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**Urban Reuse of Brownfields: Exploring Brownfield Phenomenon and
Redevelopment Scenarios for Industrial Brownfields**

By:

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A THESIS

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF SCIENCE IN URBAN PLANNING

DEPARTMENT OF ARCHITECTURE



LALITPUR, NEPAL

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DECLARATION

I hereby declare that the thesis entitled "Urban Reuse of Brownfields: Exploring Brownfield Phenomenon and Redevelopment Scenarios for Industrial Brownfields" which is being submitted to the Department of Architecture, Pulchowk Campus, Institute of Engineering, Tribhuvan University. Under the direction of Dr. Sudha Shrestha, I completed a research project as part of my master's degree requirements in urban planning (MSUrP). I declare that the work is my own and has not been submitted for a degree from another University.

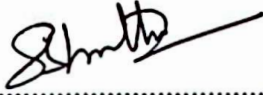


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CERTIFICATE OF THESIS APPROVAL

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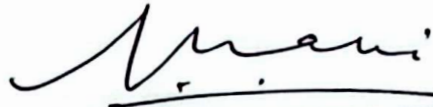
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ABSTRACT

The transformation of industrial brownfields into productive urban spaces is a critical issue in contemporary urban planning and sustainable development. Brownfields—abandoned, underutilized, or contaminated industrial sites—pose significant environmental, economic, and social challenges. However, they also present unique opportunities for regeneration and adaptive reuse. This research, titled "*Urban Reuse of Brownfields: Exploring Brownfield Phenomenon and Redevelopment Scenarios for Industrial Brownfields*," investigates the potential of brownfield redevelopment in Nepal, focusing on five historically significant industrial sites: Birgunj Sugar Mills, Janakpur Churot Karkhana, Biratnagar Jute Mills, Hetauda Kapada Udhyog, and Chobhar Dry Port. The study aims to analyze the brownfield phenomenon in Nepal by exploring the historical evolution, current conditions, and socio-economic impacts of these industrial sites. It further examines global best practices in brownfield redevelopment and their applicability to the Nepali context. A multi-method research approach is adopted, combining spatial analysis, stakeholder interviews, and policy review. Qualitative data from stakeholder interviews and policy documents are systematically analyzed using MAXQDA, a qualitative data analysis software, to identify recurring themes, patterns, and policy gaps. This analytical framework aids in developing viable redevelopment strategies that balance economic revitalization, environmental sustainability, and cultural preservation.

Findings from this study will contribute to the discourse on urban reuse by providing evidence-based recommendations for policymakers, urban planners, and developers. By advocating for context-specific redevelopment models, this research seeks to transform industrial brownfields into vibrant urban spaces, ultimately fostering sustainable urban growth in Nepal.

Keywords: Brownfields, industrial reuse, urban regeneration, sustainable development, Nepal, adaptive reuse, brownfield redevelopment, qualitative analysis, MAXQDA

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CHAPTER 1: INTRODUCTION

1.1 Background

The National Roundtable on the Environment and the Economy (NRTEE), in 2003, defined brownfields as: “abandoned, vacant, derelict or underutilized commercial or industrial property where past actions have resulted in actual or perceived contamination and where there is an active potential for redevelopment.” (2022, CBN)

During the last decades, brownfield site recovery has emerged as a sustainable land use strategic measure and an incentive for urban revitalization. Throughout Europe, the redevelopment of brownfields assumes a fundamental role in avoiding urban sprawl and increasing the environmental quality, for an effective territorial development [34]. In theoretical terms, brownfields are defined as “sites that have been affected by the former uses of the site and the surrounding land; have real or perceived contamination problems; are mainly in developed urban areas; are derelict or underused; require intervention to bring them back to beneficial use. (Tajani et al., 2023)

Many Public Enterprise Industries, like Biratnagar Jute Mill, Birgunj Sugar Mill, Hetauda Kapada Udgyog etc; that pioneered and furthered industrial growth and glory, are now closed and stagnant. Since there are no plans in motion, there is no clear directives to what can/should be done to re-operate or repurpose them. This signifies the prevalence of industrial brownfields phenomenon. Industrial brownfields are recognized as ‘Rugna Udhyog’ (meaning: sick industries) in case of Nepal. There are provisions relating to their redevelopments, however there is no clear specifications to what and how they should be developed.

Potential liabilities issues, lack of local expertise on BFR issues, stagnating or shrinking economy and lack of market demand for new development, unclear ownership, or sites that are in the property of land speculators without (immediate) development interest, unclear legal/administrative situation regarding investigation and remediation standards, potential community resistance to proposed projects are some issues that should be carefully considered while redeveloping brownfields. (Europe and Central Asia Region Sustainable Development Department, n.d.)

1.2 Need for Research

Significant number of industries are derelicts in Nepal. Industries like Biratnagar Jute Mills, Gorkhali Rubber Udhyog, Janakpur Churot Karkhana, Hetauda Kapada Udhyog etc. have been closed since long. Socio-political issues, low competitive power, inadequate human resource development etc caused many industries to close leaving them derelict and unused. Such occurrence signifies the reality of brownfield phenomenon. In case of Nepal, brownfields can be perceived as areas and industrial/commercial facilities that have lost their intended use, are stagnant and abandoned. Considering the increased number of brownfields across the globe, brownfield redevelopment projects (BRPs) have gained significant attention. Currently most of the developed countries are welcoming BRPs and consider it an effective urban policy instrument. Whereas, the adoption of BRPs is in its beginning due to confronting challenges. Therefore, identifying sustainable solutions that could facilitate BRPs in developing countries is necessary.

1.3 Importance of Research

In Nepal the history of organized industries has a very recent origin, contribution of industrial sector to the total economy is very low. Expansion of the industrial sector is crucial for increasing employment opportunities generating economic growth and achieving sustainable growth. (Karna, n.d.)

A nation moves upward from a rural economy to an efficient one with higher level of material well-being mainly through industrialization. Industrialization provides employment opportunities, relieves population pressure on land area, raises life standards of the people, develops technological and managerial skills and enables exports development and import substitution. (Khatri, n.d.)

1.4 Problem Statement

The discourse surrounding public enterprises and their inefficiencies provides a valuable lens for examining brownfield redevelopment. As industrial brownfields often stem from the failure of public-sector industries, understanding the governance and economic factors leading to their decline is crucial for formulating effective redevelopment strategies. The mismanagement and unclear objectives of state-run enterprises mirror

broader global trends where industrial sites fall into disuse due to financial and policy shortcomings. This highlights the need for structured redevelopment frameworks that balance economic revitalization with sustainable urban planning, ensuring that former industrial sites can be successfully reintegrated into the urban fabric.

1.5 Research Objectives

To assess the extent of brownfields in Nepal, understanding the barriers to their reuse and identifying opportunities for redevelopment.

1.6 Scope of Research

The thesis, "Urban Reuse of Brownfields: Exploring Brownfield Phenomenon and Redevelopment Scenarios for Industrial Brownfields," investigates the phenomenon of brownfield sites within Nepal's industrial landscape, focusing on the challenges and opportunities associated with their redevelopment. The study encompasses five prominent industrial sites: Birgunj Sugar Mills, Biratnagar Jute Mills, Hetauda Kapada Udhog, Chobhar Dry Port, and Janakpur Churot Karkhana. These sites were selected due to their historical significance and current status as underutilized or defunct industrial areas, representing a cross-section of Nepal's brownfield scenarios.

The findings aim to contribute to the discourse on sustainable urban development by providing insights into effective strategies for repurposing industrial brownfields. By examining these specific cases, the research seeks to inform policymakers, urban planners, and stakeholders involved in urban regeneration and industrial redevelopment initiatives.

1.7 Limitations of Research

Despite offering valuable insights into the redevelopment potential of industrial brownfields in Nepal, this research is subject to certain limitations. Firstly, the study employed snowball sampling for data collection, which, while effective for reaching key informants, carries the inherent risk of sampling bias, as the selection of participants may have leaned towards certain perspectives or networks. Secondly, due to time constraints, the research was unable to conduct an exhaustive and longitudinal assessment of each case study area; instead, the analysis focused on immediate observations and accessible data within the limited timeframe. Thirdly, the study is primarily descriptive in nature, aiming to provide an exploratory overview of the brownfield context in Nepal rather than offering detailed quantitative assessments or predictive redevelopment models. As such, the findings are intended to inform initial understanding and future, more in-depth research rather than serve as comprehensive redevelopment plans.

CHAPTER 2: LITERATURE REVIEW

2.1 Industrial Development in Nepal

Industrialization has to play a vital role in the process of economic development. To make them self-sufficient and to label them as an advanced economy of the world there are not any alterations except to quicken the tempo of industrialization in consonance with the development of agricultural sector. Industrialization is the key factor in development of a country which is generally acknowledged that economic backwardness of the developing nations can only be changed by gradually building up of industrial infrastructure. “A nation moves upward from a rural economy to an efficient one with higher level of material well-being mainly through industrialization. Industrialization provides employment opportunities, relieves population pressure on land area, raises life standards of the people, develops technological and managerial skills and enables exports development and import substitution.” (Karna, n.d.)

