

Joule, Eni School of Entrepreneurship: Open Innovation as a People-Driven Process

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Opening Paragraph

In today's rapid and competitive corporate landscape, global companies are rethinking their processes and reevaluating their innovation approaches to embrace external influences. This aims to succeed in a more intricate context, addressing the swift changes brought by digital transformation and energy transition. Consequently, businesses are considering Open Innovation (OI) as a critical competitive necessity and are exploring how to deploy it efficiently.

Similar events unfolded at the headquarters of Eni, an international player in the energy sector renowned for its extensive history and innovation. The company has traditionally placed substantial emphasis on its in-house Research and Development (R&D) initiatives. Over time, Eni has reached noteworthy milestones in R&D, primarily through its commitment to nurturing internal innovation, backed by considerable funding and the acknowledgment of the expertise of its R&D staff.

Under Claudio Descalzi's leadership as Eni's CEO since 2014, the company has undergone a significant transformation. The digital shift, energy transition demands, and the Covid-19 pandemic have highlighted the importance of embracing an innovative approach that prioritizes collaboration and openness for faster, higher-quality advancements.

As Eni transitions into a global energy company with a pronounced technological imprint, the corporation must reassess its workflows and reevaluate its approach to innovation within today's complex competitive landscape. Given its legacy, track record of innovation, and the evolving economic, societal, and environmental expectations, a pressing question for the firm is how it can revamp its innovation strategy **to foster a collaborative ethos driven by the expertise of Eni's workforce, which represents the company's greatest asset.**

Keywords: Open Innovation, People, OI Mindset and Culture

Eni: a globally advanced technology energy company

“Technology, new businesses, international vision and communication skills drove it through Italy’s modernization. After becoming a global company, the same elements have underpinned its transformation in the energy transition.”¹

1953: Mattei’s imprinting

On February 10, 1953, with Enrico Mattei at the helm, Ente Nazionale Idrocarburi (Eni) embarked on an endeavor to revamp Italy’s national energy strategies. As a government-controlled entity, Eni adopted the research and developmental functions previously held by Agip,² a state enterprise in the oil sector established in 1926, dedicated to attaining autonomy in the nation’s energy supply.

From its inception, Eni has aimed to support Italian economic growth by being a catalyst for trade expansion with competitive results both domestically and globally, reinforced by a robust and extensive global reputation cultivated over the years. Mattei’s leadership, recognized for his progressive and foresighted approach, has notably influenced the company’s essence. Similarly, its emblem, the six-legged dog created by Giuseppe Guzzi and chosen through an artist’s competition for its futuristic appeal, symbolizes movement and innovation.³



Figure 1: Eni’s logo, Eni website,⁴ 2023

¹ <https://www.eni.com/static/longform-enistoria/#/en/?disposition=grid>, last access December 2023.

² <https://luce-gas.it/gpl/fornitori/agip>, last access December 2023.

³ <https://www.eni.com/en-IT/company/brand-identity.html>, last access January 2023.

⁴ <https://www.eni.com/en-IT/home.html>, last access January 2023.

Moreover, the initial CEO's foresight has significantly influenced Eni's development, especially in its strategy for global expansion, leading to the creation of a distinctive approach to conducting business through alliances that rely heavily on broad cooperation, known as the "Mattei formula". The agreement included favorable terms that surpassed the common 50-50 profit-sharing model, providing an opportunity for the host country to contribute to production expenses and receive 75% of the profits, known as the 75-25 formula.⁵ Initially applied in 1954 to establish collaborative pacts with Egypt, this formula became key in advancing talks with Iran, Morocco, Tunisia, Libya, and Algeria,⁶ signifying a foundational element of Eni's international growth. In 1958, a significant trade agreement was also established with the Union of Soviet Socialist Republics (USSR). These international partnerships were considered essential for Eni's strategy to find new oil sources beyond the limited reserves in the Po Valley and meet the country's energy needs.

Until his final day in charge of Eni on October 27, 1962, Mattei's innovative foresight and leadership continued to influence the company. His contributions have left a lasting legacy that has guided Eni's philosophy and strategic direction ever since. Following his tenure, subsequent CEOs made significant choices that contributed to the development of an innovative multinational energy firm. For example, under the leadership of President Pietro Sette in 1977, Eni initiated groundbreaking research to produce electricity from solar energy, showcasing their commitment to forefront research and development. In 1992, Eni transitioned into a limited company to begin its privatization, leading to its public offering in 1995, overseen by Franco Bernabé. This move was crucial for enhancing the company's global standing in the oil sector and strengthening its operational and financial base, resulting in a record net profit of 5,500 billion Italian Lire in 1999.⁷

Today, the company is active throughout the entire energy sector value chain, engaging in the exploration, development, and production of oil and natural gas, electric power generation from cogeneration, and renewables. Eni also participates in traditional and bio-refining, chemical operations, and promotes circular economy initiatives. The company markets gas, power, and products to local consumers, businesses, and retail markets, enhancing its market presence. It also offers services in energy efficiency and sustainable mobility.⁸ Concerning the financial outcomes from the activities, the company successfully

⁵ <https://www.britannica.com/biography/Enrico-Mattei>, last access December 2023.

⁶ <https://archiviostorico.eni.com/aseni/en/pills/IT-ENI-CMS0001-000002>, last access December 2023.

⁷ <https://www.iaee.org/en/publications/newsletterdl.aspx?id=600>, last access December 2023.

