

Life for Site End of life: translating peculiarities into potential CSR (Corporate Social Responsibility) opportunities

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Abstract

In the last decade, the decline in industrial settlements has emerged as an increasingly relevant and complex phenomenon that has unveiled the limitations of the management models that are traditionally applied in this situation.

This crucial problem is addressed here by adopting a conceptual framework built to exploit a systemic perspective that moves from the recognition of the centrality of the company that used to inhabit such a site. Specifically, operational guidelines are proposed and tested through their application to the case of one large site inhabited by an Enel power plant in Porto Tolle, which is part of the Futur-e project.

The results show how the conceptual model enables the identification of site-specific guidelines for the EOL (End Of Life) strategy definition and the generation of opportunities for the entire area, which would have remained undiscovered using more traditional approaches.

Keywords

Sustainability strategy, site end of life, guidelines

Abbreviations

CSR: Corporate Social Responsibility

EOL: End Of Life

TBL: Triple Bottom Line

Vita al fine vita di impianti industriali: tradurre peculiarità in potenziali opportunità di CSR (Corporate Social Responsibility)

Abstract

Nell'ultimo decennio, la gestione del fine vita degli insediamenti industriali è emerso come problema sempre più frequente e rilevante, facendo emergere sempre più i limiti dei modelli manageriali tradizionalmente adottati per farvi fronte.

Nell'articolo, questo fenomeno è stato studiato introducendo e utilizzando un framework concettuale, che, partendo dal riconoscimento della centralità del ruolo dell'impresa che storicamente è stata proprietaria del sito, adotta poi una prospettiva sistemica. Nello specifico, l'articolo propone delle linee guida operative e le applica al caso della centrale termoelettrica di Porto Tolle, un sito (particolarmente esteso) di Enel facente parte del progetto Futur-e.

I risultati mostrano come il modello concettuale consenta di identificare degli ambiti e delle funzioni potenziali per la definizione della strategia EOL del sito, come opportunità generate per l'intera area, altrimenti difficilmente identificabili tramite l'utilizzo di approcci più tradizionali.

Parole chiave

Strategie di sostenibilità, EOL, linee guida

1. Introduction

The problem of managing the end of life of industrial settlements emerged more than 30 years ago when it became evident that, as part of their life-cycle, entire industrial sites may lose their value as a result of strategic turnarounds or due to external contingencies (Amankwah-Amoah, 2016; Santana et al., 2017, Schoenberg et al., 2013). Once their values became marginal (Invernizzi et al, 2017), the sites could be abandoned by their owners and turned into *brownfields* (CABERNET, 2006), with negative economic and social impacts for the surrounding areas (CABERNET; 2009, Bryson and Lombardi, 2009; Schaedler et al., 2013; Wedding and Crawford Brown, 2007; Cappuyns, 2016).

This phenomenon has become increasingly relevant and critical in recent years, especially in developed countries. Here, the natural evolution of industrial dynamics has become more turbulent, faster and more unpredictable due to external trends such as globalization, digitalization and internationalization (Rifkin, 2014). Struggling to survive in this new competitive environment, many companies have decided to relocate operations and change core activities and technologies, as a result closing marginal production facilities.

However, these strategies are contrary to another relevant trend, whereby companies are expected to contribute to the development of local ecosystems and to create shared value (Porter and Kramer, 2006; Hickle, 2017; Backmann et al., 2014). Along this line, even while dealing with marginal assets, firms are required to consider the impacts of their choices on society and the environment. They

cannot just ‘leave behind’ a site that they used to inhabit but are expected to play a more proactive role in and contribute to the re-development and economic re-growth.

By embracing this new role, companies could transform a ‘plight’ into an opportunity. By knowing their resources well, companies would be able to provide suggestions on how to properly leverage their as-is condition to benefit defined EOL strategies in terms of business opportunities and sustainable solutions that are able to generate value. These companies that play a key role would also have an opportunity to manage an intrinsic reputational risk. As the historic owners of the site, they are – and will always be – considered responsible for the future of the area.

