes understanding the **technological areas of expertise**

as well as the **areas of applications** of its various research or thematic groups. For example, a group with expertise in HPDA might have strong track record in analysis of time series data and may be interested in fintech applications. Knowing past collaborations and **success stories** [12] provides the industry scout with directions as to what sectors and actors to engage with, and a pool of examples to draw from when discussing with potential partners. Finally, if the aforementioned SWOT analysis has identified technological trends and opportunities the expertise of which is missing or lacking at the Centre, then the scout can communicate such findings to the Technical Manager or Steering Committee.

Another important consideration is what know-how is **deployable** within a reasonable timeframe to provide meaningful consultation and implementation of proof-of-concept or pilot projects towards test-before-invest solutions. For example, if several companies and potential projects are lined-up for a specific expert group, then the EM should consider engaging with partners that would collaborate with other teams. This is particularly important as industry moves at a faster pace: attracting the interest of a company only to keep them waiting for months to start a collaboration would negatively affect the reputation of the Centre.

These last two considerations of the capabilities and resources of the Centre are aligned with the theory of “resource-based view of the firm” (RBV for short) which bases the competitive advantage of an organisation on its resources and capabilities. RBV has dominated business strategy, shifting away from market-based positioning view [13]. The RBV perspective argues that firms can achieve and sustain a competitive edge through the acquisition, development, and deployment of valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities. The RBV suggests that by identifying and leveraging these unique resources and capabilities, organizations can create strategies that are difficult for competitors to replicate, thereby achieving superior performance and long-term success. This view contrasts with other strategic frameworks that focus on the firm's external environment, positing instead that internal factors are crucial in strategic planning and execution.

E. Strategic Thinking and Sectorial Landscaping/Mapping

Equipped with a consolidated understanding of the Centre's internal capacity, the scout will then begin to look outwards and start considering which sectors to target, how to prioritise these with the Strategic priorities, vision and mission of the Centre as well as the National Smart Specialisation strategy [14] and EU priorities [15]. Identifying synergies with EDIH, Digital Europe, Centres of Excellence, EIT sectors, specific partnerships and other JUs can be of great value.

Having identified the sectors to be targeted and prioritised, the scout will then take a deeper dive into sectorial mapping. This involves identifying sector-specific unions and associations (eg within the local Chamber of Commerce and Industry [16] or through the EEN network [17]), leveraging data analytics and potential reports. Access to such information provides an overview of the specific sector,

identification of the main players/innovators in the field, as well as the main challenges faced and attempts to solution. Sourcing success stories from EuroCC/EDIH/FF4HPC [12, 18] that will give a pool of ideas when brainstorming with in-sector actors.

III. TOOLS AND TACTICS FOR EFFECTIVE ENGAGEMENT

A. Practical Tools

For an industry scout in advanced computing, practical tools like business cards, a well-crafted presentation deck with an accompanying pitch, and a comprehensive service portfolio are essential for effective engagement. A robust website serves as a digital front door, showcasing the center's capabilities and achievements. Flyers, easily designed with tools like Canva and enhanced with AI-generated content from ChatGPT, offer a quick, visually appealing way to communicate offerings. Additionally, maintaining a strong presence on professional networks like LinkedIn is crucial for networking, sharing achievements, and connecting with industry stakeholders.

Next we discuss in detail the topic of pitching to stakeholders and active listening, both of which are key ingredients in the success of these brief networking interactions.

B. The Art of Pitching and Active Listening

The main purpose of a pitch to a stakeholder is to concisely communicate the value proposition of the Centre's expertise offered via services or projects, demonstrating its benefits and relevance to the stakeholder's needs or challenges. It aims to engage the stakeholder's interest, stimulate a dialogue, and ultimately persuade them to collaborate or participate in a project. A successful pitch is tailored to the listener's context, highlighting alignment with their strategic priorities and how it offers solutions to their specific challenges. Being equipped with a well-structured pitch can empower the success of short networking interactions at events.

Outline A successful first interaction between an EM and a stakeholder during a networking session should start with a warm introduction, including handshakes, exchanging names, positions, institutions, and business cards. This sets a professional and friendly tone. Listening to the stakeholder's priorities, computational needs, and challenges is crucial for tailoring the discussion. Providing crisp information about the center's profile, expertise, and collaboration opportunities in the form of a pitch establishes a foundation for potential partnerships. Engaging in mini-brainstorming about synergies can spark interest in collaborative projects. Wrapping up with clear next steps ensures a path forward for both parties.

Adaptation is crucial in the successful delivery of the pitch and the overall interaction, with the industry scout's approach varying based on the audience. For conversations with CEOs and business-focused individuals, the emphasis is on the impact of technologies like AI and supercomputing within a business context, using accessible business terminology and carefully avoiding overly technical language. Conversely, interactions with CTOs and technical staff demand a display

of technical expertise, delving into the specifics of advanced computing capabilities to highlight the center's innovative potential and technical prowess.