Public enterprises have historically played a significant role in national economic development, often occupying key industrial sites that later become brownfields due to inefficiencies and policy challenges. Shrestha (1983) highlights the struggle of public enterprises in Nepal, where unclear government policies and conflicting political interests have hindered their ability to operate efficiently and maintain financial sustainability. This lack of strategic direction has contributed to the decline of industrial sites, leaving behind underutilized or abandoned spaces that require redevelopment. The case of Nepal’s public enterprises underscores the broader challenges of managing industrial sites in a way that ensures long-term economic and environmental viability.

The discourse surrounding public enterprises and their inefficiencies provides a valuable lens for examining brownfield redevelopment. As industrial brownfields often stem from the failure of public-sector industries, understanding the governance and economic factors leading to their decline is crucial for formulating effective redevelopment strategies. The mismanagement and unclear objectives of state-run enterprises mirror broader global trends where industrial sites fall into disuse due to financial and policy shortcomings. This highlights the need for structured redevelopment frameworks that balance economic revitalization with sustainable urban planning, ensuring that former industrial sites can be successfully reintegrated into the urban fabric.

2.1.1 Prospects of Industrial Development in Nepal

Economic growth is the steady process by which the productive capacity of the economy is increased over time as the potential capacity of existing resources whereas development is the process of improving the quality of life of the people. Economic growth is measurable and economic development can be used to describe the underlying determinants of economic growth.(Khatri, n.d.) However, to achieve rapid economic growth through industrial development, there should be development of export-oriented manufacturing industries.(KC, n.d.) Promotion of export-based industries and diversification of export market are the major factors which significantly contribute to expanding economic activities and uplift the living standard of the people. Therefore, there is opportunity in the following areas for promotion and development of the industrial sector as well as to improve prosperity of the country. The major prospects of industrial development in Nepal are:

Tourism: Nepal is full of natural beauty, great Himalayas, adventure places, unique cultural heritages, wide range of biodiversity and historical religious places. So, there are ample opportunities in the tourism industry.

Argo-processing: Majority of the people are dependent for their income and employment in agriculture and contribute 27.59 percent in GDP (MoF, 2018). So, possibility of aerobated industries such as sugar, tea, mango juice, apple juice, bel juice, tobacco, honey, milk, fish, meat and floriculture etc.

Information Technology: Information technology has emerged as a strong means for developing business sectors such as tele-medicine, tele-education, e-commerce, e-trade, e-governance and so forth.

Human Resource Development: Nepal has also potentiality to improve and capitalize her human resources through applied education and different vocational training which would be appropriate to mobilize her available resources as its potential capacity like in East Asia. Above mentioned prospects are positive indications of bringing the pace of the industrial development of country and catch the track of prosperity.

2.1.2 Problems to Industrial Development in Nepal

Despite various plan and policy provisions, positive laws and rules, the investors have been facing many barriers to enabling the environment in the industrial sector. (Khatri, n.d.)Road closures, strikes by laborers and Nepal Bandh (total closure of the economic activities) are frequently declared by either political parties or any groups. It is quite

amazing in Nepal that even the government, even hospitals, telecommunication, sanitation and electricity workers have a tendency to go on strikes and force the country to fulfill their unnecessary as well as unethical demands. The major problems are:

- a) **Inadequate Physical and Social Infrastructures:** Physical infrastructures such as road, energy, communication, irrigation and social infrastructures such as education, health and sanitation are insufficient. That is why private sectors are also centralized in urban areas only. Therefore, the industrial sector of Nepal does not flourish even though its process started 60 years ago and is suffering from basic requirements.
- b) **Lack of Corporate Culture and Institutions:** Lack of corporate culture and intuitional development energetic people of Nepal are unable to develop managerial and entrepreneurial skills for maximum utilization of available resources. Business community is not taking risk by establishing new industries. However, they are actively participating in trading.
- c) **Lack of Political Stability and Will-Power:** Nepal has been unable to mobilize resources even if it has sufficient water resources, human resources, natural beauties, cultural heritages and bio-diversities because of long standing instability and lack of strong willpower of political leaders.
- d) **Vicious Circle of Poverty:** About 21 percent people are living below absolute poverty line (MoF, 2018). So, energetic youths are facing problems of capital deficiency. On the basis of the principle of vicious circle in level of income remains low, this leads to low level of saving and investment. Consequently, low investment leads to low productivity which again leads to low income. In economics, the cycle of poverty is the of factors or events by which poverty, once started, is likely to continue unless there is outside the countries.
- e) **Socio Cultural Constraints:** Socio-cultural values are one of many interacting factors that can impact economic as well as industrial development and influence on how we approach the process of economic development due to a set of values, beliefs, traditions and habits.
- f) **Market Imperfection:** Imperfect market becomes a barrier to achieve economic efficiency and fair business activities. On the contrary, under perfect competition, a firm or industry can operate at the point where there is no surplus of capacity that means resources are fully utilized.

- g) **Low Competitive Power and Human Resource Development:** In this age of global competition, it is not just enough for the Nepalese firms to be competitive at the domestic level. For that industrial sector should have to improve economies of scale through technological advancement, marketing strengths, efficient production and distribution systems as well as affordable labor. Building up skill and competitive human resources is the key for catching opportunities for market opening and widening. East Asian countries have good examples of success stories. So, industrial sectors have low competitive power due to less development of human resource than required.
- h) **Difficult Geographical Location:** Nepal is surrounded by India on three sides and China on one side. So, it is a land-locked country whose transit facilities are determined by the willingness of India. Nepal has a bitter past experience in case of export and import. Now, the government of Nepal can eliminate this difficulty through diplomatic relationships with these countries as most favored nations. On the other hand, difficult topography is a challenge to achieve balanced and inclusive development by addressing geographically between villages and towns, mountains, hills and terai as well as on the basis of castes, groups, genders and provinces.
- i) **Good Governance:** It refers to providing a legal and regulatory framework and enlightened fiscal and strategic direction for promotion of economic growth and development. The attitudes and perceptions of management have been frequently cited as important determinants of economic performance. Many problems are caused by lack of clarity in laws and regulations and unpredictability and inconsistency in their implementation. Sometimes, policies and regulations are made without the suggestions and knowledge of the private sector. Firms also complained about excessive government red tape, public services delays and corruption. Implementation of the import regime (problems with customs and duty drawbacks), the tax regime (inappropriate revenue targets and poor tax administration), and the labor law (inflexible economizing provisions) affect exporters mostly.
- j) **Lack of Research and Development:** Research is required for the exploration and extension of the economy in domestic as well as third countries.(Singhdurbar, n.d.) But in case of Nepal, there is no adequate institutional infrastructure for this

purpose. In spite of these constraints, the economy of Nepal has shown potential to be competitive in several areas. This is supported by analysis of abundant resource, domestic resource costs, price differentials and revealed comparative advantage. However, given the increasing volatility and competition of global markets, Nepal must make considerable efforts to improve the industrial sector as its potential. Problems facing Nepal is her inability to attract foreign private capital, imports and exports with third countries transit through only the port of Kolkata, investment opportunities in large scale industries are limited by extremely low purchasing power of the population and remoteness and poor endowment of mineral resources, knowledge of finance of marketing (whether for the country wide distribution of goods or for exports) and even of simple management procedures and accounting practices is woefully inadequate, entrepreneurship and management capacity has been very inadequate, failure to exploit known investment opportunities, social preferences for maintaining status quo than increasing production, investment in land and eye-catching consumption rather than investment in industries, lack of efficiency, initiative and organization in industrial operations are some of the more important impediments. It is necessary to introduce appropriate educational programs with emphasis on training to entrepreneurs for industrial progress. The size and behavior of markets are also major limiting factors in the industrialization of the economy (Nepal, 2004).

Therefore, the role of government required foremost changes in above mentioned problems through suitable plan and policy interventions for improving long-term economic performance to provide more than enough scope to the domestic economy to integrate with the global economy through industrial development.

2.1.3 Economic Trend and Concept

2.1.3.1 Industrial Development Trend in Nepal

The table shows that industrial production is continuously increasing except FY 2015/16 where industrial growth rate became negative i.e. -8 percent. However, growth of the industrial sector itself became more than 30 percent in 2000/01. But the GoN is unable to continue this progress. Similarly, the contribution of the industrial sector in real GDP is almost small i.e. less than 10 percent. Accordingly, real GDP is continuously increasing. Therefore, the industrial sector should be expanded significantly in the years ahead and turned out to be one of the major sectors for the massive driven sector of the economy of Nepal through its growth and development.

Fiscal Years	Industrial Production	Growth of Industrial Sector (in %)	Contribution of Industrial Sector to RGDP (in %)	Total Real GDP
1990/91	12179	15.02	4.61	263955
1995/96	21322	8.29	6.33	336681
2000/01	38409	30.63	9.29	413428
2005/06	38898	2	8.09	480435
2010/11	41923	4.1	7.14	587534
2015/16	44223	- 8	6.36	695688
2016/17	48510	9.7	6.47	749550
2017/18	52957	9.17	6.65	796784

Source: Author's construction from different Economic Surveys, MoF, Nepal.