This central role of companies contrasts with the state of the art contributions in the field of sites’ EOL. Thus far, in the literature, this problem has been addressed i) as *brownfield redevelopment* enacted ex-post by the public sector or ii) as part of firms’ turnaround strategies or revamping for maintaining profits and competitive advantages (Harrigan and Porter, 1983; Varinij and Mierka, Albrecht, 2016). Despite providing interesting results regarding i) how to consider multiple stakeholders and the TBL (Triple Bottom Line, Elkington, 1987) in redevelopment and ii) how to identify and leverage valuable resources, these approaches are not able to support companies in the need to sustainably manage the end of life of industrial sites while simultaneously taking into account bundles of diverse resources and multiple stakeholders’ needs (Piantoni et al., 2017).

With the aim of filling this gap, this paper examines companies as central players in the identification of possible re-development and re-growth strategies, even when they will not be involved in the second life of the site. Hence, to provide firms with a tool for the definition of sites’ EOL strategies, this paper starts with the framework introduced by Piantoni et al. (2017) and overcomes some of its limitations, including the lack of structured operationalization and a case application for the defined guidelines.

The objective of supporting the agile and easy use of the framework is achieved by proposing a step-by-step application to the real case of Enel’s departure from Porto Tolle. As part of Futur-e, a company-driven project for managing 23 marginal sites owned by Enel (Shanklemann, 2016), it provides an interesting setting to test the framework. The case illustrates how strategies can be applied using the dimensions of the model that identifies the interactions among resources, stakeholders and sustainability objectives.

The results demonstrate that the operationalization of the framework supports the identification of site-specific guidelines for the strategic definition that traditional approaches have overlooked.

The article is structured in three Sections. The elements of the framework are introduced in Section 2 and applied to the Porto Tolle case in Section 3. The main results, implications and future steps are then discussed in Section 4.

2. Framework development: requirements and structure

This paper adopts the framework proposed by Piantoni et al. (2017) for the definition and analysis of company strategies for sites' EOL. The key characteristics of the framework are that it is systemic (Gold et al., 2010; Invernizzi et al., 2017; Lozano, 2015) and company centred, which supports the enlargement of the dimensions of analysis in the definition of re-growth strategies as outcomes. Specifically, this framework adopts the insights derived from the Resource Based View (Peteraf and Barney, 2003; De Oliveira et al. 2003), Institutional Theory (DiMaggio and Powell, 1983) and the combination of the two (Oliver, 1997; Lòpez-Gamero and Molina Azorín, 2016; Lloret, 2015). However, as acknowledged by the authors, this framework remains highly theoretical and lacks operative guidance. Therefore, in this section, we summarize the structure of the framework (see Figure 1) by detailing its constituent elements and proposing eight steps for its application.

[Figure 1. The multi-level conceptual framework. The image was constructed by the authors]

The framework is structured hierarchically and horizontally into two parts (see **Errore. L'origine riferimento non è stata trovata.**). The left part identifies the resource-based factors, and the right part identifies the main stakeholders as representatives of the institutional and legitimation factors. In operational terms, the framework can be deployed in eight steps that are illustrated in Table 1. The aim of the guidelines is to support the identification of the inner and outer site characteristics, which become factors that lead to the definition of proactive firms' strategies for sites' EOL. Specifically, Table 1 lists eight steps, that support a company to define the activities to be performed in order to characterize the unit of analysis, the resource typologies, the main stakeholders' and company's characteristics and objectives, the connections among resources, sustainability objectives, strategic choices and strategic outcomes.

Indeed, the characterization of the inner (steps 1 and 2) and outer factors (steps 3 and 4) enables the filling of the left and right boxes, respectively. Then, due to the delineation of the TBL objectives and linkages (steps 5 and 6), the strategic choices can be defined as the outcomes of the model (steps 7 and 8).

