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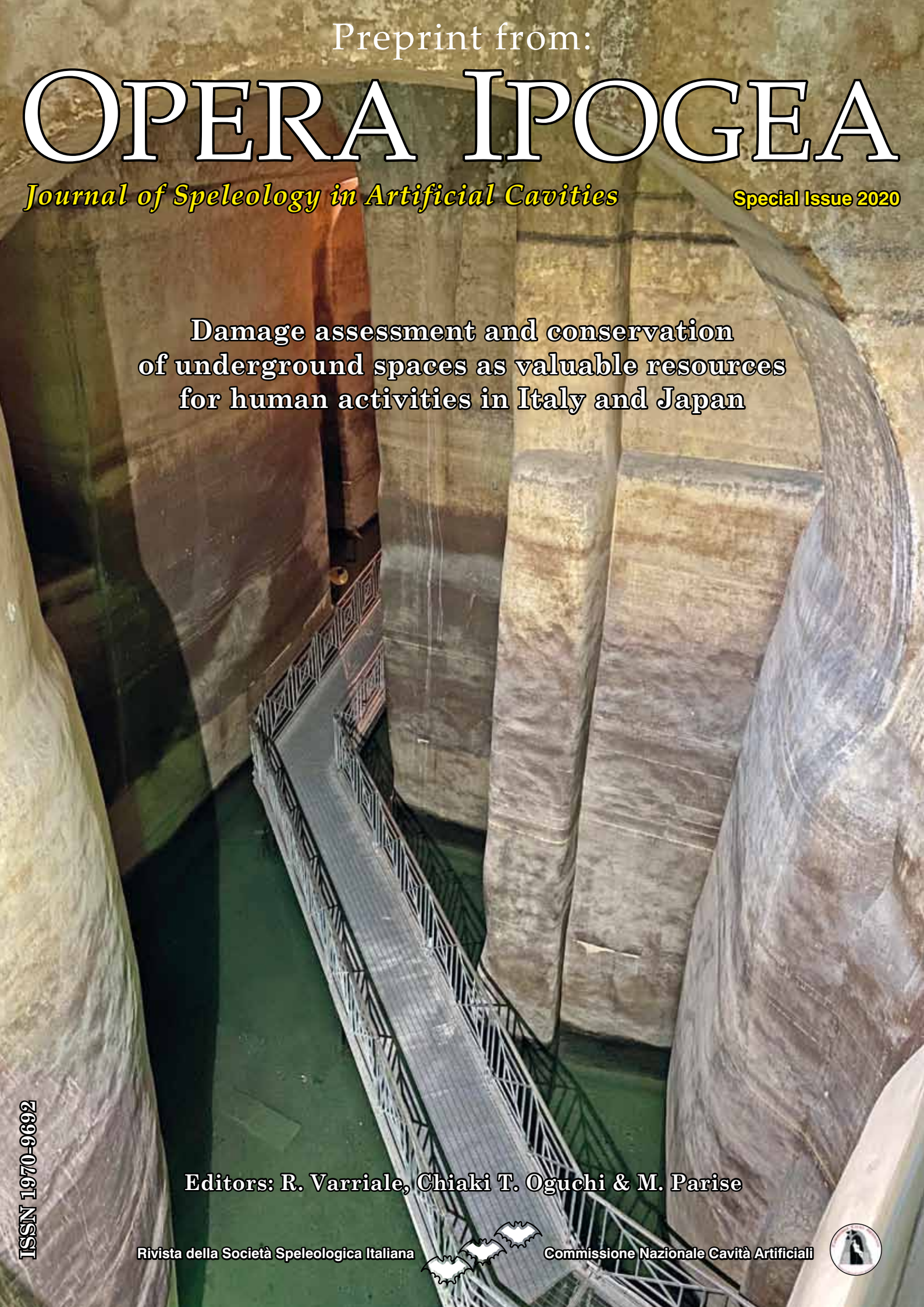

Damage assessment and conservation of underground spaces as valuable resources for human activities in Italy and Japan

Editors: R. Varriale, Chiaki T. Oguchi & M. Parise

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Bringing new life to dismissed mining towns by raising tourism: ecomuseum's hypothesis in Italy, Japan and Namibia

La rinascita delle città minerarie dismesse per lo sviluppo del turismo: le ipotesi degli eco-musei in Italia, in Giappone e in Namibia

Bruno Venditto[1]

Abstract

This article introduces the new category of *dismissed mining towns* (DMT) into the underground built asset's classification, and suggests tourism to rejuvenate DMT via the implementation of ecomuseum. The paper is divided into two sections: initially, the concepts of industrial heritage and ecomuseum are introduced, and applied to mining towns; this part is then followed by the description of three dismissed mining towns in Italy, Japan and Namibia. These are cases of industrial heritage, which in a different way have and can further benefit from tourism, and where to apply the ecomuseum concept. Dismissed mining towns represent an immense heritage that, based on the original economic uses and the historical value of the landscape, could revive the local communities, generate new activities and ultimately promote economic growth in the region. The extractive resource industries have played a contradictory role in the process of regional and national development, promoting the passage from a traditional to a modern industrial society in the case of western economies, while often retarding such process in the case of third world economies. Mining, however, is a dynamic industry, with a live span that can last for centuries or few decades, until reserves are depleted, or technical, market and political conditions change. As a result, towns grown around the mining sites, and share the same fortune; a large number of them end up to be transformed into ghost towns, representing abandoned elements of an industrial heritage apparently useless. The dismissed mining towns of Carbonia (Italy), Hashima's island (Japan) and Kolmanskop (Namibia) are here analysed. The possibility to bring such mining towns to new life, implementing the ecomuseum, and making them attractive in terms of space and cost while promoting the concurrently development of the local communities, is eventually proposed.

Keywords: ecomuseum, industrial heritage, Italy, Japan, local development, Namibia, underground build assets.