Figure 1 Industrial Production, Growth and Contribution of RGDP (in millions NPR)

Table 5: Registration of Different Nature of Industries up to 2018

Categories	No. of Industries	Total Capital (Rs. in millions)	Fixed Capital	Working Capital	Employment Generation
Agriculture and forest based	442	23267.22	20117.54	3267.69	34898
Construction	55	48898.03	47473.36	1424.68	3648
Energy based	329	929637.6	910526.67	19110.92	31291
Information Technology	38	1651.5	1377.45	274.05	1852
Manufacturing	2897	396695.2	307014.32	90151.38	312591
Mineral	68	6870.81	5756.39	1116.52	7119
Service	2085	144828.95	95992.45	48882.5	119992
Tourism	1615	129070.55	117056.96	12005.39	64105
Total	7529	1680919.86	1505315.14	176233.13	575496

Source: Based on Industrial Statistics, 2017/18.

Figure 2 Registration of Different Nature of Industries upto 2018

The table shows that the share of manufacturing industries had occupied at the top and followed by service and tourism industries up to 2017/18. Similarly, as an investment commitment, the total investment is on energy-based industries at the top and followed by manufacturing, service and tourism industries. But more employment is generated by manufacturing industries

Scales of Industries	No. of Industries	Percent	Total Capital (Rs. in millions)	Percent	No. of Employment	Percent
Large	1030	13.68	1452564.3	86.42	149263	25.94
Medium	1,640	21.78	149426.37	8.89	152504	26.50
Small	4,859	64.54	78,929.22	4.69	273729	47.56
Total	7,529	100	1680919.9	100	575496	100

Source: Department of Industry, Ministry of Industry, GoN, 2018.

Figure 4 Registered of Scale-wise Industries upto 2018

The table shows that small scale industries covers almost 65 percent out of total industries in low investment i.e. around 5 percent and provides more employment about 48 percent in comparison to others. Similarly, small and medium scale industries cover almost 87 percent out of total industries in low investment i.e. 14 percent and provide mass employment of 75 percent in comparison to large scale industries. Therefore, to generate employment opportunities within a domestic economy, the government of Nepal should promote and develop SMEs.

Fiscal Years	No. of Industries	Foreign Investment	Fixed Capital	Total Capital	Employment Generation
2013/14	307	2013.2	3504.9	4073.7	11790
2014/15	370	6745.5	7743.7	8137.1	13167
2015/16	348	1525.4	1416.5	2054.4	11663
2016/17	398	1511.3	1233.3	1700.3	11734
2017/18*	194	3491.1	3548.7	3804.1	7541
Total	1617	15286.5	17447.1	19769.6	55895

Note: An asterisk * denotes the first eight months of the FY 2017/18.

Figure 3 Foreign Investment on Nepalese Industries for the Last Five Years (Rs. in 10 million)

The table shows that the number of industries and foreign investment has been continuously increasing. Accordingly, even in the first eight months of the FY 2017/18, the commitment of foreign investment has been made two-fold than the previous FY 2016/17. This means formation of stable government attracts foreign investment significantly.

Countries	No. of Industries*	Total Investment	Foreign Investment	Share in Total Investment	Employment Generation
India	713	13652.8	8680.3	35	68655
China	1226	9191.3	6346.7	25.6	56505
China Hong Kong	36	3707.2	2728.2	11	4782
South Korea	324	1624.5	1149	4.6	11070
USA	375	2083.7	838	3.4	17654
British Virgin Island	16	1630.3	806.4	3.3	2180
UK	169	897.2	538.6	2.2	10702
Mauritius	10	391.8	335.5	1.4	974
Singapore	44	820.7	296.2	1.2	3207
UAE	17	540.6	290.4	1.1	1827
Other 82 Countries	1343	6853.7	2776.5	11.2	59578
Total 92 Countries	4273	41393.8	24785.8	100	237134

Note: An asterisk * denotes first eight months of the FY 2017/18.

Source: Economic Survey, 2018.

Figure 5 County-wise investment in Nepalese Industries (Rs. in 10 million)

The table shows that on the basis of project cost of the approved industries for foreign investors, the shares of Indian Investors have occupied 35 percent of total foreign investment. Similarly, China occupied the second position in the investment which is 25.6 percent and China Hong Kong is in the third place with 11 percent investment in share. Similarly, the share that has been invested by investors of India, China and China Hong Kong to foreign investment is 39 percent, 16 percent and 13 percent correspondingly. In the latter period, the share of Chinese investors has been increasing to total foreign investment. So, foreign investment by the first eight months of the current FY 2017/18, the shares of investors of China, India, and the USA has been 28.7 percent, 16.7 percent and 8.8 percent respectively (MOF,2018).

Names of Provinces	No. of Industries	Percent	Total Capital (Rs. in 10 millions)	Employment Generation	Percent
Province-1	673	9.18	34263.7	73610	12.98
Province-2	491	6.69	8374.9	50246	8.86
Bagmati	4961	67.64	58602.4	345947	61.01
Gandaki	556	7.58	25930.2	32441	5.72
Province-5	508	6.93	15521.3	52965	9.34
Karnali	38	0.52	10981.7	2562	0.46
S u d u r Paschim	107	1.46	2643.3	9263	1.63
Total	7334	100	156317.5	567034	100

Source: Economic Survey, 2018.

Figure 6 Province-wise Registration of Industries by 2018

The table shows that among registered industries from the beginning to 2017/18, about 4961 industries have been registered in Bagmati Province that covered one third of total industries in Nepal, whereas the lowest figure of 38 industries in Karnali Province, Similarly, on the basis of investment, Bagmati Province is at the top i.e. Rs 58602.4 Crore and Sudurpaschim at the bottom i.e. Rs. 2643.3 Crore.

2.1.3.2 Earning Power Concept

Earning power of public enterprises is used in the sense of the decisive ability of public enterprises to pursue a goal of just, equitable and reasonable profit from the demonstrated level of operative efficiency, effectiveness and productivity.(Tajani et al., 2023) The earning power constitutes not only the ability to generate reasonable profit but also implies that such reasonable profit must be the outcome of efficiency instead of deriving it from monopoly conditions. Again, efficiency alone is not sufficient since it must be guided by effective criterion. Earning power is effective if it does not exploit consumers by charging high prices and it becomes productive if it leads to greater benefits to public from a given level of efficiency. It can be presented below:

Earning Power = Efficiency + Effectiveness + Productivity

- **Reasonable Profit**
- **Social Benefit**
- **Survival of PE**

But since our interest is on the financial obligations of public enterprises, we look earning power in the light of public enterprises to generate rate of return from a given investment

so as to cover costs plus profit. Whatever capital provided to public enterprises mostly by government has a cost to bear, and such a cost can be recovered if public enterprises can achieve reasonable rate of return. Earning power in a financial sense designates the setting of a circular flow of funds to make public enterprises self-supporting through internal generation of funds so as to accomplish broader financial goals. Howard and upon are of the view that public enterprises can create excess of income over the costs if they follow three cardinal principles of financial success.

Whatever funds available for utilization must be invested in earning assets.

The amount of profit so expected must be reasonable enough to cover costs plus provisions for expansion.

The direction and control employed in the utilization of funds must be effective enough to achieve priority goals of attaining desirable level of efficiency.

Public enterprises must follow a pragmatic approach to find out how best they can choose the productive assets that help in raising their earning power. There is, in fact, a close relationship between type of assets they choose for investment and corresponding benefits both in terms of financial returns and social benefits derived from the use of such assets. In many developing countries, it is the usual experience of PEs that they have no right of choice of assets in helping to raise the sufficient earning power. The question arises: how can the purchase of old Boeing 727 already used for several years by RNAC to achieve operating efficiency for raising earning power at mid-age engineers to examine many times about its working conditions before take-off? Can't the investment in the purchase of such old Boeing lead to wrong kind of choice of assets as it needs excessive depreciation, maintenance and repairs. It is again true that many public enterprises are fond of using old assets either because they are cheap or because they are freely donated to HMG under various aid programmes, public enterprises that mean for long-term survival cannot just survive if the tendency of HMG is to pressurize public enterprises to have the use of worn-out and dead-expired assets. Sometimes this sort of policy itself may be nothing more than 'Penny saved, Pound lost' policy.

The concept of earning power in public enterprises is closely tied to their ability to generate reasonable profits while maintaining operational efficiency, effectiveness, and productivity. Shrestha (1983) emphasizes that profitability should not stem from monopolistic control or consumer exploitation but rather from sound economic management and strategic asset utilization. This perspective is crucial in understanding

the decline of industrial sites that have turned into brownfields due to financial mismanagement and inefficiencies in public enterprises. The economic sustainability of such enterprises depends on balancing reasonable profit generation with broader social benefits and ensuring the long-term survival of industrial assets.

The financial obligations of public enterprises highlight the challenges of maintaining productive industrial sites.(Tajani et al., 2023) The inability to effectively allocate resources and make strategic asset investments often leads to financial losses and the eventual abandonment of sites, contributing to brownfield formation. As seen in many developing countries, mismanagement of industrial assets, including reliance on outdated or donated equipment, results in declining operational efficiency and increased maintenance costs. This economic shortfall underscores the need for comprehensive brownfield redevelopment strategies that incorporate financial viability, efficient resource allocation, and sustainable urban planning to prevent further industrial site deterioration.