STEP	MAIN ACTIVITY; identify:	Guidelines
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1	UNIT of ANALYSIS	<p>Indicate the boundaries of the analysis by answering the following question: does it refer to one or more sites, to single industrial plants, to resources...?</p> <p>Indicate the size, location, technology, vocation, whether the plant / site / resource has particular characteristics that may be translated into a natural reuse application, etc.</p>
2	different typologies of RESOURCES at the EOL and their characteristics	<p>Specifically, resources are divided in 4 typologies:</p> <ul style="list-style-type: none"> - TANGIBLE ASSETS (plants, machinery, buildings...), - INTANGIBLE ASSETS (skills, patents...), - HUMAN RESOURCES (employees), and - LAND and infrastructure.
3	main STAKEHOLDERS	<p>Identify external factors by defining the following:</p> <ul style="list-style-type: none"> - who are the potential actors that have an interest in or are affected by the site's EOL, and - whether there are any key allies / opponents.
4	main COMPANY characteristics	<p>Define the company's industry, size, mission, vision, values, long term strategy, and financial position to decrease 'internal' institutional factors.</p>
5	sustainability objectives (TBL)	<p>Identify the overall remediation objectives and list them as economic, environmental, or social.</p>
6	possible links between resources and stakeholders	<p>The sustainability objectives defined in step 5 can be related to specific stakeholders (section 3) and achieving the leveraging potential of available resources (section 2). The practical guidelines for modelling linkages are as follows:</p> <ul style="list-style-type: none"> - focus on one objective at a time, - connect it to stakeholders (by reporting the IDs of the stakeholders' objectives), and - characterize the resources that may be leveraged to accomplish it (by reporting the IDs of the resource objectives).
7	CHOICES for strategy definition	<p>Practically and consistently with the modelled dimensions and the identified linkages, one is required to take specific choices in defining the following:</p> <ul style="list-style-type: none"> - the # of reused sites / plants /parts; - the reused resources; - the engaged stakeholders, involvement level and modality; and - the commitment of the company (employees, involved managers, connection with the strategy...) and the moment of action (before / after cessation of activities, abandonment...).

8	STRATEGY AS OUTCOME	<p>The strategies are defined as outcomes of the model and can be generally defined as follows:</p> <ul style="list-style-type: none"> - Win-Win Solutions, which are able to satisfy the main objectives and create synergistic value for the overall area; - No-Lose Strategies, which are unable to incorporate all potentialities but are helpful to neutrally addressing the objectives that could not be fully satisfied; - Risk Mitigation, which are solutions that support the reduction of risks (reputational, financial, environmental, paralysis...); and - Grasped Opportunities, which are the individuation of a single specific opportunity but not synergistic opportunities for the company or society.
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Table 1. Framework operationalization: main steps

3. Identifying site peculiarities and potentialities: the Porto Tolle case

The guidelines proposed in Section 2 are applied here to identify the main characteristics (in terms of opportunities and risks) of Enel's Porto Tolle site by taking the viewpoint of the firm itself. By leveraging the firm's knowledge of its resources and context, the framework uncovers the peculiarities and potentialities of this specific site at its EOL, which has been managed as part of the Futur-e project.

3.1 Data Overview

The data have been collected through both secondary sources and primary sources. Publicly available documents and information on the Futur-e project and on single sites, the company's website and annual reports have been consulted. More accurate information was gathered through direct interaction with the managers and project coordinators. The authors had the opportunity to take part in public events that presented the Futur-e project and participate in Futur-e 'evaluation commissions' as experts. Moreover, direct observations were performed during visits of the site areas.

As described in the official project documents (DASStU, 2016), the area of interest is located in Porto Tolle (Province of Rovigo, Veneto Region) in the district of Polesine-Camerini. This area occupies a surface of approximately 380 ha, and it is located in the Po River Delta, which is an area with high biodiversity.

The power plant is situated on the right bank of Po Pila, approximately 14 km from the centre of the town of Porto Tolle, and it is quite far from the main road (25 km from SS309).

The site comprises an area occupied by plants (north), a green area where there is also a restored nursery (south), and some partially or completely submerged areas of particular environmental value, which are subject to greater protection (east). There are also three wooded areas within the site.

The surrounding area is characterized by the presence of agricultural fields, fishing areas, natural and cultural areas of interest, watercourses (Po Pila and Po Tolle) and the sea. Close to the area, at sea, there is an offshore regasification terminal located off Porto Levante (RO).

The Power Plant Station started to produce electricity in 1980 and gradually introduced four thermoelectric steam sections, the last of which was activated in January 1984. Until the end of the 90s, the plant significantly contributed to the national energy production (10% of the annual total). In the 2000s, the production of the power plant was reduced until it became inactive in 2009 and, at the beginning of 2015, the plant's activity was definitively ceased. The main components of the generation groups are being dismantled, and some are being transferred to other plants.