⁸ <https://www.eni.com/assets/documents/eng/reports/2022/Annual-Report-2022.pdf>, last access January 2024.

produced substantial economic gains, securing an adjusted net profit totaling 13.3 billion euros in 2022 and 8.3 in 2023.⁹

2050: Looking ahead to achieve the Carbon neutrality imprinting

In the Eni for 2022 Sustainability Report,¹⁰ the company underscores its dedication to combating climate change and safeguarding the environment via decarbonization strategies, biodiversity and fresh water conservation efforts, emissions and waste reduction projects, favoring a sustainable shift. Its combined business model, which incorporates social and environmental accountability, rests on three main tenets:¹¹ achieving carbon neutrality by 2050, maintaining operational excellence, and forming developmental partnerships.

Eni's primary objective is to achieve carbon neutrality by 2050 for itself and its clients by shifting towards affordable clean fuels and products with low or zero carbon emissions.¹² To achieve this goal, Eni follows the principles of the energy trilemma as outlined by the World Energy Council:¹³ environmental sustainability, meeting present and future energy needs (energy security), and making energy accessible to an increasing global population. In this regard, Eni intends to enhance the energy mix by diversifying sources across different geographical areas (such as Congo,¹⁴ Ghana,¹⁵ etc.) and technologies to provide accessible and sustainable energy to a continuously increasing population.¹⁶

Another key aspect of Eni's approach to business is its commitment to operational excellence. This concept revolves around "giving value to people and implementing an inclusive policy that protects everyone's health and safety (...). To this end, we provide our customers with the solutions and products to play their part in the energy transition and are committed to protecting the environment and biodiversity".¹⁷ The goal is twofold: firstly, to provide an inclusive and healthy work environment for the internal staff; secondly, to assist stakeholders, particularly clients, through a conscious energy transition process by providing advanced technology and digital options.

The last cornerstone encompasses fostering partnerships aimed at achieving sustainable goals and expansion. This involves local development initiatives executed in collaboration

⁹ 2022 and 2023 adjusted net profits can be compared to the 4.3 billion in 2021 or 2.9 billion in 2019 to better understand the overall growth, <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

¹⁰ <https://www.eni.com/assets/documents/eng/just-transition/2022/eni-for-2022-just-transition-eng.pdf>, last access January 2024.

¹¹ <https://www.eni.com/en-IT/sustainability/our-commitment.html>, last access January 2024.

¹² <https://www.eni.com/static/en-IT/infographics/eni-for-2022/carbon-neutrality/>, last access January 2024.

¹³ <https://www.worldenergy.org/transition-toolkit/world-energy-trilemma-index>, last access January 2024.

¹⁴ <https://www.eni.com/en-IT/actions/global-activities/republic-congo/energy-access.html>, last access January 2024.

¹⁵ <https://www.eni.com/en-IT/actions/global-activities/ghana/octp.html>, last access January 2024.

¹⁶ <https://www.eni.com/en-IT/strategic-vision/access-energy.html>, last access January 2024.

¹⁷ <https://www.eni.com/static/en-IT/infographics/eni-for-2022/operational-excellence/>, last access January 2024.

with host nations to enhance the quality of life for residents and the operations of domestic businesses.

In its mission definition, Eni posits: “We are an energy company. We concretely support a just energy transition, with the objective of preserving our planet and promoting an efficient and sustainable access to energy for all. Our work is based on passion and innovation, On our unique strengths and skills. On the equal dignity of each person, recognizing diversity as a key value for human development, On the responsibility, integrity and transparency of our actions. We believe in the value of long-term partnerships with the Countries and communities where we operate, bringing long-lasting prosperity for all”.¹⁸ This statement alludes to the United Nations 17 Sustainable Development Goals (SDGs), specifically highlighting climate action (goal 13), life on land (goal 15), affordable and clean energy (goal 7), responsible consumption and production (goal 12), industry, innovation and infrastructure (goal 9), reduced inequalities (goal 10), gender equality (goal 5) and partnership for the goals (goal 17).

This company’s approach abides by a Code of Ethics¹⁹ outlining seven principal values that apply to anyone associated with the company, including external suppliers and partners. The values are Integrity, Respect and Protection of Human Rights, Transparency, Promotion of development, Operational Excellence, Teamwork and collaboration, and Innovation. Together, they create a unified set of terms and practices that guide decision-making toward sustainable shared value.

People as the “first source of energy”²⁰

“The culture of diversity is an essential prerequisite of a business with a strong international focus. Eni people are citizens of the world and represent the world by living side-by-side with the local communities in which Eni works.”²¹

The company believes in creating sustainable value for itself, its stakeholders, and the community by empowering its workforce, the “the first source of energy”.²² Out of the 33,142 employees,²³ predominantly situated in Italy (66%), the firm fosters an environment that prioritizes open communication, health, safety, and diversity. It treats each person’s distinct

¹⁸ <https://www.eni.com/en-IT/strategic-vision/mission.html>, last access January 2024.

¹⁹ <https://www.eni.com/content/dam/enicom/documents/ita/governance/codice-etico/eni-code-of-ethics.pdf>, last access January 2024.

²⁰ <https://www.eni.com/en-IT/sustainability/people-community/eni-people.html>, last access January 2024.

²¹ https://www.eni.com/assets/documents/Policy_Our_people.pdf, last access January 2024.

²² <https://www.eni.com/en-IT/sustainability/people-community/eni-people.html>, last access January 2024.