2.2 Redevelopment: Concept and Significance

Redevelopment refers to the process of revitalizing areas that have become underutilized, obsolete, or deteriorated. This process involves transforming existing structures or land uses to meet current urban needs, aiming to enhance economic vitality, environmental quality, and social equity. Redevelopment plays a crucial role in sustainable urban development by optimizing land use, improving infrastructure, and fostering community well-being (Roberts, 2000)

2.2.1 Types of Redevelopments

Urban redevelopment encompasses various strategies aimed at revitalizing and transforming urban areas to address issues such as decay, underutilization, or obsolescence. The primary types include:

Urban Renewal: Urban renewal involves comprehensive efforts to rejuvenate deteriorated urban neighborhoods through infrastructure improvement, housing rehabilitation, and economic development initiatives. This approach often includes land acquisition, clearance of blighted areas, and redevelopment to stimulate economic growth and improve living conditions (Roberts, 2000).

Infill Development: Infill development focuses on the utilization of vacant or underused parcels within existing urban areas to accommodate new construction. This strategy aims to optimize existing infrastructure, reduce urban sprawl, and promote sustainable land use by increasing density in already developed areas (McConnell & Wiley, 2010).

Adaptive Reuse: Adaptive reuse entails repurposing existing buildings for new functions, preserving historical and architectural value while meeting contemporary needs. This approach contributes to sustainability by conserving resources and reducing the environmental impact associated with demolition and new construction (Bullen & Love, 2011).

Brownfield Redevelopment: Brownfield redevelopment addresses the remediation and reuse of previously developed land that may be contaminated. This process involves environmental assessment, cleanup, and redevelopment to transform hazardous sites into productive uses, thereby mitigating health risks and revitalizing communities (De Sousa, 2003).

Transit-Oriented Development (TOD): TOD is a planning strategy that promotes high-density, mixed-use development within walking distance of public transportation hubs. This approach aims to reduce reliance on private vehicles, enhance public transit usage, and create walkable, sustainable communities (Cervero et al., 2004).

Mixed-Use Development: Mixed-use development integrates residential, commercial, cultural, and institutional uses within a single area or structure. This approach fosters vibrant, diverse communities by promoting walkability, reducing transportation needs, and encouraging social interaction (Grant, 2002).

Innovation Districts: Innovation districts are urban areas designed to foster economic development by clustering research institutions, startups, and technology companies. These districts promote collaboration, knowledge sharing, and entrepreneurship, contributing to the revitalization of urban economies (Katz & Wagner, 2014).

Ecological Urbanism: Ecological urbanism integrates ecological principles into urban design and planning to create sustainable, resilient cities. This approach emphasizes the interdependence of urban systems and natural environments, aiming to enhance biodiversity, reduce environmental impact, and improve quality of life (Mostafavi & Doherty, 2010).

2.2.2 Brownfields and their Redevelopment Dynamics

Brownfields are properties where the presence or potential presence of hazardous substances, pollutants, or contaminants complicates expansion or redevelopment. These sites often result from former industrial or commercial activities and are prevalent in urban centers (U.S. EPA, 1995).

The redevelopment of brownfields is a complex process influenced by various factors:

Environmental Assessment and Remediation: Identifying the extent of contamination and implementing appropriate cleanup measures are critical steps. The uncertainty and cost associated with remediation can deter investment (Alker et al., 2000).

Regulatory Framework: Navigating environmental regulations and liability concerns requires coordination among stakeholders. Clear policies and incentives can facilitate redevelopment efforts (Bartsch & Collaton, 1997).

Economic Viability: The financial feasibility of redeveloping brownfields depends on factors such as land value, market demand, and availability of funding. Public-private partnerships and government incentives often play a vital role (De Sousa, 2003).

Community Engagement: Involving local communities in the planning process ensures that redevelopment meets the needs of residents and gains public support (Greenberg et al., 2001).

2.3 Brownfield Development: Public and Expert Discussions

2.3.1 Introduction

The issue of land use regulations and industrial revival has been a recurring theme in discussions about Nepal's economic landscape. The Land Use Regulation 2022, which mandates local governments to categorize land as either agricultural or non-agricultural, has had a profound impact on the real estate market, leading to a nearly 50% drop in transactions. Such regulatory changes have introduced uncertainty and instability, affecting not only landowners and investors but also broader economic activities that depend on land use policies. (Carrie et al., 1996)

The debate over state-owned enterprises (SOEs) and their effectiveness continues to be a significant topic in Nepal's industrial discourse. Politicians frequently promise to revive sick or defunct SOEs, a sentiment often echoed by the public. However, the reality remains that many of these enterprises have failed due to government mismanagement, inefficiency, and political interference. Despite multiple revival committees and financial

interventions, Nepal has struggled to sustain its public enterprises, highlighting the limitations of state-controlled economic models.

A high-level committee was recently formed to address the issue of sick industries, but it has yet to establish its working procedure. Reports suggest that sick industries are categorized into completely sick, possibly revivable, and vulnerable industries, with recommendations for restructuring or closure. However, some recommendations face legal obstacles under the Industrial Enterprises Act 1992. The government has identified several industries for potential revival, including Butwal Dhago Udhyog, Hetauda Kapada Udhyog, Gorakhkali Rubber Udhyog, Oriental Magnetite Industry, Birgunj Sugar Industry, and Janakpur Cigarette Factory, signaling an ongoing attempt to reinvigorate Nepal's industrial sector.

Nepal's history of public enterprises dates back to the Industrial Revolution era, when state control over key industries was seen as necessary to prevent monopolies and ensure economic stability. In Nepal, limited private-sector investment and weak industrial infrastructure led to the state establishing SOEs, beginning with Biratnagar Jute Mill in 1950. However, over the past few decades, state-owned enterprises worldwide have faced financial crises due to inefficiency, corruption, and political interference. Similar trends were observed in Nepal, where public enterprises became a burden on taxpayers, necessitating privatization and liberalization efforts.

The adoption of market-based reforms in Nepal was influenced by the global shift from state-led economic planning to privatization, particularly following the collapse of communism in Eastern Europe and the former Soviet Union. Nepal's transition towards privatization and economic liberalization accelerated in the 1990s, following the restoration of the multi-party democracy in 1990. The government introduced the Privatization Act 1994 to address declining productivity and reduce the financial strain caused by failing public enterprises. The act aimed to promote private-sector participation in the economy, which was seen as more efficient and sustainable.

In recent developments, Indian and Bangladeshi companies have expressed interest in resuming operations at Biratnagar Jute Mill, Nepal's first industry. Tata Group of India has already conducted a technical feasibility study, and the government is preparing to form a board of directors to oversee the mill's revival. If the mill becomes operational, it could provide employment to around 3,000 people, but concerns remain regarding land encroachment and unauthorized construction on the mill's property. Reports suggest that

large portions of the mill's 69 bighas of land have been illegally occupied, raising questions about the viability of industrial revival efforts.

Beyond industrial policy, there is a broader concern regarding Nepal's academic and intellectual landscape. The recent news that no students enrolled for graduate studies in history at Tribhuvan University has raised alarms about declining interest in historical studies. This is particularly concerning given Nepal's rich historical heritage, which has inspired numerous researches works and books. The early industrialization efforts in Nepal, particularly with the Biratnagar Jute Mill, hold significant historical value and could warrant museum preservation as a testament to Nepal's industrial past.

This review of web articles highlights pressing challenges in Nepal's industrial, economic, and academic sectors, with an emphasis on land use regulations, the struggle of public enterprises, industrial revival efforts, and the role of privatization. The forthcoming sections will analyze these themes in greater detail, drawing from contemporary literature and policy discussions.

2.3.2 State of Industrial Brownfields and Public Enterprises in Nepal

Revitalization of Sick Industries: In an effort to boost domestic production and reduce trade deficits, the government has initiated the revitalization of nine sick industries: Janakpur Cigarette Factory, Agricultural Tools Factory, Gorkhali Rubber Industry, Nepal Orind Magnesite, Nepal Metal Company, Biratnagar Jute Mill, Birgunj Sugar Factory, Hetauda Textile Industry, and Butwal Yarn Factory. However, the broader picture of state-owned enterprises (SOEs) remains grim.

The Yellow Book published by the Ministry of Finance reveals that of the 42 SOEs currently in operation, 18 are running at a loss, with the majority of losses concentrated in the industrial sector. In contrast, the private sector has demonstrated an 8% revenue growth in the same period.

Challenges in the Cement Industry: The performance of Nepal's cement industry exemplifies the inefficiencies of state-owned enterprises. Historically, the government operated three cement industries, fulfilling national demand before opening the sector to private investment. Following the privatization shift, government-run cement industries failed to compete effectively. In the last fiscal year alone, two state-owned cement companies—Hetauda Cement Factory and Udaypur Cement Factory—reported losses of Rs 170 million and Rs 300 million, respectively. Conversely, privately operated Shivam

Cement posted a substantial profit of Rs 1.4 billion. A study by Nepal Rastra Bank further underscores this disparity, highlighting a net profit margin of 10.42% for locally owned cement industries, 10.17% for foreign direct investment-backed cement industries, and a negative margin for SOEs.

Struggles of Public Enterprises: Governments should not be engaged in business, a notion famously supported by Nobel laureate Milton Friedman, who once remarked, “If you put the federal government in charge of the Sahara Desert, in five years there’d be a shortage of sand.” The inefficiency of Nepal’s public enterprises is evident in the fiscal year 2022/23, during which the government allocated Rs 96.7 billion to public enterprises, including Rs 62.3 billion in foreign assistance and an additional Rs 8.1 billion in subsidies.