3.2 Operational guideline application

In line with the guidelines explained in Section 2 and with the Porto Tolle overview given above, the eight steps of the model are implemented by taking the Porto Tolle site as the unit of analysis. It is a thermoelectric steam power plant that is located on the Po River Delta, which is quite far from the main road, in Rovigo province (Veneto). The area is characterized by limited infrastructure and high biodiversity, which increases the difficulties of managing the site's EOL. Indeed, on the one hand, a natural 'vocation' for the site's reuse is not easily defined since the area is isolated and not characterized by any particular or vibrant economic activities. On the other hand, the identified opportunities should be in line with the environmental characteristics and respect the high biodiversity.

The site-specific *resources* are discussed based on the four categories proposed by the model. Specifically, there are few human resources (approximately 20 people) that are still active on the site compared to in the past. These resources retain the skills and know-how for the management and maintenance of the thermoelectric steam power plant (intangible assets). Among the tangible assets, the main ones are the 4 steam thermoelectric sections that comprise a steam generator, a steam turbine, an alternator, a 250 m smokestack with internal metal barrels, a condenser, a warehouse of combustible oil with 9 tanks and a floating roof, a site within reservoir with a floor bank and plants for the development of production support activities.

Finally, the land resources can be recognized as the area occupied by plants, a green area with a free nursery, completely or partially submerged areas of particular environmental value, three wooded areas, a river, sea canals, a paved road and parking.

We now consider the third step, which refers to the *stakeholders*; these include public partners (mayors, assessors, and regional and provincial representatives), universities (Politecnico di Milano and Università degli studi di Padova), the local community, potential investors, active companies in the area (the free nursery), and Enel managers and employees. The initiatives to involve the stakeholders stem from Enel's values and mission. The historic site owner has been grounding its long-term strategy on growth, renewal, the diversification of energy sources, and setting the company's objectives in line with the 'Open power' vision and with the new mission.

After having explored the overall 'right- and left-side characteristics' of the site, the main remediation objectives now have to be defined (step 5). The stakeholders and Enel have diverse objectives, which are classified as economic, environmental, and social and are in line with the TBL. The generation and active conservation of economic activities with good returns in the area, and the fulfilment of Enel's interests (economic returns, corporate image, and reputational risk mitigation) are identified as the economic objectives. Then, the main environmental objectives are the preservation of the territory and biodiversity, the generation of positive externalities, and the avoidance of brownfields and contamination. Finally, the conservation and creation of jobs, the avoidance of the creation of «*Cathedrals in the desert*» and an improved livability are the social objectives.

As required by step six, the abovelisted specific objectives are linked to stakeholders and resources, which are interested in and exploitable for, respectively, the objectives' achievement (see Figure 3). In fact, linkages emerge mainly due to experts (universities), external ideas and consultations.

[Figure 2. Step 6: individuation of linkages. The image was constructed by the authors.]

As Figure 2 above shows, the economic/financial objectives (1, 2, and 3) can be achieved by leveraging the potential reuse of tangible assets and land, especially the infrastructure. Indeed, the existence of parking areas and roads while defining the EOL strategy may support the development of future economic activities. The specific percentage of reuse or the demolition of buildings is based on single proposals. Intangible assets could theoretically be beneficial for the achievement of the economic objectives, but, in reality, they cannot be reused because they are based on obsolete knowledge and technologies.

As highlighted in the first column of the above figure, the economic objectives are strictly related to the interests of the business actors, such as Enel's managers, potential investors, and public actors. These objectives also affect other companies, the local population and local universities.

Environmental objectives are achieved by considering the land's characteristics, especially by reusing infrastructures, performing maintenance and requalifying green areas and water courses.

The above objective is strictly linked with the interests of all the involved stakeholders, including Enel's managers, investors, and public actors, who are concerned with the site's image and risks, while other actors active in the area (other companies, the local population,...) seek an increased overall liveability.