Riassunto

L'articolo introduce, nella classificazione delle attività sotterranee costruite dall'uomo, la nuova categoria di città minerarie dismesse (CMD) e suggerisce che le attività legate al turismo attraverso lo sviluppo di ecomusei, possano dare una nuova vita alle CMD. L'articolo si sviluppa in due sezioni, inizialmente vengono sviluppati i concetti di patrimonio industriale ed ecomuseo che vengono applicati alle città minerarie. Si passa poi alla descrizione di tre casi studio di città minerarie dismesse in Italia, Giappone e Namibia, Questi rappresentano degli esempi di patrimonio industriale, dove applicare il concetto di ecomuseo che potrebbe fungere da volano turistico, avendo degli effetti benefici sull'ambiente circostante. Le città minerarie rappresentano un immenso patrimonio che, sulla base degli usi economici originali e del valore storico del paesaggio, potrebbe dare nuovi stimoli alle comunità locali, generare nuove attività e infine promuovere la crescita economica nella regione. Le industrie estrattive hanno svolto un ruolo contraddittorio nel processo di sviluppo regionale e nazionale, promuovendo nel caso delle economie occidentali, il passaggio da una società industriale tradizionale a una moderna, mentre nel caso delle economie del terzo mondo, spesso ne hanno ritardano tale processo. Tuttavia, l'estrazione mineraria è un'industria dinamica, con una durata che può durare per secoli o pochi decenni, legati all'esaurimento delle riserve o al cambiamento delle condizioni tecniche, di mercato e politiche. Di conseguenza, le città cresciute attorno ai siti minerari condividono la stessa fortuna. Un gran numero di esse, alla fine del ciclo produttivo della miniera, diventano città fantasma, rappresentando elementi abbandonati di un patrimonio industriale apparentemente inutile. In questo saggio vengono analizzate le città minerarie dismesse di Carbonia (Italia), dell'isola di Hashima (Giappone) e di Kolmanskop (Namibia). Viene proposta l'idea di dare una nuova vita a tali città minerarie attraverso lo sviluppo di strutture ecomuseali, rendendole attraenti in termini di spazio e di costi, promuovendo allo stesso tempo lo sviluppo delle comunità locali.

Parole chiave: ecomuseo, patrimonio industriale, Italia, Giappone, sviluppo locale, Namibia, attività di costruzione sotterranea.

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Introduction

Mining activity, particularly in the western economies[1], has been a key factor in promoting the passage from a traditional to a modern industrial society. In many countries it still represents an important sector of the economy, providing raw materials to a large number of other industries, directly and indirectly generating employment and contributing to the creation of the countries' economic growth (Walser, 2000). Mining is, however, a dynamic industry, with a life span that can last for centuries, or few decades, until reserves are depleted, or technical, market and political conditions change. During the period of mine operations, human activities associated to the process of extraction, and particularly the rise of mining towns, often completely transformed the landscape around the mine's location. A complex physical landscape, as a result, appears, creating a specific social and cultural environment, associated with a particular style of life (Coupland & Coupland, 2014). After mining activities are terminated, and the mining towns are downsized or abandoned, together with the economic losses, the legacies associated with the location's historical and technical value, the social and human significance of the place, and its architectural or scientific value, are also lost. Hence, questions arise as to how to treat the remaining complex of physical and individual features and the cultural and socio-economic phenomena associated with them (Conesa *et al.*, 2008). In other words, when the mines close down, it is crucial to develop alternative models which, providing new socio-economic options, could at the same time keep alive the cultural and historical mining heritage, while offering new opportunities to the inhabitants of that area, and ultimately promoting economic growth to the country. The paper is structured in two sections, and examines the relationship between the tangible and intangible mining heritage and theirs impact on the local environment, while setting out some working hypotheses based on tourism and ecomuseum promotion. Section 1 is a theoretical part based on the concept of industrial heritage applied to the notion of Underground Built Asset (UBA). This is defined as "… *artificial cavities realized by man or positively readjusted for his needs that have historical and/or anthropological interest*" (Parise *et al.*, 2013, p. 230). Applying the classification of artificial cavities used by the Italian Speleological Society (Galeazzi, 2013), later adopted at the international level by the Commission on Artificial Cavities of the International Union of Speleology (Parise *et al.*, 2013), and further elaborated by Varriale (2019), it is possible to identify seven categories of UBAs, in turn divided into sub-types as indicated in table 1.

This article looks at category "E", mining works, introducing *dismissed mines* (DM) as a new sub- typology of the E category. Such typology goes beyond the location of mining extraction and considers the whole landscape around the area, encompassing the remaining of both industrial objects and human sites. This new typology, which incorporates the towns built around the mining's pits, retains, as noted by Skaloš & Kašparová (2012, p. 60) "*undeniable cultural and historical value since it documents a long-term relationship between humans and the place where they have spent their lives*". Dismissed mining towns are, in other words, a visual testimony of both the industrial and the human history, and excellent carriers of present-past connections (Huang, 2013). They may represent an immense heritage which could be used to revive local communities, generating new activities based on the original economic uses and the historical value of the landscape. Section 2 is a descriptive section: the concepts of industrial heritage and ecomuseum are revisited looking at mining towns located in Italy (Carbonia), Japan (Hashima island) and Namibia (Kolmanskop). The locations have been chosen because, despite the different geographical context, denote interesting socio-economic and cultural/historical similarities: in detail, the potential interaction between the local communities, the private sector and the public institutions make them suitable as sites for ecomuseum. The section provides some preliminary findings and a prospective methodology to offer new economic opportunities to the local communities, and/or to the institutional and the private curators, while preserving the identity, and the tangible and intangible heritage, of the mining landscape.

[1] In the case of the developing countries the control over mining operations by foreigner holders of mineral rights, has often retarded the industrialization process.

Category A - Hydraulic underground works	*(sub type A.1–A.10)*
Category B - Hypogean civilian dwellings	*(sub type B.1–B.8)*
Category C - Cult structures, veneration works	*(sub type C.1–C.2)*
Category D - Military and war works	*(sub type D.1–D.7)*
Category E - Mining works	*(sub type E.1–E.5)*
Category F - Transit underground works	*(sub type F.1–F.4)*
Category G - Other works not included in the former categories	

Tab. 1 – Categories of artificial cavities. Sources: Galeazzi (2013), Parise et al. (2013).

Tab. 1 – Categorie di cavità artificiali. Fonti: Galeazzi (2013), Parise et al. (2013).

