HARNESSING OPEN INNOVATION IN THE REORGANIZATION OF AN ENERGY UTILITY

Vito Manfredi Latilla¹, Andrea Urbinati¹, Davide Chiaroni¹, Federico Frattini¹
¹Politecnico di Milano (Italy) Department of Management Engineering

ABSTRACT

Innovation and change represent a necessary response to the challenges that new technologies pose to the electricity production sector, forcing producers to come up with new solutions and models of production, mainly enabled by innovations in telecommunications and digital technologies. In this competitive scenario, many firms have decided to harness the entrepreneurial power through formalized engagement with start-ups. However, most corporates do not know where to start, given the mushrooming array of open innovation programs nowadays available. The study analyzes the case of one leading Italian utility operating in the electricity sector, which has recently embraced, at different organizational level and involving different business units, a transformation of its organizational processes, adopting an open approach to innovation. The study aims to address the emergence of new (and open) business models in the utility sector, developing an understanding of the new organizational structures and processes the company here analyzed is adopting (and shall adopt) to harness the power of open innovation.

Keywords: business model innovation; digital transformation; energy utility sector; open innovation.

1. INTRODUCTION

Electricity producers for decades have not paid attention to alternative ways to generate profits offering a different value proposition to the market, preferring to self-reinforce exploitation of their internal competences (conventional electricity generation and distribution). This way of running business results nowadays outdated, since the electricity sector is changing more than ever, challenged by medium and long-term societal and technological trends (Teece, 2010).

New technologies are forcing electricity producers to come up with new solutions and new (decentralised) models of production, enabled by innovations in telecommunications and digital technologies, which allow the integration of service components into the firms’ range of activities (Baines et al., 2009), as well as the development of new electricity uses, such as for e-mobility, which is emerging as a new revenue streamline for utilities (Abdelkafi, Makhotin and Posselt, 2013). Furthermore, local communities and customers are looking to increasingly take ownership of their consumption, acting as “prosumers”. All this makes for a much more complicated system, that rewards agility and requires the adoption of innovative and open business models.

Innovation and change become, therefore, a necessary response to the challenges that new technologies pose to the electricity production sector (Doz and Kosonen, 2010) as well as a way to react dynamically to the shifting in the base of competition, where prosumers may potentially erode a traditional stream of revenues for incumbents. All this change happens at a time when the electricity demand in Europe is still subdued, while significant subsidised energy capacity has been connected to the grids, creating an over-capacity in the generation fleet.

2. THEORETICAL BACKGROUND

The authors have embraced a dynamic view of business model innovation as proposed by (Saebi and Foss, 2015), and have conceptualized such view as an organizational change process requiring appropriate capabilities, leadership and learning mechanisms. The study builds on the definition of Business Model Innovation (BMI) provided by (Foss and Saebi, 2016) according to which BMI is defined as “designed, novel, nontrivial changes to the key elements of a firm’s business model and/or the architecture linking these elements”. The BMI is investigated as an organizational process, in the
Innovation in general is recognized as an enabling factor for firms to achieve a sustainable competitive advantage, ensure long-term growth and improve performance (Dyer, Gregersen and Christensen, 2009). The traditional “closed” approach to innovation (Chesbrough, 2003) has been undermined by the combined effects of rapid technological change and globalization (West and Gallagher, 2006), while growing competition has forced firms to adapt their resources and capabilities in line with the changed competitive environment (Teece, Pisano and Shuen, 1997). The innovation process has become more and more complex, stimulating the transition to an “open” innovation model, based on the assumption that “no matter who you are, most of the smartest people work for someone else” (Elmquist, Fredberg and Ollila, 2009). This transition has forced internal R&D departments to capture value from external ideas, moving from an exclusive internal development process to the external search and evaluation of the required knowledge (Docherty, 2006).