²³ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

qualities as assets that contribute to the organization’s progress and facilitate personal and professional growth. Illustrating this approach, Eni is intensifying its efforts toward Diversity and Inclusion projects, including STEM education programs, the implementation of equal pay for equivalent positions, and supporting the United Nations Women Empowerment Principles.²⁴ Consequently, the representation of women at the firm is on the rise. In 2023, there was a 0.5 percentage point growth in female staff compared to 2022 and a 0.7 percentage point rise in women occupying managerial positions,²⁵ resulting in 27.38% of the workforce being women, distributed as follows: senior managers at 18.17%, middle management at 30.34%, white-collar workers at 30.77%, and blue-collar workers at 15.1%.²⁶ Nevertheless, the company is implementing new practices in areas beyond gender diversity. Significant focus has been placed on protected categories within Eni and its subsidiaries,²⁷ employing 670 individuals from such groups, as well as embracing multiculturalism by operating in 61 countries with staff from 110 nationalities,²⁸ and age diversity. To this end, initiatives promoting inter-generational knowledge transfer and the mixing of ideas have been launched, including mentoring programs and the establishment of an Eni faculty with 800 trainers.²⁹

Eni people are not only viewed as the company’s primary source of energy, but they are also seen as the vital force driving its transition. Indeed, this shift is referred to as “a people-centered transition” and rests on four key pillars: the workforce, the suppliers, the local communities, and the customers.

“The challenge of the energy transition requires a cultural change, a new mindset, and the development of new skills. [As such,] Eni is committed to engaging employees in its organizational strategies with listening and communication initiatives and defining and developing the technical competencies as well as the mindset and soft skills necessary for current and future activities”.³⁰ To put it differently, since individuals are key to managing the transition and its effects, Eni is deeply committed to backing its staff in their professional and personal development by offering educational opportunities, practicing attentive communication, and fostering an inclusive work environment.

²⁴ <https://www.weps.org/about>, last access January 2024.

²⁵ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

²⁶ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

²⁷ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

²⁸ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

²⁹ <https://www.eni.com/en-IT/careers/job-opportunities/formazione-interna.html>, last access January 2024.

³⁰ <https://www.eni.com/static/en-IT/infographics/just-transition/workers>

Technological leadership and the ability to forge valuable partnerships

“Eni looks to its future with passion and confidence, facing up to the major economic and social changes of our time, with a leading role as a protagonist in the phases of change, thanks to distinctive elements such as technological leadership and the ability to forge valuable partnerships.”³¹

A strong focus on Innovation Quality

From its inception, the firm has consistently prioritized innovation and quality. Throughout its history, it has displayed a dedication to developing pioneering technologies, contributing to its evolution into a “global power company, with a strong technological imprint.”³² Eni sets itself apart through technological prowess and embraces the notion that, as articulated in the company’s Code of Ethics,³³ innovation is fundamental to the company’s expansion and forms the bedrock of its mission.³⁴

With a keen focus on technological innovation, the firm has consolidated its Research & Development operations, with approximately 166 million euros of R&D expenditure in the year 2023.³⁵ Additionally, the company holds around 9,900 patents,³⁶ and filed 28 first patent applications in 2023³⁷. The net carrying amount for industrial patents and intellectual property rights was estimated at 176 million euros at the beginning of 2023 and 450 million at the year’s close³⁸. Organizationally, the firm has established a strong network consisting

³¹ <https://www.eni.com/en-IT/company.html>, last access December 2023.

³² <https://www.eni.com/en-IT/company/our-history.html>

³³ <https://www.eni.com/content/dam/enicom/documents/ita/governance/codice-etico/eni-code-of-ethics.pdf>, last access January 2024.

³⁴ <https://www.eni.com/en-IT/strategic-vision/innovation.html>, last access January 2024.

³⁵ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

³⁶ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

³⁷ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

³⁸ <https://www.eni.com/content/dam/enicom/documents/eng/reports/2023/Annual-Report-2023.pdf>, last access November 2024.

of 7 research centers across Italy (managed both directly by the R&D function and in collaboration), employing over 1,000 active researchers.³⁹ Each center is focused on specific areas that represent the company's interests in its long-term strategy. For instance, notable institutions⁴⁰ include the Natural Resources, Wind and Marine Energy Research Center and the New Feedstock and Energy Carriers Research Center, in San Donato Milanese; the Renewable, New Energies and Material Science Research Center in Novara and the Basic Chemicals and Plastics Research Centre Versalis in Mantova.

To demonstrate how innovation efforts align with the company's strategic direction, approximately 70% of research and development funding is allocated to initiatives aimed at reducing carbon emissions.⁴¹ This statement reflects the International Energy Agency's assertion that "50% of CO2 emission reductions will be achieved with technologies that are presently at the demonstration or prototype stage".⁴²

Eni emphasizes technological neutrality in its approach, diverging from a "one-size-fits-all" mindset by utilizing a variety of technologies to enhance flexibility in facing uncertain situations that necessitate additional research and discovery.

In 2008, further showcasing its commitment to innovation, Eni established the Eni Award⁴³. Over the years, this award has evolved to set the benchmark for international energy innovation. The award aims to promote the utilization of various energy forms, champion the incorporation of science and technology in environmental scenarios and encourage the development of upcoming research talent. Over time, the scope of the award has expanded to include a wider range of research areas, such as sustainability and energy availability, while also broadening its reach to encompass a global community of researchers, for example, those based in Africa. Recently, awards have expanded to include new categories relevant to the company's main interests, like the "Young Researcher of the Year Awards" for PhD graduates, the "Debut in Research - Young talents from Africa" for African graduates, the "Energy Transition Award" for carbon footprint reduction technologies, and the "Eni Joule for Entrepreneurship Award" for entrepreneurial efforts in decarbonization, circular economy, and addressing climate change.⁴⁴ The Innovation Awards have attracted over 11,000 applications since their establishment (averaging roughly 800 submissions annually from researchers) and have honored over 100 awardees. Nobel Prize laureates have served as judges, highlighting the significance and esteem of the awards, which have also gained recognition from the President of the Italian Republic, often present at the ceremonies.

³⁹ <https://www.eni.com/it-IT/visione/innovazione/ricerca-sviluppo.html>, last access January 2024.

⁴⁰ <https://www.eni.com/it-IT/visione/innovazione/ricerca-sviluppo.html>, last access January 2024.

