

From Abandoned Tin Mine Opencast Site to Urban Regeneration.

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ABSTRACT

Over the past few decades, Malaysia's economic system has significantly changed from physical industrial production to services. As a reaction to this process, the productive function of Malaysia's opencast tin mining areas has become obsolete. Local governments have actively sought to address the problems posed by industrial development. This threatens to end their former productive, social, and economic role, and the communities to which they belong face severe environmental and socio-economic problems. The current reuse strategy for opencast mines is challenging, as mining destroys the original land structure and affects the local ecology. It also poses a considerable challenge to urban planners, natural resource managers, and policymakers. This paper presents the realisation and successful implementation of an open pit mine rehabilitation project (Mines Wellness City (MWC)) in Malaysia over the past 20 years. A comparative approach is used to systematically analyse the economics of property development around Equine Park in the same area as Mines Wellness City (MWC). The results found that the addition of the industrial context of Mines Wellness City (MWC) was a decisive factor in the local economic impact and the sustainability of urban regeneration compared to the normal development of Equine Park. The study discusses and demonstrates the relevance of the project's landscape restoration to the local economy and environment through questionnaires and (SWOT) analysis. This study explores the impacts and benefits of industrial land restoration projects and sustainable urban planning.

Keywords:

Industrial Heritage; Sustainable Urban Development; Urban Regeneration; Industrial Landscape; Multifunctional Landscape;

INTRODUCTION

Abandoned urban industrial land would become a valuable resource for society as it reintegrates into the urban environment. This is a human endeavor found anywhere both in developed and undeveloped countries. It is an activity that can take place almost anywhere on the earth's surface. In the last few decades, industrial globalisation has had a profound effect on traditional industrial areas around the world. Previous traditional industrial management during the industrial revolution has not only caused a large number of industrial debris disposal problems but also resulted in the birth of many abandoned industrial sites, mines, and pits. Facilities, buildings, and ruins that are remained today are now faced with the problem of having to live in harmony with contemporary society. This is a major problem that the younger generation now must face because they are the ones who have to deal with the remnants of the previous generation.

Pit sites that no longer serve their original productive function will be abandoned, the abandonment, backfilling, or scrapping of these tin mining sites by the Malaysian government, in this case, is a relatively common method of disposing of industrial remnants designated as 'surplus'. However, the development of new and more challenging environmental legislation in Malaysia, and public pressure associated with the need to protect the environment, have increased the need to convert post-industrial sites into multi-purpose landscapes. Large-scale landscape reclamation can restore natural processes and functions as well as revive city areas. The creation of multi-purpose industrial landscapes in disused pit areas can protect the local environment while also promoting sustainable urban development.

According to Country Heights Holdings Bhd (CHHB), sound design should be the goal of all involved in the development process and it should be encouraged everywhere necessary. A good design can

help promote sustainable development, improve the quality of existing industrial sites, attract businesses and investments, strengthen civic pride, and have a sense of place.

This research paper discusses the development of a multi-purpose landscape as an opportunity for urban regeneration and sustainable development at the abandoned industrial pit site of Mines Wellness City (MWC) in Malaysia. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis and questionnaire data analysis were conducted on the Sungei Besi Mine industrial site. The renewal of Mines Wellness City (MWC) is developed and utilized in the context of industrial heritage whereas the Equine Park project has no such industrial history. The focus of the study here is to figure out although both these projects are of the same region but why are there significant differences in the economic development of the surrounding real estate in terms of the market value and price.

LITERATURE REVIEW

The current authoritative global definition of industrial heritage is the 2003 (Charter of Nizhny Tagil), which reflects the international community's interpretation of the basic concept of industrial heritage. The (Charter States) that "industrial heritage is the industrial, cultural heritage of historical, technical, social, architectural or scientific research value. It includes buildings and machinery, workshops, mills, factories, mines and related processing and refining sites, warehouses and shops, production, transmission sites, and energy and transport infrastructure. The Mines Wellness City (MWC) pit site in Malaysia is an industrial heritage site under the Lower Tagil Charter. This study addresses the adaptive reuse of the Mines Wellness City (MWC) in an open pit site in Malaysia. Tin lakes are usually isolated with the same overall landform, but a tin lake created by the reclamation of an industrial landscape may have different types of topography and vegetation that appear all in the same area. This is a result of tin mining lakes, and it is one of the characteristics of the industrial heritage. Therefore, it would have a higher heritage value.