Even though the adoption of the open innovation model has several potential benefits for firms (West and Bogers, 2014), it is not straightforward for large and established corporations to innovate, since their rather standardized procedures are generally inadequate to allow a smooth integration of innovations coming from the outside (Huizingh, 2011). This is particularly the case for utility companies, whose internal organization reflects the centralized system of electricity generation and grid design (Caldecott and McDaniels, 2014). Accordingly, the incumbents in the industry have mainly been recognized by regulators as monopolist in the market (Newcomb et al. 2014). Nevertheless, in the last decade established utilities have been navigating several disruptive factors to their consolidated business: rapid (digital) technology innovation; the falling cost of distributed generation; increased interest in demand-side management; slowing trends in demand and increase in energy efficiency measures; shifting government policies on renewable energy incentives; and rising electricity prices (Kind, 2013; Newcomb et al., 2014). In combination, these factors are dramatically changing the business model traditionally adopted by incumbent energy producers. Furthermore, customers as well as new regulations are now driving investment trends through energy efficiency and distributed generation, overtaking the traditional centralized model of electricity generation and the related definition of utilities’ business model (Zinaman, et al., 2015).

In this fast-changing business and regulatory scenario, utilities have been facing the pressing dilemma, whether to try to innovate from within, perhaps by establishing in-house incubators, or either to collaborate with startups. Many of them have decided to take the plunge into the open innovation wave and harness the entrepreneurial power through formalized engagement with start-ups. Generally, such utilities (i.e., Enel, EDF) have gradually built up a portfolio of formalized programs they can mix and tailor, depending on their needs and the market forces they deal with (Chiesa and Manzini, 1998).

3. RESEARCH QUESTION

The proposed paper aims to address the emergence of new (and open) business models in the utility sector. In doing so, the authors have conducted an in-depth analysis inside a utility company, developing an understanding of the renewed organizational structure the company adopts to harness the power of open innovation in its internal processes, trying to answer to the following research question: “How and why does the open innovation model influence the shaping of the business model of an established large company”?

4. METHODOLOGY

To answer the proposed research question, the paper analyzes the case of a leading Italian utility - Company ALPHA (disguised name), (hereafter “Company ALPHA” or “the Company”), which has recently embraced, at different organizational level and involving different Business Units (“BUs”), a transformation of its organizational processes, adopting an open approach to innovation.
The investigation has been framed as a single case study of business model innovation inside an established large utility company. This because case studies offer a useful methodological approach to answer the “how” and “why” questions (Yin, 2003). In particular, this single case has been selected for the following three reasons: firstly, when sampling the Italian large utilities, company ALPHA is part of the sample; secondly, company ALPHA is one of the only two Italian utilities that are actually developing and implementing internal practices to adopt open innovation models in their traditional business of energy producers; thirdly, for a pragmatic reason, since over the last six months two of the authors of the present paper actively participated in a collaborative project within the Company to analyze potential open innovation solutions to be adopted to facilitate the internal innovation process.

Information were collected using interviews and internal companies’ documents as data sources: 11 interviews were conducted within the Company, with some follow-up by emails with questions of clarification over the period of the case study. Interviews were mainly drawn from three departments (R&D, Marketing and Communication) and from various organizational levels (Table 1). Interviews commonly lasted one hour, and were conducted with the support of an interview protocol built around a set of open-ended questions. The Company provided also access to internal confidential information related to the marketing strategies and open innovation initiatives.

<table>
<thead>
<tr>
<th>Repeated interviews</th>
<th>Single Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Manager</td>
<td>Sales Manager for residential customers</td>
</tr>
<tr>
<td>Marketing Manager</td>
<td></td>
</tr>
<tr>
<td>Communication Manager</td>
<td>Business Development Manager</td>
</tr>
<tr>
<td>Head of the Development &amp; Innovation division</td>
<td></td>
</tr>
<tr>
<td>• 3</td>
<td>• 1</td>
</tr>
<tr>
<td>• 2</td>
<td>• 1</td>
</tr>
<tr>
<td>• 1</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: List of interviews