⁴¹ <https://www.eni.com/it-IT/visione/innovazione/ricerca-sviluppo.html>, last access January 2024.

⁴² <https://www.eni.com/en-IT/strategic-vision/innovation.html>, last access January 2024.

⁴³ <https://www.eni.com/en-IT/strategic-vision/innovation/eni-award.html>, last access January 2024.

⁴⁴ <https://www.eni.com/en-IT/media/events/eni-award.html>, last access January 2024.

Over time, committed endeavors have resulted in remarkable R&D achievements at Eni, bolstered by considerable funding and the acknowledged technical skills of its R&D staff. Since 2014, led by CEO Claudio Descalzi, Eni has navigated a period of change driven by digital innovation, shifting energy demands, and more recently, the impact of the Covid-19 pandemic.⁴⁵ Within this setting, the significance of prioritizing innovation has become even clearer. Specifically, to ensure it pursues an expansion trajectory towards becoming a “global power company with a strong technological imprint”,⁴⁶ Eni restructured its processes and reassessed its approach to innovation to meet the complex demands of today’s competitive landscape. This change was necessary to deal with geopolitical tensions, competition pressures, and the challenges associated with emerging energy transition technologies that OI can help deal with through leveraging a wider pool of resources and competencies. Relying on a seventy-year legacy of ongoing evolution and innovation, Eni has continuously adapted to maintain its lead. As part of its recent commitment to energy transition, it has made significant strategic, operational, and cultural shifts. Eni is challenged to reconsider its role in aiding and renewing the country’s energy policy during times of crisis and beyond.

From a one-to-one logic to a systematic approach to collaboration

Since the beginning, following Mattei’s approach, Eni has consistently championed the strength of partnerships for sustainable development. Hence, its leadership has always encouraged an alliance-driven strategy towards innovation through a network of national and international agreements with universities and research institutions. We highlight partnerships that are particularly significant for Eni’s sustainable transition efforts, including collaborations with prominent institutions such as the National Research Council (CNR), the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), and the Massachusetts Institute of Technology (MIT).⁴⁷ In its cooperative efforts with various organizations, there was a recurring pattern that could be described as “the one-to-one logic.” Indeed, Thomas Pasini, Head of R&D Novara Laboratories, remarked: “Eni has always focused its research activities on the development and optimization of innovative technologies but, even though... we had many partnerships with universities, for example, and with some external research centers, it was first and foremost a one-to-one operating mode”.⁴⁸

⁴⁵ In particular, Covid-19 intensified cost-optimization needs, boosted market competition, and promoted a shift toward sustainability, requiring an open approach to innovation to deal with these challenges, https://www.eni.com/content/dam/enicom/documents/press-release/migrated/2020-en/07/PR_ing_pandemic_effects.pdf, last access November 2024.

⁴⁶ <https://www.eni.com/en-IT/company/our-history.html>, last access December 2023.

⁴⁷ <https://www.eni.com/en-IT/actions/collaborative-innovation/universities-and-research-centers.html>, last access January 2024.

⁴⁸ Interview of the Research Team with Thomas Pasini, Head of R&D Novara Laboratories, conducted on January 12, 2024.

Initiating a move toward a systematic, ecosystem-focused approach to collaboration began with “open[ing] up to more universities and more types of actors and create multidisciplinary working groups”.⁴⁹ Over time, among the array of new actors joining the company’s new collaboration approach, startups were centerstage for two major reasons, as pointed out by Thomas Pasini: “[o]n one hand, from a purely technological perspective [...]. [In fact] by opening up to younger, more dynamic, faster realities, we see that startups offer a very diversified and appealing technological basket (...). On the other hand, talking to [...] young people, who give up on everything and believe in their highly risky ideas, and are able to transform their paths facing difficult issues daily, is challenging even for a major company like Eni. Bringing a bit of entrepreneurship and a change of approach in problem-solving [...] has become quite indispensable also for Eni’s research”.⁵⁰

The recent innovation strategy has been successful; indeed, thanks to its records,⁵¹ for the second consecutive year in 2023, Eni has been named among the 100 TOP Corporate Startup Stars, awarded by the ICC (International Chamber of Commerce) and Mind the Bridge.

Open Innovation enters the stage

Eni first engaged with Open Innovation in 2017 when it initiated the Corporate Venture Capital (CVC) arm, Eni Next. This entity serves “the highway to collect concepts generated in imaginative minds around the world [that wants] to harness that creativity and build long-term relations which lead to innovation and business outcomes”.⁵² Based in Boston, Eni Next⁵³ adopts the outside-in approach, focusing its corporate venture capital efforts on investing in rapidly expanding startups that align with the company’s energy transition ambitions such as cutting carbon emissions, by providing initial funding and additional investments. A significant step in advancing the Open Innovation journey was taken in 2018 with the establishment of a specialized unit for Open Digital Innovation, aimed at driving the digital transformation of company operations. Later, the emphasis transitioned towards creating innovation ecosystems and seeking innovative solutions focused on business objectives, which led to the rebranding as the TECH| Eni Innovation Ecosystems division. Drawing from Eni Next and TECH| Eni Innovation Ecosystems’ experience, the OI method started to play a more significant role. During this time, two other initiatives also helped formalize this approach. Firstly, also responding to the repercussions of the Covid-19 crisis, Eni founded Joule, Eni School of Entrepreneurship, “with an initial mission very focused on generating a contribution not necessarily linked to Eni’s business, but more specifically to

⁴⁹ See footnote 48.

⁵⁰ See footnote 48.

⁵¹ <https://www.eni.com/en-IT/actions/collaborative-innovation/open-innovation.html>, last access January 2024.

⁵² <https://www.eni.com/eninext/en-US/who-we-are.html>, last access January 2024.