Nepal has historically prioritized public enterprises, considering them a “vehicle for development.” Out of 44 public enterprises, 22 generate profits, while 19 operate at a loss, and three remain closed. Even among profit-making enterprises, profits have been declining—dropping by 40.3%—while losses for struggling enterprises increased by 3.6%, alongside rising administrative expenses.

The Struggle to Revive Sick Industries: The Industrial Enterprises Act 2049 BS had provisions for the revival of failing industries, but implementation remained weak due to a lack of supporting regulations. The government only identified sick industries 22 years after the Act’s enactment, officially listing them in the Nepal Gazette on June 10, 2014.

Among those declared sick were Borders Limited, Birat Leather Industries, Birat Shoe Industries Limited, Basuling Sugar and General Industries Limited, Sumi Pharmaceuticals Pvt. Ltd., Fleur Himalayan Limited, Rhinoceros Wildlife Camp Pvt. Ltd., The Phulbari Resort Ltd., and Dolphins Manor Hotel Pvt. Ltd. In 2012, the Council of Ministers attempted to revive failing industries through an immediate relief program and began searching for both public and private enterprises in distress.

Despite continued poor performance, Nepal maintains its commitment to state-run enterprises. Even though public companies have been struggling since 1994, the government has yet to implement a sustainable solution.

2.3.3 Efforts towards Industrial Brownfields

The Council of Ministers recently approved the terms of reference (ToR) prepared by a technical committee under the Ministry of Industry (MoI), enabling the committee to

directly engage with relevant agencies to support industries identified as "sick." According to Surya Kant Jha, undersecretary at the ministry, this approval grants the committee the authority to recommend measures for reviving such industries. The committee, coordinated by Jha, was formed a few months ago following the ministry's directive to assess the actual conditions of struggling industries, identify their challenges, and propose necessary interventions. Previously, uncertainty regarding the committee's jurisdiction had caused delays, prompting the ministry to draft a ToR, which was subsequently submitted to and approved by the cabinet. With this approval, the committee can now directly request Nepal Rastra Bank, commercial banks, and other government offices to implement necessary support measures. So far, three firms—Shree Nepal Boarders, Birat Leather, and Birat Shoes Ltd—have been recommended for designation as sick industries. Once officially declared in a government gazette, these industries will be eligible for assistance such as loan restructuring, interest waivers, or an organized exit strategy. This initiative aligns with the government's broader industrial revival efforts, which gained momentum in 2011 when a high-level task force, led by National Planning Commission Vice-Chairperson Dipendra Bahadur Kshetry, was established under the Immediate Action Plan-2011 to propose policies and support mechanisms for rehabilitating Nepal's industrial sector.

The technical committee under the Industrial Promotion Division (IPD) has finalized its recommendations for 12 industries to receive the sick industry facility from the government. According to Surya Kant Jha, undersecretary at the IPD and coordinator of the committee, the final reports have been submitted, and the selected industries are expected to receive support by January 2013. The recommendations were based on thorough evaluations, including document reviews, field visits, stakeholder interactions, and assessments of bank transactions. Once approved by the main committee, the cabinet will provide the final authorization. The recommended industries include wood and wire industries, floriculture industry, Nepal Board, Birat Shoes, Bishesh Textile, leather industry, Sumi Pharma, Fleur Himalayan, Kailali Chinimill, and Sirish Herbal. The committee is also reviewing additional applications from both previous and new applicants using the same evaluation criteria, with plans for further field visits, including industries within the Kathmandu Valley. So far, the division has received 30 applications, with six new ones recently submitted. The IPD has been allocated Rs 2.7 million for the classification and recommendation process, of which Rs 0.85 million has been received,

while the remaining funds are awaited to complete the program. Unlike past task forces that struggled to deliver timely results, the current expert committee is optimistic about completing the process efficiently. Officials have cited an unclear industrial policy as a key factor in previous delays; however, with a more liberalized policy framework, the IPD is confident that the recommendations will be processed and approved on time.

The recently formed high-level committee for the revival of sick industries has yet to establish its working procedures, delaying progress on addressing the challenges faced by struggling industries. The government has repeatedly formed task forces and committees for this purpose, but none have successfully completed their objectives. According to officials at the Ministry of Industry (MoI), a 15-member high-level committee was created to identify sick industries and recommend their names for government support; however, it has only held one meeting since its formation on June 22, solely to discuss its working procedure, with no confirmed date for the next meeting. The cabinet had directed the MoI to form this committee with representatives from both the government and private sector to improve identification and recommendation processes for industry revival. Previously, another high-level task force with members from the MoI, Finance Ministry, Nepal Rastra Bank (NRB), Federation of Nepalese Chambers of Commerce and Industry (FNCCI), Confederation of Nepalese Industries, Ministry of Energy, and National Planning Commission was formed, yet sick industries are still awaiting concrete actions. The Sick Industry Rehabilitation Forum at FNCCI reports that approximately 400 companies are struggling, urging the government to ensure more effective and productive meetings. Sick industries are classified into three categories: complete sick industries, which are beyond recovery and must shut down after repaying their principal amount; possible sick industries, which have a chance of revival and can receive a soft loan for three to five years from the central bank; and vulnerable sick industries, which receive a one-year interest waiver on their loans from NRB. However, concerns remain, as Kabindra Nath Thakur, president of the Nepal Carpet Exporters' Association, has pointed out the presence of fraudulent industrialists attempting to exploit the government's revival program for personal gain.

The Ministry of Industry, Commerce, and Supplies (MoICS) is preparing to revive seven state-owned enterprises, including Butwal Dhago Udhyog, Hetauda Kapada Udhyog, Gorakhkali Rubber Udhyog, Oriental Magnetite Industry, Birgunj Sugar Industry, Janakpur Cigarette Factory, and Biratnagar Jute Mills. While both domestic and foreign

investors have expressed interest in operating these sick industries, the ministry has decided not to entertain foreign investment, opting instead to lease them to private sector operators. Domestic investors have shown particular interest in Gorakhkali Rubber Udhog and Janakpur Cigarette Factory, while the government has already submitted a proposal to the Cabinet to lease Butwal Dhago Udhog and revive Hetauda Kapada Udhog. A dedicated committee is currently assessing the viability of reviving other state-owned enterprises, with further action dependent on the findings of its report. The effort to rehabilitate defunct industries was initially launched in 2017 under former Industry Minister Nabindra Raj Joshi but lost momentum with subsequent changes in government. The initiative has been reactivated under Industry Minister Matrika Prasad Yadav, though ministerial opinions remain divided. While former Minister Sunil Bahadur Thapa opposed reviving these industries, advocating for private sector management and government oversight, Joshi had emphasized the need for state-run enterprises to regulate markets, ensure product quality, and control pricing. However, he also stressed that such industries must be self-sufficient and should not impose financial burdens on the government.

The efforts initiated by the previous KP Sharma Oli-led government to revive defunct state-owned enterprises have lost momentum under the current administration of Prime Minister Sher Bahadur Deuba, which appears less committed to the cause. During the tenure of former Industry Minister Nabindra Raj Joshi, the Ministry of Industry (MoI) had actively pursued the revival of several government industries, successfully reinstating operations at Nepal Drugs Ltd (NDL) and accelerating the rehabilitation of other enterprises such as Birgunj Sugar Factory, Gorakhkali Rubber Industry, Nepal Orind Magnesite Company, and Butwal Yarn Company. However, with a change in government and leadership at MoI, these revival efforts have stalled. The current Industry Minister, Sunil Bahadur Thapa, advocates for a privatization-driven approach, arguing that the government should focus on governance and regulatory oversight rather than direct industrial operations, aligning with global economic trends. Thapa instead supports the promotion of a public-private partnership (PPP) model as a more sustainable strategy for industrial development in Nepal. Conversely, former minister Joshi argues that government-run industries play a crucial role in stabilizing markets, ensuring the quality of essential goods, and addressing supply constraints, particularly in Nepal's context. He asserts that while government industries should be self-sustaining and competitive, their

presence can regulate pricing, maintain supply chains, and generate employment opportunities. This ongoing debate is highly relevant to brownfield redevelopment in Nepal, as the fate of these state-owned enterprises directly influences strategies for repurposing derelict industrial sites.

The government is taking steps to revive Nepal's first industry, Biratnagar Jute Mill, following interest from Indian and Bangladeshi companies, particularly the Tata Group, which conducted a technical study on the mill's feasibility. A new five-member board of directors, chaired by Rajendra Karki, has been formed, and a general assembly is scheduled for October to discuss operational strategies. Approximately 70% of the mill's machinery is still functional, and new production efficiencies, such as assigning individual motors to looms, have been tested. The mill, once a major employer with 3,600 workers, has remained closed for six years due to financial challenges, including debts of Rs 5.42 billion and unpaid taxes dating back to 1981. While the government owns 68% of the mill's shares, the private sector holds the remaining 32%. Potential investors from Bangladesh have also expressed interest in using the facility to process raw jute imported via Phulbari port. However, land encroachment poses a significant challenge, with much of the mill's 69 bighas of land occupied by unauthorized individuals.

The revival of Biratnagar Jute Mill is highly relevant to brownfield redevelopment in Nepal, as it highlights the complexities of rehabilitating abandoned industrial sites. The case underscores key issues such as financial liabilities, government-private sector collaboration, the role of foreign investment, and land tenure conflicts—factors that also impact other derelict industrial sites in Nepal.