Consistently, improved liveability as a social objective is achieved by the careful reuse of tangible assets and land. This outcome also supports the achievement of the other social objectives. For instance, the buildings themselves should be reused with a long-term focus to avoid creating «Cathedrals in the desert» that would negatively impact the local population, other companies and Enel's image.

After having characterized the inner and outer pushes and the possible connections among them, due to the definition of the sustainability objectives, the main strategic choices in terms of the unit of analysis, resource reuse, stakeholders' engagement and company commitment can be implemented. The unit of analysis is the entire site, including the *Terna* electric power station, the *Enel Green Power* power plant, the *Telecom* area, and the parking owned by the Region (the local government agency). Diverse resources characterize it, but the site's human resources (employees) are minimal compared to the past, and most have been relocated by the company to other areas. Furthermore, the intangible assets are obsolete and not leveraged. Therefore, only the tangible assets, land and infrastructure are considered able to be reused. Diverse proposals suggest different reuse degrees of buildings, machinery, and materials and introduce ideas for future usage that are connected with stakeholders' needs and in line with Futur-e's TBL objectives.

With the aim of respecting the abovementioned linkages and in line with the Futur-e project, the information and data about the sites remain publicly available. Moreover, the municipality, Enel representatives and the local university have been asked to take part in 'evaluation commissions', during which they can exercise their voting power to influence the suitability of proposals. Politecnico di Milano has been involved as an expert, with the aim of presenting the technical peculiarities of the proposed solutions. Three commissions have been held where the main stakeholders having voting rights. The population, investors, other companies in the area, experts and public authorities do not have voting rights but are key for the identification of proposals. These individuals have proposed regrowth opportunities for the tourist, fishing, agricultural, sport, cultural, research and innovation, ICT and tertiary sectors.

From Enel's viewpoint, the characteristics of the unit of analysis, the individuated links and the proposals that emerged within the consultation are taken into account. This approach leads towards highlighting water sports and tourist attractions as functional areas with interesting possibilities for

economic regrowth, tangible asset reuse (at least 40%) and respect for the land's characteristics. In this case, guidelines for structuring win-win strategies are delineated after the end of the power plant's activities (beginning of 2015) but before the definitive site closure and abandonment.

The followed steps enable the synthetic representation of the Porto Tolle EOL peculiarities and potentialities as proposed by the conceptual framework (see Figures 1 and 3).

[Figure 3. Porto Tolle site. The image was constructed by the authors.]

4. Discussion and conclusion

In this article, the management of sites' EOL has been studied by adopting a company-centred viewpoint and wide dimensions of analysis for the construction of a proper conceptual framework (Piantoni et al., 2017) and its application to the EOL of the Porto Tolle site. Given that the location is a quite isolated and wide area that has poor infrastructure and does not contain a predominant vocation, after the cessation of activities, the situation of this Enel plant presented a critical challenge. The results demonstrate how, by applying the model, the peculiarities of the area can be unveiled, and regrowth opportunities can arise. Specific proposals for Porto Tolle focus on the reuse of tangible assets, land and infrastructure, while intangible assets and human resources are more difficult to be 'valuably reused'.

The links among resources, stakeholders and objectives emerge from the structured framework application and support the definition of strategic guidelines. This outcome presents two main theoretical implications. On the one hand, some limitations of the existing framework, as acknowledged by previous authors (Piantoni et al., 2017), are addressed and overcome by the introduction of operationalized dimensions. On the other hand, the gap in the literature is partially filled by the proposed company-centred tool that aims to exploit the potentialities of bundles of resources in the entire site area at its EOL.

Due to its systemic perspective, the tool can also be helpful for defining strategic guidelines for creating shared value (Porter and Kramer, 2006) and for grabbing business opportunities that would have remained dormant with traditional approaches (CABERNET, 2006; Invernizzi, 2017).

Further theoretical and practical implications should be studied in the future, including testing the model on other companies' sites in diverse industries and in other countries. Moreover, it would be useful to structure quantitative impact assessment models that are tailored to the specificities of the problem.

Despite its limitations, this work can be seen as a first step towards the adoption of an innovative company-centred yet systemic approach for the analysis and individuation of sustainable strategies for sites' EOL (CABERNET, 2006; Invernizzi, 2017).

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