Section 1

Industrial mining heritage

Industrialisation in the 18th and 19th centuries was strongly associated to the extraction industries; it spread to Europe and North America, drastically changing the rural and urban landscape. Among other things, it triggered the development of new human settlements necessary to accommodate the workers in need of public services and infrastructures, and/or the expansion of existing urban centers around a concentration of industries there located (Loures, 2008). With the decline of the extractive sector, in consequence of both the de-industrialization process and the rapid technological changes, dismissed industrial sites appeared. These were a surviving evidence of "*UK and European industrial history*" which was at risk of "*being destroyed before its preservation or documentation*" (Ambrose, 2013, p. 21). In the 50s, concern for industrial heritages started to emerge, initially in the United Kingdom, the cradle of the industrial revolution (Palmer *et al.*, 2012), and onwards elsewhere in Europe and in the "*developed economies*" as well. In 1973 the International Committee for the Conservation of Industrial Heritage (TICCIH) was established for the study of industrial archaeology and the promotion of international cooperation in preserving, conserving, investigating, documenting, researching, interpreting, and advancing education of the industrial heritage. In 1978 the Wieliczka Salt Mine, in Poland, was listed as first industrial site in the UNESCO World Heritage site list, and in 1981 the first international industrial heritage symposium was held in France. In less than 30 years protection of industrial heritage became a relevant issue in the academic debate, embracing not only "*… the extraction, production and processing of all types of raw materials (mineral and organic), the working, manufacturing and marketing of those products"*, but also *"… the supporting infrastructure, settlement, utilities, transport and communications*" associated with the mining activities (Council of Europe, 2013, p. 6). Such holistic perspective of industrial heritage was confirmed in 2003 when the TICCIH's delegates meeting in the Russian town of Nizhny Tagil indicated that "*… the buildings and structures built for industrial activities, the processes and tools used within them and the towns and landscapes in which they are located, along with all their other tangible and intangible manifestations*", are of fundamental importance, and "*… should be studied, identified, protected and maintained for the use and benefit of today and of the future*" (Ticcih, 2003, p 1-2). Under this definition the material remains of the mining industry, embracing industrial landscapes, settlements and housing, industrial products and processes, as well as documentation of the industrial society, are considered part of the industrial heritage. It follows that the new UBA's sub typology of *abandoned mines/mining towns* here introduced, does fall into the classification of industrial heritage. Consequently, the background of a city, or a town, where the industrial activities took place, and the resulting landscapes, are equally important in the buildup of industrial heritage (Mc Kercher *et al.*, 2005; Yaw-Hsiang, 2008). Such remains ultimately represent a legacy that has historical, technical, scientific and architectural value, as well as socio-economic significance (Tsai, 2014). More specifically, it is possible to argue that dismissed mining towns being part of industrial heritage, were established for the purpose of industrial activities, since can be considered as a complex mix between "*… technology and humanities facing the processes of de-industrialisation and the associated challenges of urban renewal and industrial restructuring*" (Li, 2017, p. 26). The cultural, aesthetic and economic values take priority over the industrial production aspects of these sites. Those more intangible elements, precisely, are part of the industrial heritage component; exhibited correctly, those elements are able to transform the '*heritage location*' into a '*heritage destination*' (Kirshenblat-Gimblett, 1998). In recent years there is an increasing confidence, and it is commonly believed that mining heritage, in his broader definition including the urban settlements, with proper management could be an important cultural touristic resource, capable of generating new productive activities and economic opportunities (Conlin & Jolliffe, 2011; Ateş 2016). The assignment of specific values to such locations and their identification will determine how the heritage will be managed and what purpose it will fulfil. Decoding the historical and socio-cultural values emerging from mining legacy through the means of tourism is one of the ways to preserve those values and the industrial heritage. As noted by Gouthro & Palmer (2010), industrial heritage tourism is becoming a sound niche within the heritage tourism sector and, nowadays, *"… depending upon the social and economic history of the country being visited, tourists can experience a diverse range of attractions depicting aspects of the industrial past*" (p. 33). By rousing people's curiosity and creating interest, tourism may directly and indirectly increase general public awareness on the importance of the industrial heritage. The mining sites, particularly the dismissed mining towns, are, however, not particularly suitable for the traditional in-building museum experience which cannot fully embody the complex relationship between the landscape, the industrial objects and the community. For this reason, the ecomuseum hypothesis is here investigated. Being much more similar to an open-air type museum, the ecomuseum could better represent the mix of history, industrial reminiscences, and social experience that mining towns epitomize, ultimately addressing what the public and the tourists in general might want to observe.

Mining towns and ecomuseum

As indicated by Keyes (1992), the name 'ecomuseum' was used for the first time referring to the *l'Ecomusee de la Communaute Le Creusot Montceau-les-Mines*, in central France, which was created at the end of 1973,

with the aim of enhancing the heritage of an area characterised since the end of the 18th century by the development of major industrial activities. The emphasis was on the mining, steel working and quarries in the Le Creusot-Montceau area. Preserving cultural identity and satisfying the local needs of "*economics, politics and regeneration*" (Nazariadli & Rayatidamavandi, 2011, p. 93) were among the different targets of the first ecomuseum. Since then the ecomuseum have more and more focused on the interaction between the landscape, the local communities and the visitors, as "*a museum of humankind and nature"* as put by Georges Henri Riviere (1985, p. 182), one of the leading scholars to introduce the concept of ecomuseum, who defines it as "*… something conceived, built and run by citizens and local authorities. … a mirror used by the local population to reflect on its own life. … a mirror held up to visitors to help them understand themselves better*". The aims and functions of this new type of museum advocated the move away from the traditional idea of a close location where to showcase specific objects, constrained in the limits of a building; the territory, related with its inhabitants, becomes the setting of the museum. In such a way the social, cultural and economic surroundings were able to narrate the landscape and to provide a holistic picture of the interaction between the individuals and the location. This shift was in line with the conclusion of the UNESCO's *Round Table on the Development and the Role of Museums in the Contemporary World*, held in Santiago de Chile in 1972, where a new type of museum was advocated in which: "*… man would be shown in conjunction with his environment*" (UNESCO, 1973, p. 21) and the objects regarded as evidence of the link with the past with a "*… view to creating an awareness of the anthropological, social, economic and technological development of the countries …*" (UNESCO, 1973, p. 34). The ecomuseum concept further transformed the traditional idea of museum, emphasizing on a collective representation of environmental fields and local residents' life (Kimeev, 2008), turning a conceptual space into a place of experience (Chang, 2015). The heritage is protected, promoting cultural and economic development (Davis, 2005), and the institution becomes an "*… instrument of social change, as a tool for development and action … with the perspective of global heritage*" (Santos Primo, 1999, p. 11). In this way the ecomuseum becomes a broad and holistic apparatus that helps the community to reclaim the past, providing a new understanding to protect and manage the tangible and intangible heritage, encouraging the use of different social practices, that can help the community and the area to progress further (Navajas Corral, 2010; Borrelli & Devis, 2012; Riva, 2017)[2]. The ecomuseum becomes community–driven

Fig. 1 – Core elements constituting an ecomuseum (modified after Ohara, 1998).