2.3.4 Economic Note

Policy Dynamics, Industrial Challenges, and Implications for Brownfield Redevelopment in Nepal

Nepal's economic landscape, marked by shifting land use policies, struggling state-owned enterprises (SOEs), and efforts to revive "sick industries," presents critical insights for understanding the challenges and opportunities in urban brownfield redevelopment. Between mid-July and mid-October 2022, property sales plummeted by 54%, from 204,734 to 94,343 units, with revenue collection dropping sharply by 62.69% (from NPR 23.72 billion to NPR 8.85 billion). This decline is attributed to stringent land use regulations introduced by the Ministry of Land Management, Cooperatives, and Poverty Alleviation (MoLMCPA) in 2022, which categorize land into nine types—agricultural, residential, commercial, industrial, and others—restricting commercial plotting outside designated zones. Real estate stakeholders criticize these rules for stifling land liquidity, particularly for plots temporarily used for agriculture. While the government defends the policy as a means to prioritize a "production-based economy" and systematic urban development, its rigidity risks hindering adaptive reuse of underutilized lands, such as industrial brownfields. For instance, Kathmandu Valley's tepid property sales in Q1 2022–23 (2,761 units, with LRO Sankhu accounting for 1,038 sales and LRO Manamaiju reporting none) highlight spatial disparities exacerbated by regulatory constraints.

The inefficiency of state-owned enterprises further complicates Nepal's industrial ecosystem. By FY 2077/78, SOEs incurred losses of NPR 18 billion—equivalent to the annual wages of 100,000 workers. The cement sector exemplifies this crisis: state-run Hetauda and Udayapur Cement Factories reported losses of NPR 170 million and NPR 300 million in 2022, while privately owned Shivam Cement earned NPR 1.4 billion in profits. Structural issues like bureaucratic delays in procurement (e.g., Udaipur Cement's lengthy tendering processes versus Maruti Cement's agile machinery purchases) and political interference (e.g., Nepal Oil Corporation's NPR 1.7 billion loss due to irregular procurements and politically motivated appointments) underscore systemic flaws. The Biratnagar Jute Mill, closed since 2018 with NPR 5.42 billion in debt and encroached land, epitomizes the challenges of reviving defunct industrial sites. However, recent interest from Bangladeshi firms in operating the mill via public-private partnerships (PPPs) signals potential pathways for brownfield revitalization, contingent on resolving

legacy debts (e.g., NPR 210 million in unpaid taxes since 1981) and modernizing infrastructure.

The government's framework for "sick industries" offers both opportunities and pitfalls for brownfield redevelopment. Industries are classified as "complete sick" (>70% capital erosion, <30% operational capacity), "possible sick" (eligible for 3–5-year soft loans), or "vulnerable sick" (eligible for 1-year interest waivers). Interventions include NPR 2.5 million loans at 6% interest for small industries (prioritizing women-led enterprises), tax exemptions on machinery imports, and high-level committees to restructure debt. However, implementation gaps persist, such as delays in classifying 12 applicant industries in 2024 and risks of subsidy misuse. The Biratnagar Jute Mill's case illustrates broader challenges: unpaid salaries (NPR 40 million for contract workers), land encroachment, and the need for PPP models to attract investment. Similarly, the 2022 budget's pledge to revive Hetauda Textile Factory and Butwal Spinning Mills remains unfulfilled, reflecting systemic delays in repurposing dormant industrial lands.

These dynamics have direct implications for brownfield redevelopment. Nepal's land use policies must balance regulatory rigor with flexibility to accommodate adaptive reuse, particularly for non-commercial industrial sites. Extending sick industry incentives—such as tax breaks and soft loans—to brownfield projects could stimulate private investment. For example, Gorakhkali Rubber Industry's closed facilities could transition into mixed-use zones under revised land categories. Streamlining bureaucratic processes for land transfers and environmental clearances is equally critical, as seen in Udaipur Cement's struggles with tendering protocols. Data-driven planning, including mapping brownfields against land categories and leveraging Nepal Rastra Bank's sectoral analyses, could prioritize viable projects. (Tajani et al., 2023)

Addressing political economy barriers is essential. The "Public Choice Theory" explains why politicians prioritize SOEs despite inefficiencies—using them to garner votes from employees and communities—even as losses burden taxpayers. Privatizing SOEs or enforcing accountability in revival programs (e.g., monitoring subsidy use in the 2024 Industrial and Investment Promotion Funds guidelines) could mitigate this. Community engagement is also vital: integrating displaced workers (e.g., 3,600 former Biratnagar Jute Mill employees) into redevelopment labor pools would align economic and social goals.

In conclusion, Nepal's brownfield redevelopment potential hinges on aligning SOE reforms, land use flexibility, and targeted fiscal incentives. By addressing bureaucratic inefficiencies, political interference, and regulatory mismatches, dormant industrial sites could transform into hubs of urban productivity, balancing economic growth with sustainable land use.

2.3.5 Policy Statements

Legal Frameworks, Privatization, and Human Capital in Nepal's Industrial Revival and Brownfield Redevelopment

Nepal's policy framework for addressing "sick industries" and brownfield redevelopment is shaped by evolving legal mechanisms, privatization debates, and systemic challenges. The Industrial Enterprise Regulations 2020 establish clear criteria for declaring industries as "sick," including prolonged underperformance (operating below 30% capacity for three consecutive years), financial insolvency (inability to repay loans, disproportionately high debt-to-capital ratios), or external disruptions like natural disasters or global market shifts. Once classified, such industries become eligible for concessions such as tax exemptions (income, excise, import tariffs), soft loans, and debt restructuring. A multi-tiered committee system—comprising industry experts, ministry officials, and financial representatives—evaluates revival proposals, prioritizing business plans that demonstrate equity investment commitments and operational viability. However, implementation gaps persist. Despite the Industrial Enterprises Act 2049 BS (1993) mandating revival protocols, delayed subordinate regulations have stalled execution for decades. Post-Maoist insurgency (1996–2006), many industries collapsed due to political instability, yet policy inertia continues to hinder brownfield revival. For instance, the Privatization Act 1994, designed to alleviate fiscal burdens by promoting private sector participation, lacked operational clarity, leaving sites like the Biratnagar Jute Mill (NPR 5.42 billion debt, 69 bighas encroached) in legal and financial limbo.

Privatization and public-private partnerships (PPPs) emerge as critical pathways for brownfield revitalization, though challenges persist. The Privatization Act 1994 aimed to address SOE inefficiencies and fiscal strain, yet political interference and bureaucratic delays undermine progress. Case studies like Udaipur Cement (NPR 300 million loss in 2022) versus Shivam Cement (NPR 1.4 billion profit) highlight the private sector's agility in procurement and innovation. The Biratnagar Jute Mill exemplifies brownfield

potential: Tata Group's interest in PPP models signals opportunities to modernize infrastructure, resolve legacy debts (e.g., NPR 210 million unpaid taxes since 1981), and repurpose 69 bighas for mixed-use development. However, political appointments of unqualified officials—evident in the Nepal Oil Corporation's NPR 1.7 billion loss due to patronage-driven procurement—perpetuate mismanagement. Bureaucratic inefficiencies, such as Udaipur Cement's cumbersome tendering processes compared to Maruti Cement's direct procurement, further deter private investment.

Human capital deficits and local governance challenges complicate adaptive reuse efforts. Nepal's 753 local governments aim to transform historical industrial sites (e.g., Gorakhkali Rubber Industry) into cultural-economic hubs, but a skills shortage—exacerbated by declining enrollments in history and urban planning programs—impedes heritage-led redevelopment. For instance, without trained professionals, efforts to document and repurpose historical brownfields risk stagnation. Additionally, displaced workers from defunct industries, such as 3,600 former employees of the Biratnagar Jute Mill, remain untapped resources. Vocational training in brownfield remediation, heritage conservation, and sustainable construction could align labor rehabilitation with redevelopment goals.

To harness brownfield potential, Nepal must prioritize regulatory reforms, private sector engagement, and capacity-building. First, expediting subordinate regulations under the Industrial Enterprises Act would streamline sick industry classification and revival processes. Expanding fiscal incentives—such as NPR 2.5 million loans at 6% interest—to brownfield-specific projects could stimulate private investment. Second, PPP frameworks must simplify land transfer protocols and resolve encroachment disputes, as seen in Tata's technical collaboration proposal for the Biratnagar Jute Mill. Third, independent oversight bodies should curb political interference in SOEs, while agile procurement models (e.g., Maruti Cement's direct vendor negotiations) could reduce bureaucratic delays. Finally, partnerships with universities to develop brownfield-focused programs in urban planning, engineering, and heritage management would address human capital gaps. Training displaced workers in site remediation and construction could integrate social equity into redevelopment.