Internationale Vereinigung für Theoretische und Angewandte Limnologie: Mitteilungen, 1994) The National Heritage Board of Malaysia (2005) defines heritage sites, objects, and underwater cultural heritage as Underwater cultural heritage, whether listed or unlisted. Heritage significance or value concerning a cultural place can be defined as the ability or potential of the site to demonstrate or symbolise our understanding or appreciation of the human story (Sim, 1997), cited in (Pearson & Sullivan, 1995). Mining heritage sites are places where minerals and other valuable minerals have been dug out of the ground. The broader context in which mining takes place and in other places, including entire landscapes, may be of value in their own right. Landscapes themselves may have a heritage significance as a result of mining (Pearson & McGowan, 2000). By assigning human value judgments to natural landscape functions, multifunctional landscapes are closely related to land use decisions and have become an important development direction in the current study of landscape functions, a key area of integrated multidisciplinary landscape research and a new disciplinary growth point for landscape ecology (Peng et al., *Advances in Earth Sciences* (Peng, 2015.) Adaptive reuse of industrial heritage is an approach that can be used to help reduce abandoned or unused industrial heritage as well as prevent the destruction of industrial, cultural heritage assets; therefore, introducing new projects and functions into a structure and contributing to the maintenance, restoration, development and redevelopment of targeted areas within a community (Sugden E., 2018). Urban areas are complex and dynamic systems, they reflect the many processes that drive physical, social, environmental, and economic transformation. They themselves are the primary agents of many of these changes. Urban regeneration is a source of impact due to the interaction of these many factors and, more importantly, of the opportunities and challenges presented by urban degradation (Sage, 1999).

From an abandoned tin mining site to a quality urban landscape: Mines Wellness City (MWC)



Figure 1: Original Pre-Development Industrial Site of Mines Wellness City (MWC) Photo Credit Mines Wellness City (MWC) Developer's Website



Figure 2: Mines Wellness City (MWC) Development Plan Source: Project Developer's Official Website



Figure 3: Mines Wellness City Multifunctional Landscape and Urban Regeneration Landscape Images

By 2020, the city is expected to be a RM5.5 billion development, playing a central role in tourism and becoming Malaysia's foremost wellness destination. The city's expansion is part of the government's Economic Transformation Programme (ETP), led by PEMANDU (Performance Management and Delivery Unit) under the Prime Minister's Department. The development of Mines Wellness City will lead and contribute to increased economic activity, employment opportunities as well as gross national income.

Situated around the 150-acre lake in Kuala Lumpur, Mines Wellness City is a green sanctuary for local and foreign wellness visitors seeking to enhance their physical and mental health in a holistic environment. The city serves as a one-stop destination showcasing the facility that integrates and supports the spread of Lifestyle of Health and Sustainability (LOHAS), as well as a central hub for LOHAS where people, businesses, and networks are connected in one city.

Mines Waterfront Business Park offers the advantage of excellent connectivity and access to nature's richest resources. The view from the business offices is a panoramic vista that inspires many great ideas. It is fully equipped with vibrant business facilities, including convenient banking facilities, shopping centers, hotels, and all sorts of entertainment.



Figure 4: Mines Wellness City Tourist Attraction Route Map, Source: Google Images

Mines Wellness City is one of the most iconic examples of the adaptive use of an abandoned tin mining site in Malaysia. It is also one of the best examples of post-industrial landscape reclamation. Before becoming a tourist resort area, the area consisted of several open pits caused by the tin mines—an industrial heritage object with a high index of pollution and degradation. According to the design plan of Country Heights Holdings Bhd (CHHB), this project's future development is a long-standing one and it is also a social development necessity.

The development of the Mines Wellness City project will play a vital role in the area's economic growth. The result of Mines Wellness City will also directly impact property prices in the surrounding area. The following section will provide a detailed summary of the survey questionnaire used to examine the real estate and condominium developments around Mines Wellness City. The project's main objective is to create a new public space that will redirect the urban sprawl and establish a relationship with the city. The connection between the city and the river is also re-established based on the changes in land-use patterns and land values. Changes in land-use patterns and land values caused by urban growth, territorial specialisation, and new infrastructures make the area an increasingly attractive location. The solution for this project also includes structures of the ecological and multifunctional landscape of functional significance, contributing to establishing a spatial organisation of the same intentions organised to transform into a coherent and formal group. Landscape values are crucial in developing the concept of Mines Wellness City. The exceptional views of the river and the greenery are observed through the creation of visual corridors by creating elevated platforms in the surrounding areas.