⁵³ <https://www.eni.com/eninext/en-US/who-we-are.html>, last access January 2024.

the positive externalities of being a social actor”⁵⁴ as expressed by Mattia Voltaggio, Head of Joule. Additionally, Eni established its corporate venture mechanism, Eniverse,⁵⁵ to leverage the firm’s open innovation strategy from an internal perspective by commercializing untapped in-house patented technologies. Eniverse positions Eni as a pioneer in the energy industry by setting up a vehicle that enhances its technological assets and talent base, which are core pillars of innovation that the company consistently backs and depends on to navigate the energy transition effectively.

In this integrated model (Figure 2), Eni Next and Eniverse, functioning as corporate bodies, directly create value by investing in startups and establishing new ventures utilizing Eni’s resources and knowledge. Meanwhile, Joule and TECH| Eni Innovation Ecosystems, operating as corporate functions, offer services to aid the innovation journey, mainly responding to a demand-driven approach steered by the business’s requirements.

As an enabling platform for its OI approach, Eni also created EniSpace,⁵⁶ providing a digital space for Eni’s suppliers. Here, suppliers can discover business opportunities, maintain their relationship with the company, and participate in challenges issued by Eni (Innovation Match⁵⁷). This platform also welcomes other entities like SMEs, large corporations, research institutes, universities, and startups to engage in specific initiatives.

⁵⁴ Interview of the Research Team with Mattia Voltaggio, Head of Joule, conducted on December 18, 2023.

⁵⁵ <https://www.eni.com/eniverse/en-IT/who-we-are.html>, last access January 2024.

⁵⁶ https://enispace.eni.com/en_US/enispace.page, last access January 2024.

⁵⁷ https://enispace.eni.com/en_US/innovation.page,%20last%20access%20January%202024

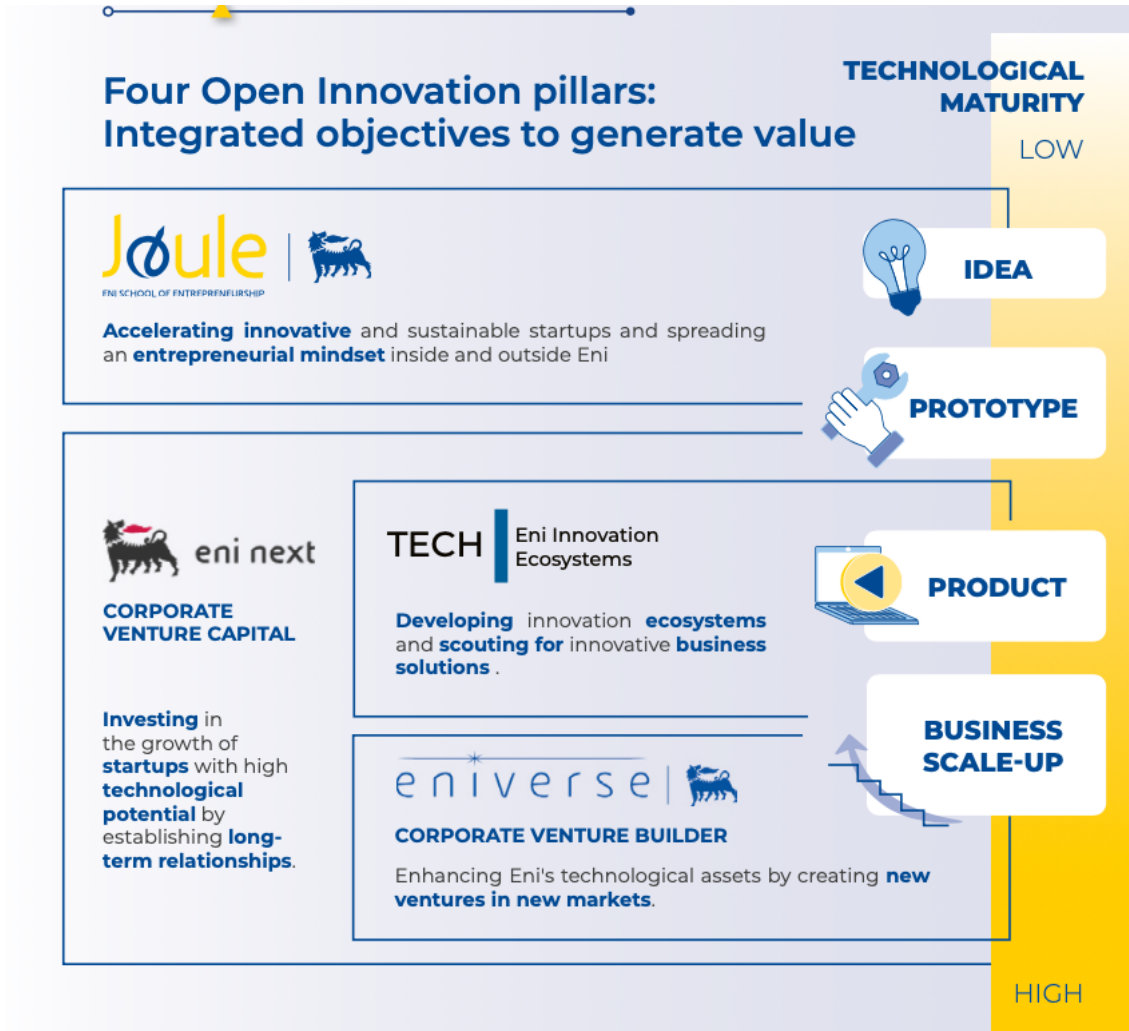


Figure 2: Eni's Open Innovation pillars, 2023 Joule Impact Report, 2023

Joule, Eni School of Entrepreneurship: an evolving entity

“Joule, Eni School of Entrepreneurship, has been supporting the growth of sustainable enterprises since 2020 with training courses and acceleration programs. A true ecosystem, creating space for the new visions of the future, by developing key competences and tools for accelerating startups, accessing challenges and concrete opportunities and a network of top-quality trainers and teachers.”⁵⁸