To the extent of the present case study, the authors adopted the extended case method (Burawoy, 1998) (Danneels, 2007). This methodological approach uses empirical data gathered through direct interviews to re-conceptualize and extend theory. The authors went through a three-step process to conduct the case study: firstly, they examined the relevant academic literature on open innovation and business model innovation (see above, Theoretical Background); secondly, they prepared a semi-structured questionnaire for the interviews with the Company’s key informants; thirdly, they used the information gathered during the interviews to rielaborate the innovation models proposed by scholars. This extended case method went through many cycles of confrontation between data collected from interviews and the review of the academic literature, with data analysis and exploration of the literature that occurred (almost) in conjunction.

The authors, after reviewing the academic literature and confronted it with the reality of the energy utility sector, have developed the framework proposed in Figure 1 below to capture the keywords of the utility of the future that emerge from the academic literature and from the analysis of sector-specific reports. The framework shows also the relation among such keywords: the red color represents the cornerstone of the new business model for an energy producer; the blue keywords represent the guiding lights of such reorganizational process; the green keywords represent the technological changes and challenges that characterize such transformation.
5. THE CASE STUDY

Company ALPHA is one of the top energy companies in Italy, integrated along all the value chain of power and gas. It supplies power and gas together with energy efficiency services to about 1.2 million business and residential customers. The R&D Department is made of 30 employees and is structured around two main divisions. The “Research & Laboratories” division is dedicated to mid- and long-term projects; it has a set of laboratories used for research purposes and technology assessment activities in the gas and power areas (e.g. batteries, fuel cells, smart home solutions). The “Development & Innovation” division deals with projects closer to the business application (e.g. forecasting tools for energy management and trading activities, digital services for customers), which the Company intends to strengthen, engaging in the direct development of energy efficiency services and renewable energy generation, through the promotion of innovative business models.

5.1 THE “AS IS” OF COMPANY ALPHA

Thanks to its current position and to its integrated presence in the gas and electrical energy value chain, Company ALPHA is well-placed to seize opportunities created by market changes to sustain its growth, meanwhile pursuing efficiency and profitability. Fully cognizant of the importance of innovation to sustain growth and support its strategic ambition, Company ALPHA has been undertaking various initiatives in this area for several years.

“The most visible part of our strategy to harness open innovation inside our company is the Pulse competition, a start-up competition created in 2014 and managed by the Company Communication team. The competition aims to demonstrate Company ALPHA’s commitment to promote innovation and entrepreneurship, helping the development and growth of the best start-ups throughout Italy. Moreover, the competition intends to support projects that reflect the Company’s values and commitment towards customers and the local communities” (Communication Manager).

The “Pulse Award” provides tangible support to start-ups that are creating and inventing the future. Specifically, the competition is aimed at Italian start-ups that contribute to economic development in the regions or offer innovative energy solutions. In 2016, Company ALPHA Pulse dealt with the Internet of Things, the low carbon city and the sharing economy.
During the first three editions, the Pulse Award saw more than 1,400 projects submitted by start-ups, research centres and students. A total of €700,000 have been handed out in direct funding to 7 start-ups and 1 social project, besides targeted incubation programs and support from Company ALPHA experts and external partners, without considering the media exposure.

“However, regardless of its very positive communication impact, the Pulse competition shall increase its performance in terms of business value creation. Therefore, the Company has decided to tackle this issue with the 4th edition and to increase the likelihood for an actual business cooperation with the winning entrepreneurs to occur. To this end, the Company has decided for a stronger involvement of BUs’ representatives in the different phases of the organisation (R&D Manager).

Besides Pulse Award, Company ALPHA develops its relationships with the innovation ecosystem through various initiatives such as the “Innovation Week”, a series of events and conferences held in its Milan headquarters since 2015, gathering a large community of innovation leaders. As part of its territorial development strategy, the same message is delivered in some Italian regions through the so-called “Innovation Days roadshow”, consisting of exhibitions and round-tables involving local stakeholders. Such project involved 5 cities spread all over Italy.