Fig. 1 – Gli elementi costitutivi di un eco ecomuseo (modificato da Ohara, 1998).

and, incorporating heritages and landscape with tourism, it aims to revitalize that specific area. Although there is not a unique model of ecomuseum, consensus has been reached on the differences between it and the traditional museums; the latter developed around the *building* with its *collections* organised by *experts* attended by *visitors*, and the former spreads on a specific territory arranged by the local population based on the memory (Rivard, 1988). At the center of the ecomuseum concept (fig. 1), it remains the heritage understood as the result of the human interaction with the territory providing concrete evidences for cultural characteristics and residents' ways of life in a region. It is an innovative institution that works together with other institutions and associations present in a given territory, trying to involve the entire population therein. Based on Ohara (1998), it can be said that an ecomuseum exemplifies three elements which should constitute a closely integrated whole:

(i) the preservation of tangible and intangible heritage in a given region,
(ii) the participation of the local population in the management of the operations, and
(iii) a museum function.

The level of interaction between these three elements is a way to assess both the level of efficiency of an ecomuseum and its capacity to grasp a sense of place.

Section 2

The dismissed mining towns hypothesis

Having introduced the concepts of industrial heritage and ecomuseum, this section examines the cases of dismissed mining towns, located in a landscape suit-

[2] This definition of ecomuseum respect what indicated in the Declaration of Intent (2004, p.1) of the Long Networks, Ecomuseums and Europe, held in Trento in May 2004, namely that "*An ecomuseum is a dynamic way in which communities preserve, interpret, and manage their heritage for sustainable development. …* [it] *is based on a community agreement*".

CONTINENTS Country	**Ecomuseum**	%	CONTINENTS Country	**Ecomuseum**	%
Europe	344	83.8	Latin America	28	6.8
Italy	**143**	**34.8**	**Brazil**	**16**	
France	87		Argentina	4	
Denmark	4		Costarica	4	
Spain	43		Chile	1	
Poland	22		Ecuador	1	
Portugal	13		Mexico	1	
Sweden	12		Venezuela	1	
Czech Republic	4		Asia	22	5.4
Belgium	4		China	10	
United Kingdom	3		**Japan**	**9**	**2.2**
Norway	2		Vietnam	2	
Germany	2		India	1	
Finland	1		North America	14	3.4
Greece	1		Canada	13	
Netherlands	1		USA	1	
Turkey	1		Oceania	2	0.5
Slovakia	1		Australia	2	
			Africa	1	0.1
Total	411		Senegal	1	

Tab. 2 – Ecomuseums distribution in the world (modified after Borelli & Davis, 2012, p. 34).
Tab. 2 – La distribuzione degli ecomusei nel mondo (modificata da Borelli & Davis, 2012, p. 34).

able to attract industrial heritage's tourists and draw the visitors' attention to a wide variety of both tangible and intangible heritage places within the area, and boost regional development. The latest available data (Borrelli & Davis, 2012) indicates that there are approximately 400 ecomuseum sites worldwide; the majority of them in Europe, followed by Latin America, Asia North America, Oceania and Africa (tab. 2).
Italy has the highest number of ecomuseums in the world, and a long tradition in the museumization of abandoned mining sites. The Historical and Environmental Geo-mining Park of Sardinia, created in 1998[3], and the Technological and Archaeological Park of the Metalliferous Hills in the province of Grosseto, created in 2002, are two concrete examples for revitalization of dismissed mining sites.
This section explores the dismissed mining towns of Carbonia in Italy, Hashima's island in Japan and Kolmanskop in Namibia, as cases where the tourists' interest for industrial / cultural heritage, interacting with the community and the private and public institutional interest can bring new life to the area and promote development.

Carbonia

The mining town of Carbonia, located in the Italian island of Sardinia, was established in the wake of Italy industrialisation (fig. 2). Sardinia had a long mining history, starting probably around the 6th millennium BC; the island mining preeminent role has continued until modern time. In the census on abandoned mining sites by ISPRA (2006), out of a total of 2.990 mines identified in the period 1870-2006, 427 sites were actually located in Sardinia [4] (D'Andrea & Patanè, 2011), representing the second regions in terms of dismissed mine in the country. Starting from the 1950, similarly to what happened in many other European countries, the Italian mining industry went into a continuous and inevitable decline, accelerated in the early sixty with the rules set by the European Coal and Steel Community (ECSC) regulating the sector. The vast majority of metal-mining and non-metal mining have now ceased production and the mines still active are very few (Berry *et al.*, 2011). The mining

[3] It was the first ecomuseum to be part of the Geosite-Geoparks World Network, being included in the UNESCO Heritage in 2007.

[4] The other regions with a high presence of abandoned mines were Sicily (765 sites), Tuscany (416 sites), Piedmont (375 sites), and Lombardy (294 sites), which, together with Sardinia's sites, represented 74.78% of the total (ISPRA, 2006).

Fig. 2 – The mining pits over time (on the left: 1930s, credit: cityinenvironment.blogspot.com http://cityinenvironment.blogspot.com/2013/02/carbonia-landscape-machine-carbonia-is.html; on the right: 2000s, credit: D. Cassanello. https://www.sardegnaturismo.it/it/esplora/museo-del-carbone).

Fig. 2 – I pozzi minerari nel tempo (a sinistra: 1930, crediti: cityinenvironment.blogspot.com http://cityinenvironment.blogspot.com/2013/02/carbonia-landscape-machine-carbonia-is.html; a destra: 2000, crediti: D. Cassanello. https://www.sardegnaturismo.it/it/esplora/museo-del-carbone).

activities, however, have left an indelible mark both on the physical landscape and on the local communities grown around them. Carbonia[5] is a testimony of the evolution of the Italian mining sector. Built in less than one year, next to Serbariu's coalfield[6], Carbonia was a modern "company town", with miners' residences, production plants and infrastructures creating an urban layout planned to satisfy the needs of a specific capitalistic mode of production (Penghin & Sanna, 2009; Sabiu, 2015a).