Active listening with the stakeholder as the focal point and the goal of adding value to their organisation, offers valuable insights into the company's perspective, strategic priorities and computational challenges. Depending on the context, questions such as "Do you harness the value of your data?", "Have you incorporated AI in your workflows?", or for manufacturing companies, "Do you utilize in-silico design?" guide the discussion towards identifying areas where the scout's organization can offer impactful solutions and support.

Upon establishing this context, the industry scout can then highlight the Centre's exceptional proficiency in leveraging advanced digital technologies, such as High-Performance Computing, Artificial Intelligence, High-Performance Data Analytics, engineering simulations and computational modelling etc. The focus should be application-oriented and tailored to the listener. Examples of relevant applications drawing from the track record of the Centre or the pool of success stories from other NCCs within the EuroCC2 network, make these technologies more tangible and their impact better communicated. The industry scout must be able to communicate the importance of HPC to executives that may lack technical background. Adapting pitching techniques from entrepreneurial and business development contexts can be immensely powerful when preparing this short pitch [8-11]

Industry scouts should also spotlight the Centre's wide array of services and collaboration opportunities. This includes offering consultation services to identify and address specific industry needs using HPC and advanced computing, initiating pilot projects to demonstrate the practical application of advanced computing solutions, and providing bespoke training tailored to the unique requirements of different sectors. The Centre also engages in joint research projects, fostering partnerships between academia and industry. Additionally, distinguishing between services offered free of charge via European projects such as EuroCC2 or EDIH, pursuing joint research funding in national or Horizon Europe grants and those requiring contracts is crucial for setting clear expectations, ensuring that potential collaborators understand the scope and terms of engagement.

C. Leveraging Events and Networking Strategies

A multi-stakeholder approach as a networking strategy has had great success for the NCC Cyprus and local EDIH. Rather than approaching stakeholders in a 1-1 approach, the EMs can target a variety of networking events in which they can engage with multiple stakeholders per event and thus maximize engagement opportunities. This also gives the EM the opportunity to interact with executive team members with an established context already in place. For example, visiting a booth at an EXPO or meeting an executive after they have delivered a plenary talk at a conference, offers insights into the organization's priorities and activities, and thus the opportunity for the EM to better adapt accordingly.

There are several types of events that can facilitate direct connections with industry players, such as sectorial

Conferences and Forums organised by the Chamber of Commerce & Industry, Industrialist Unions, Sectorial Associations and Unions, governmental departments or the local EEN or EIT offices. Such events are invaluable for strategic networking as they offer excellent networking opportunities and insights into industrial challenges, trends and innovation.

Preparation before networking events is crucial. Industry scouts should review the event's agenda, speakers, and booth list to identify key opportunities and plan their time effectively. This allows for a strategic approach to networking, ensuring that scouts target the most relevant sessions and stakeholders, such as CEOs and CTOs.

During the event, leveraging insights from plenaries can kickstart conversations, allowing scouts to adapt their language and pitch to the specific context of each stakeholder as analysed above. Networking breaks offer prime opportunities for informal interactions. Engaging in guided discussions helps in sourcing requirements and exploring potential synergies. It's vital to exchange business cards and connect on LinkedIn, with a clear plan for follow-up steps.

Post-event, consolidating notes and registering contacts is essential. Industry scouts should evaluate potential collaborations based on their alignment with the center's strategic priorities and the stakeholder's willingness to collaborate. Highlighting promising contacts and briefing the team allows for a focused approach in inviting companies for introductory meetings, maximizing the potential for fruitful partnerships.

I. INITIATING AND NURTURING COLLABORATIONS

Scheduling the initial meeting between the company and a guest organization requires careful planning and consideration of participants to ensure effective communication and outcomes. The delegation from the guest company or organization should ideally include key decision-makers and technical experts, such as the CEO, Head of IT, CTO, Technical Personnel, and Production Managers, depending on the size and type of the company. From the internal team, participants should include the Manager, EM, members of the Engineering team or Technical Specialists.

Prior to the meeting, it's essential to email the agenda and scope to all participants to ensure everyone is aligned on the purpose and objectives of the meeting. Sending a questionnaire in advance can help gather preliminary information, facilitating a more focused and productive discussion. A reminder should be sent a day before the meeting to confirm attendance and ensure all participants are prepared. Additionally, briefing the internal team on the background, expectations, and specific goals of the meeting is critical to present a unified and informed front during the engagement.