“[the Innovation Lab] is devoted to projects put forward by a core of employees who have come together spontaneously with new ideas for the company. However, it does not apply to top-down business initiatives, as innovative they might be. The Innovation Lab philosophy encourages risk taking, by endorsing a “fail fast, fail smart” approach, and recognises, beyond the results effectively generated for the business, the actual value of (i) the new skills acquired and (ii) the dissemination of a lively culture of innovation within the company”. (Communication Manager)

Despite significant promotion efforts, only one Innovation Lab has been launched so far. Nevertheless, convinced of the innovative potential of its teams, the Company has decided to tackle the innovation issue, launching another dedicated program, pertinently named “Innovation Booster”. This new scheme intends to develop and disseminate, throughout the Company, a steady culture of participatory innovation. It is expected to spark off inspiration and open new perspectives, by stimulating creative thinking within the Company, feeding its pipeline of innovation projects.

Simultaneously, Company ALPHA set up in 2016 a “Transformation Committee”, or more precisely, a set of working groups composed by the Company’s talents and due to raise proposals for improving the Company performance on various topics.

“[the Innovation Lab] is devoted to projects put forward by a core of employees who have come together spontaneously with new ideas for the company. However, it does not apply to top-down business initiatives, as innovative they might be. The Innovation Lab philosophy encourages risk taking, by endorsing a “fail fast, fail smart” approach, and recognises, beyond the results effectively generated for the business, the actual value of (i) the new skills acquired and (ii) the dissemination of a lively culture of innovation within the company”. (Communication Manager).

Despite significant promotion efforts, only one Innovation Lab has been launched so far. Nevertheless, convinced of the innovative potential of its teams, the Company has decided to tackle the innovation issue, launching another dedicated program, pertinently named “Innovation Booster”. This new scheme intends to develop and disseminate, throughout the Company, a steady culture of participatory innovation. It is expected to spark off inspiration and open new perspectives, by stimulating creative thinking within the Company, feeding its pipeline of innovation projects.

One of these teams was assigned the topic of Entrepreneurship. This work is still in progress; so far the team has drafted a typical 3-stage model, that includes (i) an idea generation phase, followed by (ii) the careful assessment of the proposals and (iii) the stabilisation/development of the selected projects. Various tools may be used to achieve the idea generation phase, including Call4Ideas digital platforms or Innovation Booster sessions” (Marketing Manager).

Anyway, up to recently, little has been done to give structure to the rather scattered internal innovation initiatives, and the (very few) collaborations undertaken with start-ups have been mostly taking place on a client-supplier basis rather than through an actual development partnership. The
initiatives launched in the field of open innovation have not generated yet much business opportunities with entrepreneurs. To date, no top-down strategic decision has been made by the Company to shift towards an actual open innovation model.

Hereafter some seeds of an open innovation culture within the Company are analysed, following a “test and learn” philosophy, and a general framework aiming to better integrate and coordinate these various initiatives is proposed by the authors (see below, Fig. 2).

5.2 BRINGING IN OPEN INNOVATION PRACTICES IN COMPANY ALPHA: “TO BE”

It may be worth reminding that the Company on one side operates industrial assets to produce electricity and hydrocarbons and trade them on the energy markets and, on the other side, supplies a medium-size portfolio of B2B and B2C customers with power, gas and energy services. Therefore, triangulating all the information gathered from the key respondents with the literature review performed on academic papers and sector-specific reports, we propose to develop the Company open innovation model around four main pillars, which shall consider (i) the monitoring and analysis of technology and societal macro-trends in the energy and digital sector, (ii) the development of internal co-working facilities to support innovation, (iii) the creation of spin-off, (iv) the sourcing of external innovations.