In the 30s coal extraction was seen as a way to make the country energy self-sufficient and Sardinia's coalfield basin of Sirai-Serbariu turned out to be very large and, in light of the assessments on the richness of the deposits, it was foreseen the necessity to employ a high number of mineworkers. The town was *"… part of a territorial and socio-economic project that envisaged the redesign of a territory and its landscapes based on coal*" (Santini, 2014, p. 110). At the same time Carbonia represented, for those who moved to work and live there, the possibility of having a "secure" job and houses with "unthinkable comforts" for people coming from poor rural locations. The rise in production experienced during the autarchy introduced by the fascist regime in the thirties, was abruptly interrupted when, in 1940, Italy entered World War II, and coal extraction responded exclusively to the war industry; it then stopped in 1943 to resume only after the end of the conflict. In the fifties the country's industrial reconstruction gave way to the recovery of the extractive industry. The benefits for the coal sector, however, did not last long; the establishment in the same period of the European Coal and Steel Community (ECSC)[7] meant that production was controlled by a centralised authority, on the basis of quotas agreed between member countries. This system led to a decline in the coal's extraction and a general restructuring of the steel industry. The mechanisation processes put in place by the Sardinian Coal Mining Company (SCMC) permitted the postponement of the closure of many pits and the retrenchment of workers, but SCMC encouraged miners' early retirement and thousands of miners either retrenched or moved away[8] (Santini, 2014). The regional economy, heavily dependent from the mining sector, was negatively affected and Serbariu's mine was officially closed in 1971. Through the seventies and eighties, the mine was left to a state of total abandonment with the consequent degradation of the site; Carbonia experienced both an economic and social crisis with the failing of the social working identity of the area. In 1980s on the waves of a renewed interest on the mining history of Sardinia and its industrial heritage, some municipal and regional administrators, supported in this by individual citizens gathered in local cultural and environmental associations, proposed to acquire and preserve dismissed mining assets and use them both to promote cultural and scientific activities, and to attract tourists. In 1997 a dossier was submitted to the General Assembly of UNESCO, pre-

[5] Carbonia-Iglesias, including the historical area of Sulcis-Iglesiente, was the smallest province of the island, a province in the autonomous region of Sardinia. In 2016 the province has been suppressed and incorporated with the provinces of Cagliari and Medio Campidano to form the new province of South Sardinia, https://www.tuttitalia.it/sardegna/provincia-del-sud-sardegna/.

[6] The coalmine was inaugurated in 1937, had nine wells and one hundred kilometers of tunnels.

[7] The European Coal and Steel Community (ECSC), formally established in 1951, was the first international organisation to be based on the principles of supranationalism and started the process of formal integration which ultimately led to the European Union. (www.Europa.eu).

[8] Between 1950 and 1965 around 15,000 miners left the town of Carbonia (Santini, 2014, p. 52).

senting the concept of the Environmental Geo-mineral Park based on the cultural, environmental and historical values that the mines had played in the history of Sardinia. In September 1998 UNESCO signed the Charter of Cagliari, officially recognizing the value of the island's mining culture: the charter contained the principles and the objectives that the proposed park would have had to pursue (Castelli & Pintus, 2005). The municipality of Carbonia was particularly active and in 1988 it signed an agreement with the Institute of Socio-Anthropological Disciplines of the University of Cagliari for the establishment of a documentation center on the history of the city, aiming to the enhancement of the territory and its cultural heritage. In 1991 the municipality managed to purchase the mine of Serbariu, the renovation program involved the recovery of the coalmine buildings and infrastructural system so that their memory was preserved (Kirova *et al.*, 2003). In the year 2000 a new urban redevelopment project linking the city and the mine started focusing on the protection of the site with specific actions emphasising heritage as a system of individual, cultural and economic principles (Penghin, 2010). The Historical Environmental Geomineral Park (HEGP) of Sardinia, of which Carbonia was part, was established in 2001. Since its inception, the Park aimed at recovering and enhancing the mining historical and cultural heritage in a sustainable way by integrating with the naturalistic-environmental resources present in the Park's territories. In this sense the Park represented an attempt to form a vast ecomuseum intended not as a simple physical place, but as a space in continuous construction (Lai, 2000; Papa, 2006) and place of memory (Nora, 1989). A place where the identity and the mining memory of the areas involved could be seen as a set of historical, cultural and economic factors whose interaction contributes to constitute the landscape.

Carbonia among all the sites included in the Park's area has been the only municipality able to concretely act to implement a type of ecomuseum as indicated in the objectives of the Park. In 2006, this was created as part of the urban redevelopment plan of the city and the mine, in partnership with the Park managed to establish the Italian Center for the Culture of Coal (CICC), thanks to the miners' donations, and aimed at the promotion, conservation, protection, restoration and enrichment of the structures and assets of the former Serbariu's mine and other coal mines in the territory of Carbonia. On such principles Carbonia won the European Landscape Award in 2011. Today recovered from the mining areas there is a cultural section represented by the CICC, and a research center for energy production with low environmental impact. A permanent pole has been created for the cultural and tourist promotion of Carbonia which tries to involve the inhabitants of the city and attract new visitors, allowing a productive, cultural and social regeneration of its community, thus satisfying the principal idea of an ecomuseum. Carbonia is an example of how the enhancement of the peculiar historical aspects of a territory can become an opportunity for social and economic revitalization. To obtain such result it was necessary to involve both the institutions at local, regional, national and international level, as well as the local communities, both as individual and as associations. The Carbonia Itinerary Routes of Modern Architecture (CIAM)[9] illustrated how this process of urban and industrial heritage regeneration has transformed Carbonia into a sort of ecomuseum (fig. 3). Designed to enhance and raise awareness of the city's urban and architectural heritage, it connects the most characteristic city areas and buildings linked to the events of its foundation. In this way, it creates the conditions for the re-appropriation of the historical identity of the community.

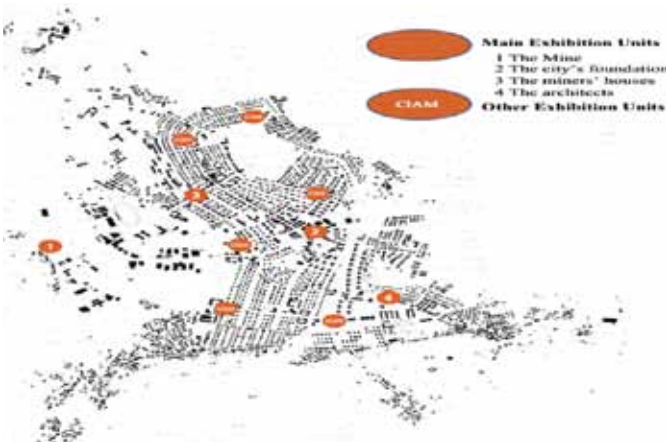

Fig. 3 – The open museum's itinerary (modified after Santini, 2014, p. 224).

Fig. 3 – Gli itinerari del museo aperto (modificato da Santini, 2014, p. 224).