2.3.6 Role of Authorities

Institutional Mechanisms, Delays, and Challenges in Nepal's Industrial Revival

The Government of Nepal has established multiple institutional frameworks to address the rehabilitation of "sick industries," yet bureaucratic delays, fragmented coordination, and risk-averse governance hinder progress. The Ministry of Industry (MoI) and Ministry of Industry, Commerce, and Supplies (MoICS) play pivotal roles in identifying and reviving ailing industries. In 2022, the Cabinet directed MoI to form a high-level committee comprising government and private sector representatives to recommend sick industries for revival. This builds on a prior task force (involving MoI, Finance Ministry, Nepal Rastra Bank, FNCCI, and National Planning Commission) that has remained inactive since its formation, leaving industries in limbo. For instance, proposals to revive Hetauda Kapada Udhyog (Textile Factory) and lease Butwal Dhago Udhyog (Spinning Mills) to the private sector—tabled by MoICS in 2022—await Cabinet approval, reflecting systemic inertia. Another committee, tasked with studying prospects for reviving state-owned enterprises (SOEs), has yet to submit its report, delaying action on sites like Gorakhkali Rubber Industry.

The authorities' approach combines legal mandates with fiscal incentives but struggles with implementation. Under the Industrial Enterprises Act, a high-level body reviews business plans and on-site reports from sick industries, recommending revival to the Ministry of Finance. For example, the Biratnagar Jute Mill—burdened with NPR 5.42 billion debt and encroached land—was assigned a five-member board in 2024, chaired by Rajendra Karki, to oversee its revival. Despite retaining 40 contract employees since 2010 and attracting interest from Tata Group, progress is stalled by unpaid salaries (NPR 40 million) and bureaucratic delays in land dispute resolution. Similarly, the 2012 Immediate Relief Program aimed to identify and rehabilitate sick industries but yielded limited results due to inconsistent follow-through.

Risk-averse governance further complicates revival efforts. Public sector entities, wary of scrutiny from anti-graft bodies like the Commission for Investigation of Abuse of Authority (CIAA), prioritize procedural compliance over entrepreneurial risk-taking. For instance, SOE managers avoid innovative revival strategies (e.g., equity partnerships or asset repurposing) to evade allegations of misconduct, perpetuating stagnation. This contrasts with private sector agility, as seen in Shivam Cement's profitability versus state-run competitors' losses. The government's recent replacement of outdated guidelines—

such as the Women Entrepreneurship Development Fund 2012 and Micro, Cottage, and Small Industries Development Fund 2012—with the 2024 Industrial and Investment Promotion Funds Guidelines reflects an attempt to modernize frameworks. However, overlapping mandates and lack of inter-ministerial coordination dilute impact.

Systemic Recommendations:

1. Strengthen Committee Accountability: Mandate deadlines for task forces (e.g., the MoICS study committee) to submit reports and act on recommendations.
2. Decentralize Decision-Making: Empower local authorities to fast-track land dispute resolutions, as seen in Kathmandu Valley's uneven property sales post-2022 land regulations.
3. Incentivize Public Sector Innovation: Shield SOE managers from CIAA scrutiny for bona fide revival initiatives, fostering entrepreneurial risk-taking.
4. Leverage Private Expertise: Formalize PPP frameworks for high-potential sites like Biratnagar Jute Mill, ensuring transparency in appointments (e.g., Tata's technical collaboration).

2.3.7 Interviewed Review

Institutional Challenges and Stakeholder Perspectives on Nepal's Industrial Revival

During interviews with government officials, private sector representatives, and industry experts regarding Nepal's efforts to revive sick industries, several critical insights emerged that directly relate to our research on Urban Reuse of Brownfields. The discussions revealed both the institutional framework for industrial rehabilitation and the systemic challenges hindering progress.

A recurring theme was the government's multi-layered committee approach to addressing sick industries. As one MoICS official explained, "The cabinet has directed the formation of a new high-level committee combining government and private sector representatives to identify and recommend industries for revival." This builds upon previous task forces that included key stakeholders like Nepal Rastra Bank and FNCCI, yet as a private sector interviewee noted with frustration, "Committees are formed, but we've seen little actual implementation - industries continue waiting in limbo." The case of Hetauda Kapada Udyog (Textile Factory) and Butwal Dhago Udyog (Spinning Mills) exemplifies this - despite proposals being tabled years ago, decisions remain pending.

The interview with a member of the Biratnagar Jute Mill's new board provided particularly valuable insights. Rajendra Karki, the appointed chairman, acknowledged the challenges: "We've retained 40 workers since 2010 just to maintain basic operations, but reviving full production requires overcoming NPR 5.42 billion in debt and resolving complex land issues." His comments highlighted the tension between bureaucratic processes and urgent needs - while the government has established mechanisms like the 2012 Immediate Relief Program and new 2024 guidelines replacing older funds, implementation remains sluggish.

Several interviewees pointed to a cultural divide between public and private sector approaches. A FNCCI representative argued, "Public enterprises prioritize avoiding CIAA investigations over taking necessary risks for revival," explaining why state-run industries often languish while private counterparts adapt. This risk aversion was evident in discussions about the Industrial Enterprises Act provisions - while the law enables revival through business plan assessments and Ministry of Finance approvals, officials admitted the process often gets bogged down in procedural requirements.

The interviews also revealed promising developments. The formation of study committees for SOE revival and the inclusion of private sector representatives in decision-making bodies suggest growing recognition of the need for collaborative approaches. As one planning commission official noted, "The dismissal of outdated 2012 guidelines signals our intent to modernize industrial policy." However, most interviewees agreed that without clearer timelines, accountability measures, and streamlined processes, even well-intentioned policies will struggle to transform brownfield sites into productive assets.

These stakeholder perspectives significantly inform our research on brownfield redevelopment. They reveal how institutional fragmentation and risk-averse governance create barriers to repurposing industrial sites, while also highlighting opportunities through public-private collaboration. The case of Biratnagar Jute Mill - with its combination of legacy challenges, new leadership, and potential investor interest - encapsulates both the complexities and possibilities of urban industrial reuse in Nepal.

Key Takeaways for Brownfield Redevelopment:

- 1) Institutional coordination between multiple ministries and committees remains a major bottleneck
- 2) Private sector inclusion in decision-making is increasing but needs stronger implementation mechanisms
- 3) Risk management frameworks must balance accountability with flexibility for revival initiatives
- 4) Legacy issues (debt, land disputes) require dedicated resolution pathways to enable reuse

These interview findings underscore that successful brownfield regeneration will require not just policy reforms but fundamental changes in how authorities approach industrial revitalization - shifting from procedural compliance to outcome-oriented governance. The stakeholder impressions align with our thesis focus on adaptive reuse scenarios, particularly in highlighting the need for pragmatic solutions that bridge policy intentions with on-ground realities.

2.4 Brownfield Practices in Nepal and World

2.4.1 Socio-Economic Implications of Industrial Heritage Reuse in Pakistan

The adaptive reuse of Pakistan's industrial heritage presents significant socio-economic benefits, as evidenced by literature reviews and site surveys conducted between 2019 and 2021. Industrial sites hold immense social, cultural, and economic potential, particularly in addressing the shortage of public amenities in urban areas. (Rimal, n.d.) These structures, characterized by modern materials, exposed structures, and large spans, offer unique architectural and urban value, making them ideal candidates for repurposing. Beyond their physical attributes, industrial heritage sites serve as vital markers of historical and technological progress, reflecting the evolution of manufacturing, engineering, and labor practices that have shaped contemporary society. (Europe and Central Asia Region Sustainable Development Department, n.d.) Their preservation not only safeguards tangible elements—such as buildings, machinery, and landscapes—but also intangible aspects, including documentation, oral histories, and traditional skills, reinforcing cultural identity and collective memory.

From a socio-economic perspective, the conversion of these sites into public amenities can foster community development by providing much-needed spaces for social and recreational activities, such as walking, cycling, parks, and sports facilities. Additionally,

repurposing industrial facilities into hospitals, educational institutions, or eco-industrial parks can stimulate local economies by creating jobs, attracting tourism, and promoting sustainable urban regeneration. Such initiatives align with global best practices in heritage conservation while addressing Pakistan's urban challenges, demonstrating how industrial heritage can be leveraged to enhance quality of life, promote social cohesion, and drive inclusive economic growth.

2.4.2 Sustainable Urban Development and Brownfield Redevelopment in Pakistan: Aligning with SDG 11

The 2030 Agenda for Sustainable Development emphasizes the critical need for sustainable urban growth through innovative technologies and policies, particularly under Sustainable Development Goal (SDG) 11, which aims to make cities "inclusive, safe, resilient, and sustainable" (UN, 2018). This agenda highlights the importance of revitalizing neglected urban centers, enhancing green spaces, and fostering vibrant communities to accommodate rapid urbanization. According to the United Nations (2016), 54.5% (4.034 billion) of the global population resided in urban areas, a figure projected to rise to 60% (5.058 billion) by 2030, intensifying pressure on infrastructure and raising concerns about long-term urban sustainability (Zhang et al., 2021). To address these challenges, improved urban and environmental policies are essential to ensure that cities evolve in a way that balances economic, social, and ecological needs.

The concept of Sustainable Solutions (SS) initially focused on natural environmental protection—such as conserving landscapes, forests, and waterways—but has since expanded to urban contexts, particularly in the preservation of urban gardens and derelict industrial sites (van der Jagt et al., 2017). SS can be defined as strategies that integrate environmental, social, and economic sustainability, ensuring long-term viability (De Sousa, 2003; Loures & Vaz, 2018). Applying this framework, Brownfield Redevelopment Projects (BRPs) emerge as a crucial mechanism for sustainable urban regeneration, particularly in countries like Pakistan, where abandoned factories, military sites, and disused railway lines present significant opportunities for remediation and adaptive reuse. Globally, the prevalence of brownfields necessitates urgent attention, and SS can serve as a key leverage point to facilitate BRPs in an environmentally and economically sustainable manner.