The Company, indeed, shall be able to grow closer to customers, designing and experimenting new solutions and energy services that enable a low-carbon and flexible energy demand. This includes (i) improving customer knowledge and data mining to better target the commercial offers, (ii) promoting new and efficient uses of electricity, (iii) developing energy efficiency solutions/services for buildings and industrial applications, taking advantage of the smart grids features and innovative pricing offers, (iv) designing smart solutions for cities and territories. Furthermore, the Company shall be able to anticipate and prepare the electrical systems of tomorrow. This includes (i) optimizing the lifetime of network infrastructures, (ii) anticipating the increase of intermittent production connected to the grid and (iii) designing local energy solutions that can be integrated within the overall system. These goals shall be achieved while consolidating and developing a competitive and a low-carbon power generation mix.

To achieve its goals, the mission we see for an up-to-date Company “Innovation Policy” would consider the creation of more value from internal innovation, taking advantage of the Company consolidated R&D expertise and collaborators experience, and the introduction of specific innovation practices to benefit further from external innovation, turning innovative solutions provided by startups into effective business trials.

Furthermore, to refocus the Company business model towards open innovation, the Company shall mobilize employees around a new vision that reflects the innovation challenges. With this regard, a best practice adopted by several competitors in the energy sector is the creation of a structured web-based digital platform where sharing external sources of innovation between employees and BUs. Hence, we consider three main work-streams for embarking Company ALPHA on a profitable open innovation journey: (i) the sourcing of start-ups from the external business ecosystem, (ii) the transfer of relevant material towards Company’s BUs thanks to the adoption of a web-based digital platform as suggested here above; (iii) the facilitation of business and market trials.

5.2.1 THE SOURCING OF START-UPS FROM THE EXTERNAL BUSINESS ECOSYSTEM

The sourcing activities should comprise 3 main tasks: (i) the exploration of the innovation ecosystem; (ii) the screening and characterization of start-ups; (iii) the recording of the information collected. These tasks might be entrusted to a group of “Open Innovation Watchers” to be appointed, for instance, inside the R&D department. They should ideally be selected for their interest in new technologies and innovation topics, general technical knowledge, good communication skills and the ability to quickly analyse and summarize information.
**Exploration** – The exploration of the ecosystem can be performed with two different purposes, either in a pure discovery mode or in a focused seeking mode. In the first case, the objective is to detect relevant initiatives, which may evidence some societal, technical or business trends that the Company shall be aware of, or which could be proactively made known to the BUs to inspire them and potentially trigger new projects. This requires a real open-minded attitude and a fair ability to perceive potential opportunities beyond the commercial skin of the start-ups. Indeed, some innovative solutions that have been developed in completely different business environments may prove to be of great value for Company ALPHA’s businesses, if properly put in perspective. This is particularly evident with digital technologies, which blur the technological boundaries between the industrial sectors. In the second case, the exploration aims to track down solutions that can meet spotted business needs or that answer to an explicit request raised by a specific BU. With this regard, the involvement of the BUs’ experts can be of great support to accelerate the early screening process, especially when the seemingly eligible start-ups are in abundance.

**Screening and Characterization** – Characterizing the start-up means collecting essential information for understanding what the start-up is, where it comes from, what it does and where it would like to go. This task generally relies on a preliminary scan of public information mainly available on the web, followed by an actual meeting with the start-up to go deeper in the investigation.

**Recording** – Developing an internal web-based digital platform would be an effective solution to keep record in a structured way of the information collected relevant to a start-up, to easily manage the relationships with start-ups, from the initial contact up to their registration as potential suppliers, enabling innovation transfer processes towards BUs, by connecting the solution offered by a start-up with the specific needs of the BU.

The critical part of the process is undoubtedly the transfer of valuable information to the BUs. Indeed, “scouting start-ups is of little significance if it doesn’t eventually provide the business units with value creation opportunities”. (R&D Manager)

A successful transfer requires key Company’s figures to be aware and up to date on the potential business needs and to manage apposite tools and processes for enabling constructive cooperation with the BUs.