The project has developed spaces with various uses with a wide choice of services such as sports and recreation such as the Golden Horse Health Reserve, cultural activity areas, a Chinese medicine health centre, the Palace Vacation Club, and an environmental education area. The sports and recreation area includes a golf course, jogging tracks, a fishing pier, boat ramps, themed arcades, a horse farm, the Mines Cruise boats as well as an equestrian centre. The sports competition area includes:

- An international standard golf course.
- A traditional international equestrian track competition centre.
- Several tennis courts and lawns for high-intensity sports such as football and rugby.

The cultural activity area is a casual space for music exhibitions, theatre, and other cultural activities at the Malaysia International Exhibition and Convention Centre (MIECC). In this way, the features of this programme promote flexibility for a wide range of activities. The organisation of Mines Wellness City has created several relaxed spaces built as parks offering a variety of social, cultural, and sporting activities.

Sungei Besi Mine tin mining industrial site from past to future urban regeneration



Figure 5: Mines Wellness City Tin Mining Site and The Current State of The Industrial Site After Its Transformation as well as Its Future Development Plans. Source: Facebook, Google Maps Screenshot and Development Company Website.

The transformation of the Mines Wellness City from a formerly uninhabited tin mining site to an industrial area is a classic example of urban regeneration, it has transformed the city and given it a whole new vision and opportunity to reshape the town and beyond. The tin mining site, which was previously a single tin mining industry, has now transformed to include the Golden Horse Health Reserve, Cultural activity area, a Chinese health centre, a Palace Vacation Club, an environmental education area, and a sports and recreation area. As more and more industrial sites are being transformed into multifunctional landscapes, these projects are not going to just become regular ornamental landscape features. This project is transformed into a complex and neat multifunctional landscape corridor with an artificial lake, a bicycle track, an exhibition hall, a swimming pool, a horse racing arena, an art gallery, a park, a golf course, a mall, as well as surrounding landscape facilities. With the simple transformation of an abandoned industrial site, the area has not just become a simple urban park but a collection of public facilities, landscape facilities, and landscape architecture designated to the community. It has also become a multifunctional landscape that can and will continue to provide more convenience and satisfaction to the citizens.

METHODOLOGY

The research methodology aims to systematically collect information for the study through a (SWOT) analysis method and a questionnaire survey. The four-part research phase framework focuses on the core areas of data collection. The primary purpose of the two research methods was to examine the interplay of environmental and economic impacts of the transformation of the pit site in Malaysia, where I needed to systematically collect data to justify my research questions, ultimately discussing and justifying the economic and environmental relevance of the transformation of the project. The implications of the pit site rehabilitation project and sustainable urban planning are explored. The adaptive reuse of the industrial heritage of Sungei Besi Mine, one of the concentrated industrial sites of the Malaysian tin mines, is explored from concept to implementation possibilities, mainly with the (Mines Wellness City (MWC)) case study to explain the need for adaptive reuse of industrial sites in the context of contemporary society, the development of (Mines Wellness The development of a Mines Wellness City (MWC) project can improve the natural habitat of an industrial site and at the same time contribute to the economic development of the surrounding area, defining the path for sustainable urban regeneration. At the same time, to compare the specificities of the Mines Wellness

City industrial site regeneration project with those of a normal socio-economic development area, we have selected another project in the same area, Equine Park, and conducted a SWOT and questionnaire survey to summarise the factors influencing the economic purchasing power of the two. A SWOT and questionnaire survey was carried out on another project in the same area, Equine Park, to summarise the economic purchasing power factors that influence the surrounding properties.

During the qualitative phase, we analyzed the data through constant comparative methods. The findings were retrieved from the available documents. These are two tables that summarize the key findings of the overall analysis.

Table 1: Background to The Development of The Two Projects

Mines Wellness City		Equine Park	
Background of the Mines Wellness City development	Tin mining site	Background of Equine Park development	Has convenient transportations
	Industrial transformation		Walking distance with MRT
	Industrial Culture		Beautiful natural environment
	Industrial Landscape		Furniture Mall
	Man-made Lake		Shopping Mall
	Convenient lifestyle		Close to Putrajaya
	Walking distance to KTM		
	Shopping Mall		
	Brownfield Golf Course		
	Exhibition Hall		

RESULTS AND DISCUSSION

A case study of the Mines Wellness City tin mining site adaptive reuse project found its cultural, economic, and environmental aspects to be relevant, the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted to demonstrate the relevance of this tin mining site adaptation project. Cultural, economic and environmental aspects were considered.