The Hashima's island in Japan[10]

Hashima Island presents interesting similarities with the Italian case of Carbonia which make it a potential site for an ecomuseum. Also known as Gunkan-jima[11] (meaning Battleship Island) for its resemblance to a Japanese battleship, Hashima is a very small island of approximately 6 hectares, located approximately 19 kilometers offshore from the city of Nagasaki (fig. 3). Now abandoned, the island was an undersea coal mine until 1974, a vivid exemplification of Japan rapid industrialization (Goldfarb, 2018). Coal was known in Japan since 189 B.C.; mostly used for personal consumption, it was in the middle of the 19th century, when Japan under the Meiji government experienced a period of rapid expansion, that coal extraction

[9] http://www.comune.carbonia.ci.it/urbiportal/Content/it_IT/3229.html

[10] Presently most publications on Hashima island are in Japanese, this make it difficult for non-Japanese speaking scholars to research on it.

[11] Gunkan-jima means Battleship Island, because the forest of apartment blocks that rise out of the narrow island, gives it the appearance of a warship (The Mainichi Daily News, 21 April 2009).

Fig. 4 – Hashima's island (on the left: Hashima 1929, source: https://tanken.com/gunkan.html; on the right: Hashima 2008, source: https://www.flickr.com/photos/kntrty/3720075234/).

Fig. 4 – L'isola di Hashima (a sinistra: Hashima 1929, fonte: https://tanken.com/gunkan.html; a destra: Hashima 2008, fonte: https://www.flickr.com/photos/kntrty/3720075234/).

started at industrial level (Kunitomo, 2009). Hashima mine, due to the high quality of the carbon content of the ore, was one of the most important sites in country with coal layers exceeding 1000 m in depth; it greatly contributed to the industrialisation of modern Japan. The island was bought by the Mitsubishi Conglomerate in 1890 and the mine was equipped with 3 times more modern machineries than any other mine in the Northern Kyushu area (Hatakeyama, 1997). The first pit drilling began in 1887 and in a short time already about 1,000 miners worked on the island on three pits, which were in full operation for 24 hours. At its peak in 1941, more than 5,000 people worked and lived on the island, extracting 410,000 tons of coal, representing 0.7 % of the total annual production (Hashimoto & Telfer, 2017). The island also had some elements of exclusivity, in this making Hashima very similar to Carbonia. To attract people to the island, in fact, the average salary of the mine workers was considerable higher than that of the growing manufacturing industries, which meant that in 1958 the majority of resident miners could afford to have amenities such as a TV set, a refrigerator or a washing machine that the average Japanese could not afford (Goth *et al.*, 2003)[12]. In the 60s when oil, by then easily accessible, became the primary source of energy in Japan, coal extraction started to decrease and mines to close down. When the upper layers of coal reserves began depleting, making excavation deeper and deeper, and increasingly difficult to achieve profitability, Hashima mine followed the same path; the workforce was gradually reduced until the final closure in 1974.

For almost three decades, until the beginning of the new century, the island was abandoned and ignored; as pointed out by Lavery, Dixon & Hassall (2014), "*Devoid of residents and exposed to the elements, the site's buildings and their interiors quickly became perilous and Hashima was made officially off limits to visitors*" (p. 2571-2572), de facto becoming a ghost town (fig. 4). In 1999 on the 15th anniversary of the closure of the mine, a miner's son started a campaign to have the island mining history known as a world heritage. Media were fast to raise the interest and various TV series and documentary were broadcasted. In 2001 the Mitsubishi Conglomerate donated the island to the Takashima municipality and in 2005 it became property of the City of Nagasaki (Kimura, 2010). In 2009 an application for the "Modern Industrial Heritage Sites of Kyûshû and Yamaguci" under the Modern Industrial Heritage was submitted by the Nagasaki Prefecture to the UNESCO World Heritage tentative list. This sparked new curiosity on the island which led to the lifting of the landing ban and the opening of Hashima to tourists. In 2013 the Japanese Prime Minister backed the UNESCO submission for the Modern Industrial Heritage, which included Hashima island (Hashimoto & Telfer, 2017), and in July 2015 under the heading *Japan's Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining* the sites were inscribed under the UNESCO's World Heritage[13]. Since the initial submission

[12] Only 10.4 % of Japanese owned a TV in that period (Hashimoto & Telfer, 2017).

[13] Japan's Meiji Industrial Revolution UNESCO heritage is composed by 11 sites, with 23 components in "8 discrete areas". The sites bear testimony to the rapid industrialization of the country from the middle of the 19th century to the early 20th century, through the development of the iron and steel industry, shipbuilding and coal mining. The sites also include company and government buildings related to these industries (Palmer, 2018; UNESCO Web page https://whc.unesco.org/en/list/1484/). It is worth noticing that there was a controversy preceding the inscription of the sites in the UNESCO's list of World Heritage. The initial 2009 bid made no mention of the use of the conscripted Korean and

of the Heritage's application in 2009 the island has been a major tourist destination, despite that a vast majority of the island remains off-limits to visitors for security reasons, as the costs to ensure the safety of the place could modify the historical state of decay of the building. Tourists have increased from 60,000 annual visitors in 2009 to over 300,000; overall from April 2009 to February 2017, 1,221,039 tourists visited the island[14], which totals 1,315,856 when boat tours without landings were added (Palmer, 2018). Hashima's booming tourist business ultimately has been the result of a combined effort of community involvement led by former residents, local and national government commitment in promoting tourism and private initiative from companies licensed to run tours. Such close partnership has been centered on the new partnership-based framework for the conservation and the operational management of the sites of the Meiji Industrial Revolution: Kyushu-Yamaguchi and Related Areas, established by the Japanese government (Palmer 2018).

The Namibian mining ghost towns of Kolmanskop[15]