“This tasks may be accomplished appointing a group – a sort of task force - of Open Innovation Wizards inside the R&D Department. They would act as the one-stop interfaces between the BUs and the Open Innovation team”. (Business Development Manager)

Open Innovation Wizards would be committed to pay close attention to the “Voices of the BUs” to find out their main innovation concerns, and specific potential requirements (in terms of technology needs or business/commercial needs) to be met.

“The Open Innovation Wizards would be in charge of preparing bundles of innovative propositions, tailored to the BUs’ topics of interest/requirements; for instance by asking the Open Innovation Watchers to carry out specific searches in the start-up ecosystem” (Business Development Manager).

The Open Innovation Wizards represent, in this sense, a convenient protective screen for the BUs against the heterogeneous universe of start-ups and entrepreneurs willing to sell their ideas and solutions to large companies. Open innovation Wizards should, therefore, be selected for their ability to listen to the BUs’ requirements, and ability to scout proactive in the start-up ecosystem.

Furthermore, to foster its business transfer activity, Company ALPHA is willing to formalize the internal exchange of information. To this regard,

“We are considering the appointment of Open Innovation focal points within each business unit interested in the innovation process. These people shall be chosen for their ability to seize and prioritise the potential needs of their unit, and for an actual interest in innovation topics. Regular meetings could be organised, say every 3 months, with the Open Innovation Wizard to exchange information on the current activities and other innovation topics of particular interest for their respective business unit. Furthermore, an actual Open Innovation Committee gathering these BU’s
representatives could be created for giving more substantiability to the scheme, as well as more momentum and positive effects through cross-functional contamination”. (Business Development Manager)

6. RESULTS OF THE OPEN INNOVATION JOURNEY

The outcome of this open innovation journey analysed throughout the paper can be delivered in four different ways, depending on the purpose. Here below our suggestions to the Company:

- Creating an open innovation section on the Company intranet where to list innovative start-ups found by the Watchers and tell success stories of open innovation. This may support the development of an internal culture on open innovation and encourage the implementation of open innovation practices.
- Creating a digital community - an internal social network - of open innovation enthusiasts. This may benefit the overall innovation process, sharing valuable information on innovation topics, raising concerns on specific innovations, as well as sharing potential solutions to make the organization more effective both in its internal processes and in its value proposition to the market.
- Organising, in coordination with the BUs’ open innovation focal points, regular meetings for presenting bundles of innovative start-ups, either in response to investigation requests coming from the BUs or for pure inspiration purposes.
- Facilitating the organisation of business trials of innovative solutions supplied by start-ups. With this regard, the number of business trials launched every year might be used as a “Key Performance Indicator” (KPI) to measure the effectiveness of the overall process.

Below (Figure 2) is the Open Innovation framework proposed to the Company, which summarizes the results of the activities and analysis performed throughout the case study.

![Open Innovation Framework](image)

**Fig. 2: Overview of the operative Open Innovation framework proposed to Company ALPHA**
7. CONCLUSION

Large incumbent corporations are becoming progressively aware of the power of external sources of innovation such as startups, which are inventing the new technologies and business models that will shape the business environment of tomorrow. With this regard, this paper outlined the processes through which Company ALPHA has embraced an open innovation approach to its corporate reorganization, undertaking several open innovation initiatives. Nevertheless, such initiative were undertaken mainly without a structural and consistent approach to business model innovation, and were partially de-linked from the whole Company’s internal innovation process. So far, initiatives launched have not generated relevant business opportunities to increase or diversify stream of revenues. Still, the vitality of the external innovation ecosystem, together with an organic and structured approach to the innovation process, as the one proposed in Figure 2 above, may end up in interesting business and commercial opportunities for Company ALPHA.

Testing “on field” the framework proposed by the authors is currently the next step in the internal reorganization process of the Company, as well as an opportunity for the authors to gain a better understanding whether to generalize and extend the proposed framework to other companies operating in the electricity production and distribution sector.

REFERENCES


Docherty, M. (2006), Primer on “open innovation”: principles and practice. The next “big thing” in innovation. PDMA Visions, 30(2), 13-17