Strengths

- Idyllic location.
- Possibility of using renewable resources.
- Soil and climate characteristics and high bioenergy potential.
- High heritage value due to history with tin mining sites.
- Abundant resources and a wise investment.
- Easy access to places such as Kuala Lumpur, Putrajaya, and Kuala Lumpur International Airport.

Weaknesses

- A relatively short tradition of landscape reclamation.
- Low articulation of urban planning tools.
- Lack of specific principles for urban renewal.
- Difficulty in convincing the government (municipality) to provide immediate funding for the reclamation of derelict land.
- The municipal is interested in transforming this valuable masterpiece into a residential area (profit maximisation).

Opportunities

- Improvement of the quality of soil and water.
- Multiple functions for different water bodies.
- Creation of commercial clusters and expansion of existing ones.
- Even after the maximum usage of new areas there is a potential to reuse old abandoned areas
- Creation of a wide range of recreational facilities.
- Re-create its potential as a traditional landscape with strong links to other towns in the area.
- Redevelop the cultural landscape of the old industrial tin mines and strengthen the links between the area and the surrounding regions.

Threats

- Ambitious projects for landscape change lack funding sources and are slow to develop;
- Lack of awareness of the importance of the industrial heritage landscape for the ecological balance and stability of the area;
- Limited possibilities for financial support for municipal development;
- Lack of political will to establish and fund institutions to support cultural and environmental development;
- Failure to implement policies to protect the heritage of the tin mining industrial sites;
- Urban regeneration and expansion.

Table 2: SWOT Analysis Comparing Similar Developments in Two Locations

Similarities	Mines Wellness City	Equine Park
1	Has convenient transportations	Has convenient transportations
2	Walk to public transport station	Walk to public transport station
3	Shopping Mall	Shopping Mall
Differences	Mines Wellness City	Equine Park
1	Tin mining site	Beautiful natural environment
2	Industrial transformation	Furniture Mall
3	Industrial Culture	Close to Putrajaya
4	Industrial Landscape	
5	Man-made Lake	
6	Brownfield Golf Course	
7	Exhibition Hall	

Comparison between the two sites proposed for parallel development by adding SWOT analysis and Significant similarities were found between the two site developments. Again, the development sites are centrally located in the area and are progressively growing in size concerning the shopping centre. The differences are also evident because the Mines Wellness City development site has a well-established industrial background and a strong and sustainable development ethos. Equine Park is a simple urban development with a shopping mall and residential development. The similarities and differences between the two are evident in the fact that research has shown that the industrial background and culture, and the increasing maturity of the sustainability concept, have impacted the sale and rental prices of properties in the Mines Wellness City area. On the other hand, Equine Park is a traditional development model, and the surrounding area lags far behind the Mines Wellness City area in terms of sale and rental prices.

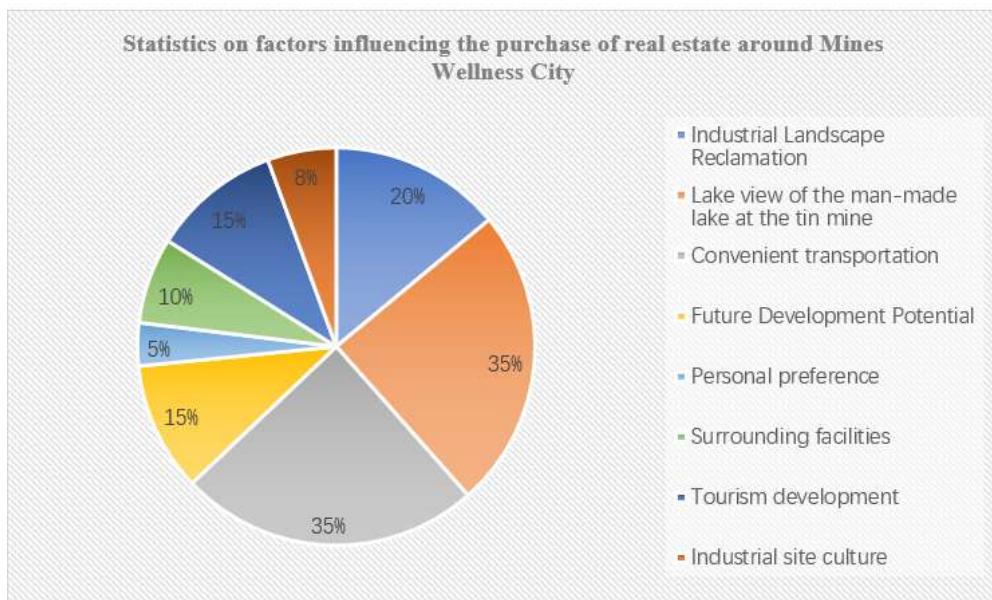
However, the analysis and restoration of this landscape constitute an opportunity that is often lost over time, given the increasing urban pressures that have led to the loss of various mining industry infrastructures, some of which have high heritage values and are of local and national importance, but yet little has been done to preserve and restore them.