At the meeting, after introductions and extending hospitality, a brief presentation of the Centre (3-5 minutes) provides an overview of its capabilities, focusing on the interested gauged by the industry scout. The guest organisation should then be offered 10-20 minutes to present

an overview of mission, activities and challenges. This sets the foundation for a targeted discussion, where asking pointed questions becomes instrumental in uncovering the company's challenges, data handling capabilities, and the technical expertise of their ICT and Engineering personnel. This is a crucial interactive part of the meeting which involves brainstorming to identify 2-3 specific synergies, laying the groundwork for potential collaborative projects. By the end of the meeting, the team should aim to have decided on the topic of collaboration.

The meeting should conclude by establishing next steps, including the person responsible for follow-up and the main contact points, to maintain momentum and ensure the collaboration progresses smoothly. Shortly after the meeting, the team can draft a scope of work or roadmap to be finalized together with the stakeholder, ensuring both parties have a clear understanding of the collaboration's objectives. This can include the scope of collaboration and milestones to be achieved, the timeframe and resource allocation. Distinguishing between services offered free of charge via European projects such as EuroCC2 or EDIH, pursuing joint research funding in national or Horizon Europe grants and those requiring contracts is crucial for setting clear expectations from the very beginning, ensuring that potential collaborators understand the scope and terms of engagement.

In embarking on any collaboration, it is vital to address legal considerations meticulously. Ensuring that Non-Disclosure Agreements (NDAs) are in place protects sensitive information shared between parties. Intellectual Property (IP) protection is paramount, clearly defining the ownership of innovations and technologies developed during the collaboration. Legal liability issues must be addressed, outlining each party's responsibilities and liabilities. Due diligence is essential, not only in assessing the potential and capabilities of the collaboration partner but also in ensuring compliance with all relevant laws and regulations. These legal frameworks form the backbone of a secure and fruitful collaboration, safeguarding the interests of all involved parties. The EM should seek expert advice on such topics from specialised departments of the Centre, such as the Legal and Knowledge Transfer Departments.

IV. CONCLUSION

As we navigate the complexities and opportunities presented by the digital era, the significance of integrating advanced computing technologies across various industries cannot be overstated. These technologies, encompassing HPC, large AI, HPDA, digital twins, computational modeling and in-silico design simulations, are reshaping the competitive landscape, enabling unprecedented levels of innovation, efficiency, and product development. The ability of industries to harness these capabilities directly correlates with their potential to solve complex problems, accelerate research and development, and ultimately, lead in a rapidly evolving global market. This integration not only fosters the creation of new products and services but also enhances the sustainability and resilience of businesses facing the challenges of the 21st century.

Central to realizing the full potential of these advanced computing technologies is the role of effective stakeholder engagement. As the bridge between the technical possibilities offered by advanced computing and the practical applications within industries, stakeholder engagement is pivotal in driving innovation and growth. Engagement Managers, serving as conduits for this translation, play a crucial role in identifying opportunities for collaboration, aligning technological capabilities with business needs, and fostering environments where innovation can flourish. By prioritizing communication, collaboration, and strategic alignment, these professionals ensure that the benefits of advanced computing are fully leveraged, marking a path toward sustained economic growth and technological leadership.

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REFERENCES

- [1] <https://www.eurocc-access.eu/>
- [2] <https://www.hpccoe.eu/eu-hpc-centres-of-excellence2/>
- [3] <https://digital-strategy.ec.europa.eu/en/activities/edih>
- [4] <https://eurocc.cyi.ac.cy/>
- [5] <https://www.diginn.eu/>
- [6] <https://simea.eu/>
- [7] D. J. Teece, "Business Models, Business Strategy and Innovation", Long Range Planning, vol. 43, 2010, pp 172-194.
- [8] B. Aulet, "Disciplined Entrepreneurship: 24 Steps to Help Entrepreneurs Launch Successful New Ventures". John Wiley & Sons; 2013.
- [9] P. L. Speser, "The Art and Science of Technology Transfer", Wiley, 2006.
- [10] N. Rossides, "[Eureka! to Market: A Guide for Academic Entrepreneurs Kindle Edition](#)", Stoic Owl Press; 2023.
- [11] L. Escoffier, A. La Vopa, P. Speser, D. Satinsky, "Open Innovation Essentials for Small and Medium Enterprises: A Guide to Help Entrepreneurs in Adopting the Open Innovation Paradigm in Their Business", Business Expert Press, 2016
- [12] <https://www.eurocc-access.eu/success-stories/>
- [13] G. Hooley, A. Broderick, K. Möller (1998). "Competitive positioning and the resource-based view of the firm". Journal of Strategic Marketing. 6 (2): 97-116.
- [14] <https://s3platform.jrc.ec.europa.eu/>
- [15] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024_en
- [16] <https://www.eurochambres.eu/about/members/>
- [17] <https://een.ec.europa.eu/>
- [18] <https://www.ff4eurohpc.eu/>