Kolmanskop (Coleman's head), was a small mining town build at the beginning of the 20th century on the southwestern coast of Namibia, 10 kilometres inland, linked to the port town of Lüderitz with a railway; it is now a ghost town which has however the potential to be listed as UNESCO world industrial heritage and be transformed into an successful open/ecomuseum.
Previously known as the German colony of South West Africa (SWA), Namibia was occupied by South Africa during World War I under the apartheid rule. The country gained its independence in 1990, after a prolonged liberation struggle led by the South West Africa People's Organisation. It covers an area of about 824,000 km^2, the country is sparsely inhabited with currently a population of just 2.5 million[16]. The economy is heavily dependent on the primary sectors, principally on the extraction and processing of minerals for export and on the agriculture and fisheries; tourism also plays a prominent role (Sherbourne, 2016). Since the end of apartheid, there has been an improvement in the major socio-economic indicators and Namibia is now regarded as an upper middle-income country. Development, however, has been uneven across its 14 regions, and employment and educational opportunities are significantly worse in the rural areas, giving an apparent justification to high rural to urban migration patterns (Venditto, 2019). Evidence of mining in Namibia dates as far back as more than 400 years ago; long before mining technology was introduced, Namibians have been smelting copper in anthills, with aid of charcoal, in the Otavi Mountainland and archaeological work of copper smelting where found at Matchless mine, located about 40 km west of the capital Windhoek (Schneider, 1998). Mining in the modern sense of the word began at the end of the 19th century during its colonial occupation by Britain and Germany (Ndalulilwa *et al.*, 2011; Littlewood, 2014). It was, however the discovery of diamonds in 1908, in the southern coastal area, that triggered the mining rush. Since then widespread deposits, mostly for precious stones (primarily diamonds), base metals, precious metals, and industrial minerals (mainly salt), have been mined all over the country and there is no exaggeration in saying that Namibian's economy has been built on its mining industry. In 2018 mining activities accounted for 14 % of GDP (Chamber of Mines, 2018), but provided more than 50% of foreign exchange earnings (Bank of Namibia, 2018). Taxation from mining companies and their employees represents a substantial part of the Namibian government's annual revenues, and thousands of Namibians are employed, either directly or indirectly in this industry (Littlewood, 2014). The vestige of this long mining history is a register of more than 260 mines, which have been abandoned and closed, in a period ranging from 1905 to 1999. The discovery of diamonds at Kolmanskop transformed this small village into one of the richest communities in the continent. Built in the German architectural style, Kolmanskop become an attractive little town in the desert, completely electrified with amenities never seen before in Africa; about 340 Germans (including 40 children) and 800 local indigenous contract workers[17] lived in the town. An hospital, a ballroom, a power station, a school, a skittle-alley, a theatre, a sport-hall, a casino, an ice factory, the first x-ray-station in the southern hemisphere, as well as the first tram in Africa, were among the facilities to be found in the town (JB, 2015) in this resembling what miners could enjoy in the mining towns of Carbonia and Hashima. After the discovery of the diamonds, Kolmanskop was immediately incorporated by the

Chinese labourers at the Hashima Island in the 1930s and 1940s, after Japan colonized Korea and invaded China. At the World Heritage Committee meeting in July 2015, Japan's ambassador to UNESCO acknowledged however that in the 1940s Koreans workers were forced to work under harsh conditions and agreed to share those historical facts to the public. South Korea withdrew its opposition and the site was subsequently approved for inclusion on the UNESCO World Heritage list (UNESCO, 2015; Kim, 2018).

[14] Considering that as an alternative tourists also can visit the Gunkanjima Digital Museum on the mainland, which provides information about the island, including a simulated journey down a working mineshaft and a digital installation that recounts aspects of living through testimonials and photographs, the number of tourists which are attracted by the history of the island could be sensibly higher.

[15] I wish to thanks Mr. Chris Nakare for the assistance provided in the compilation of this section.

[16] In 2019, Namibia has an estimated population of 2.49 million (world population review).

[17] Local indigenous worker did not benefit from the extreme wealth from mining activities. Under the forced/contract labour system instituted by the colonial Germany and maintained during the South African apartheid system, substantial quantities of cheap unskilled labour were provided but there was little or no attempt at stabilising the workforce, rather a form of recurrent migration was created (Moorsom, 1997).

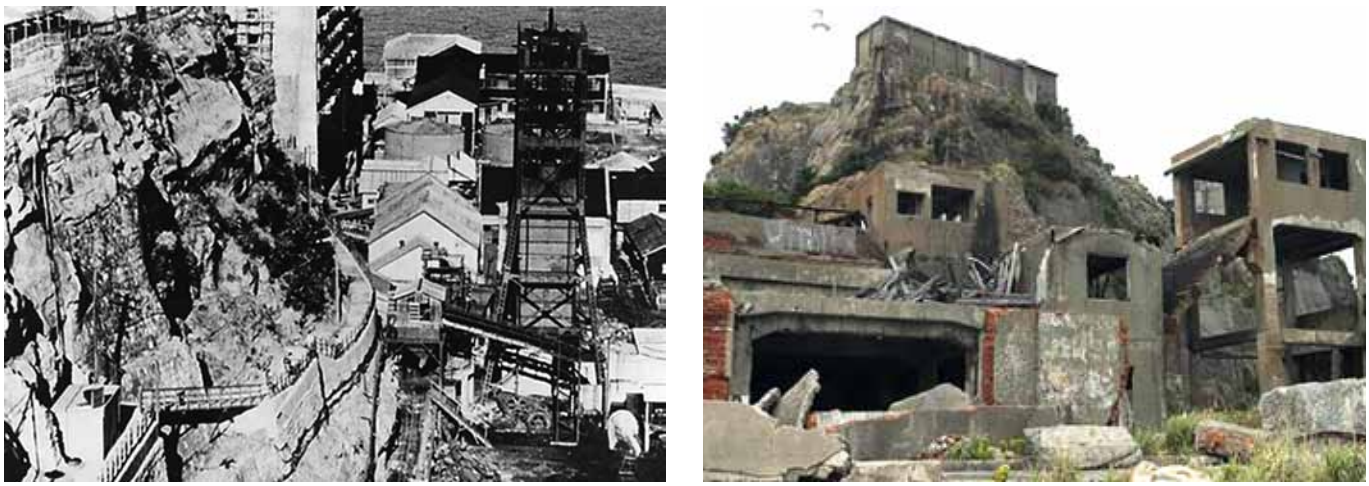

Fig. 5 – Hashima's mine pit (on the left: The second mine pit pier, source: https://matome.naver.jp/odai/2143095492419555801 /2143095938224368403; on the right: Some remains today, source: https://www.flickr.com/photos/eddie_16/9693825504/ in/photostream/).

Fig. 5 – Pozzo della miniera di Hashima (a sinistra: Il secondo pozzo, fonte: https://matome.naver.jp/odai/2143095492419555801 /2143095938224368403; a destra: quello che rimane oggi, fonte: https://www.flickr.com/photos/eddie_16/9693825504/ in/photostream/)

German authorities into the *Sperrgebiet*[18], a large restricted area extending 360 km northwards from the Orange River and 100 km inland from the coast, in order to control mining in the diamond's fields. After World War I, in 1920, South Africa gained control of Namibia and sold the diamond's deposits to Consolidated Diamond Mines (CDM) created by Sir Ernest Oppenheimer. In 1929 CDM was transferred to De Beers. Kolmanskop grew rapidly until 1928 when the richest diamond-bearing deposits ever known, and easily to dig[19], were discovered 270 km south of Kolmanskop, near the Orange River, at the southern end of the Sperrgebiet. Many of the town's inhabitants joined this new diamond rush to the south, leaving their homes. As a result, Kolmanskop was subject to a rapid and inexorable decline: by 1938, most of the workers and equipment were moved to the new diamond fields. The CDM's headquarters remained in the town until 1943 when it moved to Oranjemund[20]; mining operations in Kolmanskop ceased in 1950 and the last person left the town in 1956. Abandoned to the elements, Kolmanskop became a ghost-mining town (fig. 5).