Joule’s inception: Supporting the country by empowering the startup ecosystem

Joule, the Eni School of Entrepreneurship, was established in 2020 amidst the Covid-19 crisis to employ Open Innovation in aiding the nation through a challenging period. Mattia Voltaggio, Head of Joule, elaborates on their purpose: “There was a need for a push to the national system, especially considering that to this day, the fact that the country does not accelerate startups coming from the world of universities and research centers remains a pain point. [...] So, it was thought that Eni could be an actor with the right economic strength, relationships, and network to support the country in this objective”.⁵⁹

Joule, since its inception, has been part of the Human Capital & Procurement Coordination division, which shaped its trajectory to become a key player in spotting emerging talents and Open Innovation practices by focusing on early-stage startups. Though this segment offers lower immediate financial gains compared to partnering with mature firms, it provides the chance to engage with businesses with high growth potential, possibly leading to future investments and, crucially, creating a beneficial environment for dynamic exchanges within the firm.

As the company’s holistic strategy for OI has developed, Joule has shifted its central attention over time due to its adaptable nature. As Voltaggio notes: “[Joule] originates from

⁵⁸ <https://www.eni.com/joule/en-IT/home.html>, last access February 2024.

⁵⁹ Interview of the Research Team with Mattia Voltaggio, Head of Joule, conducted on December 18, 2023.

an objective that is significantly different from what it has become today. Consequently, its identity and positioning within the framework of other Open Innovation tools have adapted over time”.⁶⁰ Consequently, Joule has devoted itself to creating not only corporate value by actively engaging with early-stage startups for meaningful exchanges but also societal value through the development of significant innovations.

Joule’s mission: supporting the OI process through three main pillars

The Joule’s Impact Report 2023 declares “Joule is Eni School of Entrepreneurship. Since 2020 it has been supporting the growth of innovative and sustainable startups to create an entrepreneurial ecosystem in the zero-emission energy value chain and spread an entrepreneurial mindset inside and outside Eni”.⁶¹ To bridge the gap between the internal and external dimensions, Joule’s organization adapts its formula: “Innovation = (Culture + Mindset) x Technology,” focusing on three main pillars: Origination & Intrapreneurship, Startup Acceleration Programs, and Impact Assessment, Monitoring & Reporting.

Origination & Intrapreneurship is primarily about seeking innovative solutions, verifying ideas, ensuring problem-solution alignment, and promoting an entrepreneurial mindset. In response to identified organizational innovation needs, it also fosters internal entrepreneurship by encouraging the submission of innovative ideas from all company segments and eventually exploring new potential startups. This phase is critical as it focuses on discovering the optimal solutions that meet the organization’s needs. In addition, this division is dedicated to recognizing and developing internal talent, and fostering an entrepreneurial spirit and perspective among employees via targeted programs. Paola Santilli, Joule’s Startup Scouting & Idea Evaluation manager, states that the goal of this initiative is “to spread a new way of doing things even within a large company, adopting an agile and “think outside the box” approach aimed at gathering new input from the outside. This is the goal of open innovation that we would like to pursue in all our functions, especially in the R&D unit where the risk of remaining more internally oriented is significant since they manage very high internal know-how”.⁶²

As its name implies, the Startup Acceleration Programs unit is focused on bridging Eni with the external landscape by engaging with early-stage startups via scouting and incubator programs. Joule’s Impact Report 2023 reveals that there are eight distinctive programs in progress, including ZERO – Cleantech Accelerator and Basilicata Open LAB, striving to foster sustainable innovation. A pivotal aspect of these initiatives’ effectiveness is the creation of a strong network of internal experts who understand the importance of their contributions. Antonietta De Sanctis, Head of Joule’s Startup Acceleration Programs,

⁶⁰ See footnote 59.

⁶¹ <https://www.eni.com/assets/documents/joule/Impact-Report-2023-joule.pdf>, last access March 2024.

⁶² Interview of the Research Team with Joule’s Origination & Intrapreneurship, conducted on December 12, 2023.

emphasizes this by saying “our mentors are passionate about startups and follow them even after they leave our programs, [hence] becoming proper points of reference [for them]”.⁶³ Moreover, Joule positions itself as an ecosystem accelerator, setting itself apart from standard corporate accelerators by blending both internal and external expertise to build its ecosystem. In its initiatives with early-stage startups, Joule collaborates with expert partners like Seedble, Gellify, PoliHub|Innovation Park & Startup Accelerator, Zest Group, Elis Innovation Hub, and Mind the Bridge. Additionally, it works with various universities, cultivating a diverse and potent knowledge ecosystem.

The final component shaping Joule’s operations is the Impact Assessment, Monitoring & Reporting unit. This unit not only undertakes monitoring through regular detailed surveys and interactions with internal teams and startups but also concentrates on generating and gauging impact. Through advanced methods and partnerships with entities like Open Impact and Elis Innovation Hub, Joule is creating a comprehensive approach to measuring impact that considers environmental, social, and economic aspects of value. Consequently, in 2023, for the first time, Eni succeeded in calculating the Social Return on Investment (SROI)⁶⁴ for every startup participating in the ZERO program,⁶⁵ yielding an average ratio of 4.16.⁶⁶ This indicates that for every euro allocated to the acceleration program, a social value of 4.16 euros was produced.