A questionnaire survey of the residents of Mines Wellness City was carried out, and it was found that the reclamation of the tin mine site and the surrounding landscape had a significant environmental and economic impact on the project. This is reflected in the difference between the landscape with and without the industrial site in the same area. For this reason, we have produced a detailed comparison between the two projects using bar graphs and a pie chart of the economic influences around Mines Wellness City. Mines Wellness City and Equine Park are projects within the same area, the only difference is that Mines Wellness City is an urban regeneration project of an abandoned industrial site dependent on industrial culture, landscape, and values. At the same time, Equine Park is an economical construction project under normal social development. The statistics were obtained from interviews with iProperty Malaysia, a local rental software, and Wikipro, a rental and sales agency.

Table 1: Average Selling Price and Average Monthly Rental Fee of Properties Around Mines Wellness City



Table 2: Average Selling Price and Average Monthly Rental Fee of Properties in The Equine Park Neighbourhood



Pie Chart 1: Statistics on Factors Influencing the Purchase of Real Estates Around Mines Wellness City

In the study of the transformation of the Mines Wellness City tin mining site, the environmental and economic impacts, particularly the impact of the industrial landscape reclamation on the sale and rental prices of the surrounding properties, were investigated to verify the transformation and development of the surrounding economy through the urban regeneration of the industrial tin mining site and the integrated development of the multifunctional landscape. Comparing data from two shopping centres in the same area shows that social infrastructure, accessibility, and

commercial facilities are similar. The transformation of the site of tin mining and the formation of the artificial lake in Mine Wellness City will significantly diverge between the two development centres under similar conditions. There is a substantial difference in the property's sale price and the rental fees in the market. The process of transforming the tin mining site does have a positive effect on the surrounding economy. The multifunctional landscape has also perfectly reflected in the project's development, and the urban regeneration has delivered a wonderful result.

Finally, a questionnaire survey on the environmental and economic impact on the real estate economy in the vicinity of Mines Wellness City has led to a scientific conclusion, with 133 responses out of 202 surveys sent to citizens with 69 of them being disabled. As shown in Pie Chart 1, data were collected to show why the public is more willing to pay higher prices for properties around Mines Wellness City whereas the property price presented in Equine Park is much lower. The results of the study are known to be mainly due to the reclamation of the tin mining industrial landscape, the formation of an artificial lake at the tin mining site, and also the easy accessibilities around the city. This suggests that preserving the tin mining industrial culture and the reclamation of the industrial landscape as well as urban regeneration, it would lead to a sustainable and prosperous aspect of the area.

Through a systematic comparison of the two projects above, it is clear that there is a certain economic influence on the property prices and rents around the two areas with and without an industrial heritage cultural background. The reclamation of the industrial landscape has led to environmental improvements, which have caused an inclination to own a property near Mine Wellness City, which has an industrial landscape as its backdrop, thus resulting in a lower property price in Equine Park. The impact of real estate development is therefore significant.

CONCLUSION

This case study found that environmental improvements significantly impact the local economy, the best example being the Mines Wellness City tin mining open pit rehabilitation project driving economic development in the surrounding areas. The questionnaire research methodology concluded that there is a strong relationship between the impact on the sale price and monthly rental fees of properties around Mines Wellness City and the improved environment of the Mines Tin Mining artificial lake. This typical success story also has a positive effect on urban development. The goal of urban regeneration is perfectly reflected in the transformation of what started as a lonely, abandoned tin mining area, into an environmentally friendly and sustainable multi-functional significance. As compared to the Equine Park project, which is under normal economic development, Equine Park lacks the industrial factor as the background of its whole project. This will then directly affect the economic strength of the real estate around the area. Instead, the presence of industrial landscape, industrial culture, land reclamation, and adaptive reuse of abandoned land are important factors that boost the economic value of a particular land. This is a significant study that will allow urban development planners and government officials to look at the decisions made on the adaptive reuse of industrial sites.

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