In 1980 the CDM (now Namdeb Diamond Corporation) underwent the renovation of several buildings for tourism purposes and established a museum. Although mining operation have terminated, the town remains included in the forbidden zone; Kolmanskop is in fact located within the Elizabeth Bay mining licence area (No. 45) issued by the Ministry of Mines and Energy (MNE), and widespread mining activities continue along the Atlantic coastal edge and on the banks of the Orange River further south.

The jurisdiction and management of the site is under the authority of the MME together with Namdeb which has held the mining and prospecting licences in the area since 1919 and is currently the custodian. However in 2008 the Sperrgebiet was gazetted as a national park, and in 2012 it was renamed Tsau / Khaeb National Park; National parks are under the custodian of the Ministry of Environment and Tourism (MET). Hence, Kolmanskop is also under the control of the MET. This makes the management of the Park, and of the ghost mining town even more complex. MET, MME and Namdeb are working closely together to plan access into the park for both tourism and park management; with regard to Kolmanskop specifically, it has been proposed the rezoning of the town to be outside the restricted area, making easier the access of the tourist and its management (MET, 2013). Currently, a private Lüderitz-based company has been contracted by Namdeb to operate, conduct tours and manage Kolmanskop Ghost Town on their behalf, but access is strictly prohibited without a MME permit. By facilitating the access of Kolmanskop industrial heritage and linking it to the other touristic and nature conservation activities already present in the area it would be possible to promote growth in the region, thereby reducing poverty also at the community level. Kolmanskop however proves

[18] The Sperrgebiet, '*restricted area*' was designed to give the government control over the region thought to contain diamonds and accounted for 20% of the worldwide diamond take. In 1909 almost 500,000 carats were produced there, and yields almost tripled in 5 years (Oranjemund Bush Telegraph, undated).

[19] Diamonds could be found on the beach terraces, it only required scouting the beaches (JB, 2015).

[20] In 1994 De Beers, the owner of CDM, and the Namibian government, agreed to transform CDM into Namdeb (Namibia - De Beers) Diamond Corporation, a joint venture company in which the Namibian government and De Beers each would have a 50% shareholding (Littlewood, 2014).

Fig. 6 – Kolmanskop, what remains today (on the left: credit: kolmanskop.net, on the right: credit: https://freewheely.com/2015/02/kolmanskop-ghost-town-and-the-namibian-diamonds-history/).

Fig. 6 – Kolmanskop, quello che rimane oggi (a sinistra: crediti: kolmanskop.net, a destra: crediti: https://freewheely.com/2015/02/kolmanskop-ghost-town-and-the-namibian-diamonds-history/

how difficult it is managing industrial heritage in a complex environment where different stakeholders are involved, with sometime conflicting interests. Whilst traditionally communities through customary land rights, governments and policy makers hold the majority of the power, in reality Namdeb seems the most powerful player. By moving toward the creation of an ecomuseum around Kolmanskop area, exhibiting the town's unique specific mining history, but at the same time the uniqueness of its biodiversity history linked to the Tsau / Khaeb National Park, the region could benefit all. Local communities could be trained how to responsibly manage the cultural and natural assets they have inherited, entrepreneurs could tap from this human and economic development to transform their lives and community expanding the activities offered for both the classical and the heritage tourists (Mowforth & Munt, 2015).

Tourism, ecomuseum, and the abandoned historical mining site

Mining life cycle goes through different phases following a typical S shape form as indicated in figure 8 (Porter, 1980; Hinkamper, 2013). Resource exhaustion, loss of profitability or loss of demand determine the closure of the mine; by becoming an industrial heritage tourism attraction and hence transforming the mining function it is possible to bring to new life to the mining site. keep it alive. Yet not all closed mines sites become an industrial heritage tourism attraction (fig. 6).

To become an industrial attraction, and to start a new life after reaching phase 4, some social or cultural meaning must be given to the former mines. This means that some social or cultural meaning must be given to the former mines (Timothy, 2011; Xie, 2015), which must be in accord with the interests of the involved stakeholders, especially the tourists. The mines' past should have been able to generate what Fabre (2002, p. 6) defines as "*patrimonial emotions*", which create a common identity represented by industrial processes and that have left traces of their presence in the landscape with buildings, quarries, mines, etc., into which one can identify.

In this way dismissed mining can be transformed into "niche markets", bringing tourism into what are often marginal areas. Former mining sites intended as industrial heritage attractions, subjected to requalification and recovery of their historical and cultural significance, would have greater chances of success if they were part of an ecomuseum which can offer a wider range of attractions in the area, as the cases here presented seem to indicate. As indicated by Sabiu (2015b), ecomuseum developed around dismissed mines needs to identify objectives and intervention procedures with local authorities in which the industrial heritage lie, and particular attention should be given to tourism polices since heritage tourists could act as an engine of economic development and create, to a certain extent, new job opportunities while promoting local and cultural development (Atezeni, 2011).

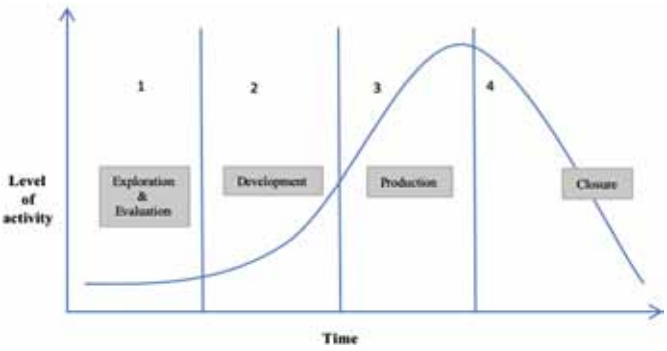

Fig. 7 – Mining life cycle (modified after Porter, 1980, and Hinkamper, 2013).

Fig. 7 – Il ciclo di vita della miniera (modificato da Porter, 1980, and Hinkamper, 2013).

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