The role of Joule in supporting Eni’s Open Innovation strategy appears evident, yet what were the intrinsic difficulties in engaging all the necessary participants, both within and beyond the company, and what unresolved issues remain for the future?

⁶³ Interview of the Research Team with Antonietta De Sanctis, Head of Joule’s Startup Acceleration Programs, conducted on December 12, 2023.

⁶⁴ The SROI methodology is “a framework to measure and account for the value created by a programme or series of initiatives, beyond financial value. It incorporates social, health, environmental and economic costs and benefits”, more information available at: https://www.undp.org/sites/g/files/zskgke326/files/migration/eurasia/Appendix-SROI-methodology_ENG.pdf, last access March 2024.

⁶⁵ <https://www.zeroacceleratorcleantech.com/?lang=en>, last access February 2024.

⁶⁶ <https://www.eni.com/assets/documents/joule/Impact-Report-2023-joule.pdf,%20last%20access%20March%202024>.

Open Innovation as a People-driven process

“We are an open innovation unit in the area of human capital. We generate impact on people by leveraging the development of new technologies.”⁶⁷

Setting a common ground... toward a full-fledged OI approach

In the early stages of Joule’s journey, advocating for an Open Innovation model and highlighting its advantages and utility presented challenges. Indeed, successfully onboarding all of Eni’s employees into Joule was crucial. Aligned with its role within Eni’s Human Capital & Procurement Coordination department, “it was necessary to build widespread relationships to let Eni’s people know us [Joule’s team]. We had to introduce Joule properly, be open, share details about Joule’s activities, and be able to integrate ourselves with the other OI functions to generate value together”,⁶⁸ said Domenica Surace, the Head of Joule’s Impact Assessment, Monitoring & Reporting unit.

In 2023, a community exceeding 10,000 individuals, including 1,200 Eni employees, was established and nurtured through a series of dedicated community-focused initiatives and efficient communication tools, managed under the aegis of Domenica Surace’s unit and guided by Luisa Berti. Launching Joule’s website⁶⁹ and introducing the digital platform “Joule Open”⁷⁰ facilitated the revelation of Joule’s “reason why” to the entire company and beyond.

Additionally, to raise awareness of Joule and improve its interactions with different organizational bodies, a boundary spanner position was established to “maintain an open channel of both technological and personal contamination”,⁷¹ as emphasized by Thomas Pasini, Head of R&D Novara Laboratories and former Head of Origination & Intrapreneurship in Joule. He held the latter position between 2022 and 2023 but recently

⁶⁷ <https://www.eni.com/assets/documents/joule/Impact-Report-2023-joule.pdf>, last access March 2024.

⁶⁸ Meeting of the Research Team with Domenica Surace and Francesca Ficeto, Joule’s Impact Assessment, Monitoring & Reporting unit, on February 29, 2024.

⁶⁹ <https://www.eni.com/joule/en-IT/home.html>, last access February 2024.

⁷⁰ <https://www.eni.com/joule/it-IT/opportunita-esclusiva-open.html>, last access February 2024.

⁷¹ Interview of the Research Team with Thomas Pasini, Head of R&D Novara Laboratories, conducted on January 12, 2024.

handed over his responsibilities to Luca Dal Forno, who took on the roles of Joule's Head of Origination & Intrapreneurship and Eni's Subsurface Technologies R&D Manager in September 2023. Pasini pointed out that the dual position created a valuable link between Joule and R&D “[And while it seemed to have] become a standard, a daily practice [...] [i]t [was] not something to be taken for granted because although we [were] part of the same company, we [were] part of different organizational units (...)”.⁷²

This was also one of the reasons why Domenica Surace emphasized that “to change the [internal] mentality, [we started] to take people from the outside who had certain types of competencies and could bring them inside [the original team]”.⁷³ Initially, the core team members were chosen from Eni's experienced personnel who were deeply familiar with the company's values and vision, which facilitated a swift initiation phase. Later on, to round out the required skills and competencies essential for Joule's progress, new team members were recruited also from external organizations. This strategic integration created an exceptionally diverse and dynamic group, including individuals from different professional arenas such as history, journalism, human resources, and computer science, all sharing a zeal for innovation.

In July 2022, the common ground was set, and Joule's internal architecture was formalized (Figure 3).

⁷² Interview of the Research Team with Thomas Pasini, Head of R&D Novara Laboratories, conducted on January 12, 2024.

⁷³ Interview of the Research Team with Joule's unit Origination and Intrapreneurship, with Luca Dal Forno, Simona Marcantonio, Paola Santilli as interviewees, in the presence of Domenica Surace and Francesca Ficeto, conducted on December 12, 2023.



Figure 3 : Joule’s organisational model, Joule’s Impact Report 2023, 2023

“Today [in light of this model], we start from a somewhat defined consensus of who does what; not that we had such a clear overview right away, but gradually we understood better how everyone could contribute to their little piece of the innovation chain (...)”,⁷⁴ Voltaggio, the Head of Joule, expressed clearly at the dawn of 2024. Therefore, Eni implemented several initiatives to formalize and spread the Open Innovation process throughout its internal and external networks. A digital platform called “gENius” was introduced for OI experts to oversee the interaction of the four OI components, enhancing visibility, transparency, and fostering accountability, cooperation, and knowledge sharing. Presently, the company maintains a database with approximately 2000 startups. Additionally, a cross-functional OI Team was formed in January 2024, uniting leaders from OI-engaged divisions quarterly to exchange information, initiatives, and best practices, deliberate on and jointly determine future directions, and promote coordination and implementation via unified guidelines and formal communication pathways.

⁷⁴ Interview of the Research Team with Mattia Voltaggio, Head of Joule, conducted on December 18, 2023.

Overall, Joule’s development involved significant adaptation and was marked by key milestones that steered its progress to meet changing requirements and company objectives. **The ultimate goal is to develop a comprehensive approach to OI, which necessitates the establishment of a strong OI culture. But how?**

An OI culture centered on people: employees, startupper, and partners to bridge Joule’s internal and external dimensions

In order to implement an Open Innovation integrated strategy, it is essential to create an organization deeply dedicated to innovation and collaboration. This involves bringing together professionals from various fields and skill sets to foster a shared OI culture, which can drive employee engagement and maximize the potential value of OI.

Luca Dal Forno, who leads Joule’s Origination & Intrapreneurship unit, observes that challenges often stem from differences in “people’s age, background, experience, technicalities, geographical location and we experience it objectively every day because certain doors have to be broken down several times before they remain open and accept this type of new message culture. And we are doing it with various intrapreneurship programs”.⁷⁵



Figure 4: Joule’s intrapreneurship programs, Joule’s Impact Report 2023, 2023

“Y Start” initiates employees into the realm of innovation, enhancing their awareness and helping them craft essential soft skills. The “Train the Joule Expert” program is designed to equip mentors of the Joule Expert Academy with practical tools and knowledge to support fast-growing startups. Lastly, the “Joule Discovery Lab” serves as a dedicated space for cultivating innovative ideas created by Eni employees or in partnership with external entities like startups. In addition to fostering an intrapreneurial culture among staff, establishing a foundation for interaction with external parties was equally essential. Simona Marcantonio, manager of Joule’s Intrapreneurship Programs, had definitive thoughts: “[Internal] people who met the start-ups were in constructive interaction with

⁷⁵ Interview of the Research Team with Joule’s unit Origination and Intrapreneurship, with Luca Dal Forno, Simona Marcantonio, Paola Santilli as interviewees, in the presence of Domenica Surace and Francesca Ficeto, conducted on December 12, 2023.

them on aspects [related to] [...] technical content. [What was necessary] was finding a form of language that would promote effectiveness in the exchange (...). From here emerged the need to launch projects about innovation literacy”.⁷⁶ Additionally, Joule took the initiative to foster connections between Eni’s internal staff and external stakeholders. This included setting up avenues for dialogue and exchange between R&D specialists and entrepreneurial talents within startup incubators and accelerators. Such interactions cultivated a mutually beneficial relationship, providing value to both employees and entrepreneurs. Employees had the opportunity to step outside their comfort zones and gain fresh skills through a new perspective on ongoing innovation, ultimately enhancing their career prospects. Meanwhile, the entrepreneurs gained access to valuable industry insights and could tap into the wealth of knowledge and experience held by seasoned professionals.

Joule’s impact framework clearly shows its distinct identity compared to other Open Innovation entities within and outside the company. True to its placement within Eni’s Human Capital & Procurement Coordination department, Joule emphasizes the significance of individuals as principal drivers of innovation, considered OI’s X factor.

⁷⁶ Interview of the Research Team with Joule’s unit Origination and Intrapreneurship, with Luca Dal Forno, Simona Marcantonio, Paola Santilli as interviewees, in the presence of Domenica Surace and Francesca Ficeto, conducted on December 12, 2023.

What's next?

Cultivating an entrepreneurial mindset throughout a company is vital for making an impact, but this task is challenging to execute or evaluate. Even though Eni has invested significant efforts in developing and applying a method to calculate the Social Return on Investment of its programs, assessing intangible assets – such as the employability impact on Eni's workforce – introduces further complexity, necessitating advanced instruments. Domenica Surace states “we cannot measure or monetize the value [of these initiatives], but [they have] certainly an impact that is [both] [...] intangible, because you cannot monetize it, [...] [and] tangible because you see it when people change their way of approaching work”.⁷⁷ Additionally, due to the complex nature of Eni's OI initiatives, which aim to create a comprehensive impact that includes economic, environmental, and social aspects, quantifying their success becomes increasingly challenging.

This obstacle is not unique to Joule but is faced by other departments involved in Open Innovation as well. Hence, the units engaged in OI, in collaboration with the Planning and Control division, are creating a comprehensive tool to assess the total value created by the company's innovation efforts (termed “Return on Innovation”) and encourage adopting a culture that prioritizes value. The ultimate goal is to create and oversee a comprehensive monitoring dashboard that aligns with IFRS accounting standards while combining quantitative and qualitative metrics, embracing both tangible/financial and intangible/non-financial elements. **How might the organization consider these various factors to ensure it produces an accurate and multidimensional impact that will inform upcoming innovative efforts and strategic planning?**

⁷⁷ Interview of the Research Team with Joule's unit Origination and Intrapreneurship, with Luca Dal Forno, Simona Marcantonio, Paola Santilli as interviewees, in the presence of Domenica Surace and Francesca Ficeto, conducted on December 12, 2023.

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Interviewee(s)	Role	(Online) Interview date and time
Domenica Surace Francesca Ficeto Luisa Berti Valentina Raule	Team Impact Assessment, Monitoring e Reporting	12/12/23 – 09:30-10:15
Luca Dal Forno Simona Marcantonio Paola Santilli	Team Origination and Intrapreneurship	12/12/23 – 10:30-11:15
Antonietta de Sanctis	Head of Joule’s Startup Acceleration Programs	12/12/23 – 11:30-12:15
Mattia Voltaggio	Head of Eni Joule	18/12/23 – 14:00-14:30
Thomas Pasini	Head of R&D Novara Laboratories	12/01/24 – 12:00-13:00
Laura D’Angelo	Venture Strategy & Development Director @ Eniverse Ventures	23/01/24 – 11:00-12:00
Domenica Surace Francesca Ficeto (informants’ validation of results – follow-up meeting)	Team Impact Assessment, Monitoring e Reporting	29/02/24 – 10:30-11:30