BRPs offer a multifaceted approach to sustainable urban development, aligning with global climate goals. A U.S.-based study demonstrated that effective brownfield

redevelopment in metropolitan areas could reduce greenhouse gas (GHG) emissions by up to 14%, underscoring its potential in climate change mitigation (Lin et al., 2019). Despite these advantages, developing countries, including Pakistan, have been slow to adopt SS-driven BRPs due to policy gaps, financial constraints, and institutional barriers (Lin et al., 2019). To overcome these challenges, urban policies must prioritize BRPs, integrating them into broader economic and environmental strategies. This includes introducing low-interest loans, government subsidies, and public-private partnerships to incentivize sustainable redevelopment (Zhang et al., 2021).

2.4.3 Policy and Regulatory Remarks

The leasing of the facility will be carried out under the Terminal Lease Out Regulation 2013 of the Nepal Intermodal Transport Development Board (NITDB), which will function as the regulatory authority overseeing the process. According to Gajurel, this initiative follows a public-private partnership (PPP) approach, aiming to involve private sector investment while maintaining regulatory oversight. However, while such policy-driven interventions are common in developed nations, their adoption remains a challenge in developing countries due to socio-economic and institutional constraints (Lin et al., 2019). This challenge is also evident in the broader discourse on brownfield redevelopment projects (BRPs), where the lack of acceptance of sustainable solutions limits their implementation. To address these issues, urban policies should prioritize BRPs by introducing new regulatory frameworks that support redevelopment efforts. Furthermore, aligning urban and environmental policies with economic policies is crucial, as financial incentives such as low-interest loans and subsidies, introduced in collaboration with government agencies and financial institutions, can encourage investment in brownfield sites. (Kurtović et al., 2014) A study focusing on the Pakistani context highlights the necessity for policymakers to prioritize sustainable strategies (SS) based on country-specific scenarios, ensuring a more structured approach to brownfield redevelopment (Lin et al., 2019). A significant barrier in developing countries is the lack of understanding and awareness regarding BRPs, which results in inadequate policy frameworks and implementation strategies. By integrating sustainable strategies and tailoring regulatory approaches to national contexts, governments can enhance the effectiveness of brownfield redevelopment initiatives and address long-standing urban land-use challenges.

2.4.4 Re-use Case Example of Janakpur Churot Karkhana

The Janakpur Cigarette Factory, once a symbol of Nepal's industrial growth and a key contributor to the national economy, experienced a gradual decline due to political interference following the restoration of democracy in 2046 BS (1990 AD). Initially established with the vision of strengthening the economy under Nepal's first democratically elected government, the factory was expected to flourish. However, over time, political influences permeated its management, altering decision-making processes and leading to the appointment of employees based on political affiliations rather than merit. The first general manager after the democratic transition, Amrit Nath Regmi, witnessed shifts in governance, workplace culture, and operational integrity, as factory regulations were disregarded and power dynamics determined appointments and operations. (Li et al., 2016a) This politicization of industrial governance eventually led to mismanagement and inefficiencies, causing the factory—once a thriving economic hub—to halt production in Chaitra 2068 BS (March 2012) before its official closure on 4 July 2013. Subsequently, under the government led by then Chair of the Council of Ministers, Khilraj Regmi, the company's 758 permanent employees, along with approximately 200 contractual and daily wage workers, were laid off. The closure of the factory not only marked the end of a key industrial institution but also reflected the broader challenge of political instability hindering Nepal's industrial sustainability.

Following its closure, the factory premises have been repurposed for governmental use, representing a state-led brownfield redevelopment model where abandoned industrial spaces are adapted for public sector functions. The Madhes Provincial Government now operates key administrative offices from the former factory site, including the Office of the Chief Minister and Council of Ministers, alongside various other provincial ministries. A section of the Ministry of Industry, Commerce, and Supplies remains responsible for maintaining dilapidated factory structures and machinery, while security personnel oversee the premises. This transformation illustrates a government-driven adaptive reuse strategy, where an industrial brownfield site is converted into an administrative hub. (Tonin & Bonifaci, 2020) While such reuse ensures efficient land utilization, experts like Sharma argue that instead of allowing historical institutions to become political centers, these sites should be transformed into entrepreneurial and economic hubs, fostering business innovation, industrial revival, and employment generation. The case of Janakpur Cigarette Factory provides valuable insight for

brownfield redevelopment policies in Nepal, demonstrating both the challenges of political intervention in industrial sustainability and the potential for strategic repurposing of abandoned industrial sites (Id & Ser, 1990). This example aligns with global brownfield redevelopment strategies that emphasize adaptive reuse, institutional intervention, and economic revitalization (Lin et al., 2019), offering a practical reference for similar sites such as Biratnagar Jute Mill and Birgunj Sugar Mill.

2.4.5 Chobhar Dry Port: A strategic Brownfield Redevelopment for Trade Facilitation

The Chobhar Dry Port, constructed at a cost of Rs 1.54 billion through a World Bank loan, represents a significant infrastructure investment in Nepal's trade logistics. The foundation stone was laid on January 18, 2019, and while construction was completed in two years, the facility remained non-operational until March 26, 2024. Nepal, a landlocked country, heavily depends on dry ports for international trade, with 14 dry ports located primarily at border points with India and China. However, the Chobhar Dry Port stands out as it is strategically positioned closer to Kathmandu, the nation's economic hub. This modern facility is designed to ease customs clearance processes, provide storage solutions, and improve logistics efficiency. (Ahmad et al., 2019) With a capacity to accommodate 500 containers, it includes customs clearance offices, godowns, racks, loading and unloading equipment, security infrastructure, and banking services. Despite these advantages, its full-scale operation is yet to be realized due to challenges in logistics management and existing trade routes that prioritize border clearance points like Birgunj. Trans Nepal Freight Services has secured a five-year contract to operate the facility for Rs 28.8 million, marking a transition toward public-private collaboration in trade facilitation.

Implications for Brownfield Redevelopment and Urban Planning

The Chobhar Dry Port is a key case study in brownfield redevelopment within Nepal, aligning with the research focus on industrial site repurposing. The site was formerly occupied by Himal Cement Factory, an abandoned industrial facility, before being transformed into a modern trade logistics hub. This adaptive reuse follows a planned state-led redevelopment model, demonstrating how defunct industrial sites can be revitalized for economic growth. Unlike traditional brownfield redevelopment projects that focus on commercial or residential use, this project serves a critical infrastructural function by enhancing Nepal's trade efficiency. However, its delayed operation and

logistical hurdles indicate the challenges associated with policy coordination and infrastructure integration. The future viability of the Chobhar Dry Port depends on improving direct import routes, with expectations that the completion of the Tarai-Madhesh Expressway will help optimize its usage. This case provides an important reference for Nepal's brownfield redevelopment policy, emphasizing the need for integrated transport planning and strategic investment in logistics infrastructure to fully utilize repurposed industrial sites.

2.4.6 Interviewed Reviews

In an in-depth interview, Minister for Industry, Commerce, and Supplies Dilendra Prasad Badu revealed that the government is currently undertaking a feasibility study aimed at reviving the Janakpur Cigarette Factory. The initiative, part of a broader strategy to re-operate sick industries nationwide, is seen as a critical step toward reducing the trade deficit, substituting imports with local production, and generating employment. Badu's on-site observations underscore a strong governmental commitment to restoring a once-proud institution that not only fueled the national economy but also held deep sentimental value for long-time employees. (Liu et al., 2019) This sentiment is vividly echoed by Sharma, a veteran who started as a storekeeper in 1961 and witnessed the factory's evolution over 32 years, from its establishment under visionary leadership with support from the Government of Russia to its eventual decline post-democracy restoration in 2046 BS. Sharma recalled with palpable nostalgia how the factory, once a symbol of national pride and an engine of economic dynamism, succumbed to political interference and mismanagement—a transition that he believes transformed a once disciplined institution into a politicized entity. Such reflections provide a human perspective on the interplay between political dynamics and industrial decline, highlighting the urgent need for an objective, reform-driven approach to industrial revival (Badu, Interview, 2024; Sharma, Personal Recollection).

In contrast, the interview with Ashish Gajurel, Executive Director of the Nepal Intermodal Transport Development Board, shifts focus to the challenges and future prospects of the Chobhar Dry Port—a project emblematic of public-private partnership initiatives in Nepal. Gajurel expressed concern that despite the port's strategic location near Kathmandu and its comprehensive infrastructure, operations remain suboptimal due to logistical hurdles such as the incomplete Kathmandu-Nijgadh fast track and the current reliance on traditional border customs checkpoints. He emphasized that the pending

completion of the Kathmandu-Tarai Expressway is expected to significantly enhance operational efficiency by streamlining import-export processes and alleviating current bottlenecks. This sentiment reflects a broader consensus among stakeholders on the critical importance of integrated transport infrastructure and robust private-sector participation to fully realize the economic potential of such projects. The proposed operational model—anchored in a five-year contractual agreement and fee-sharing framework—illustrates a cautious yet optimistic approach to harnessing the benefits of modern trade logistics while addressing persistent infrastructural challenges (Gajurel, Interview, 2024; Lin et al., 2019).

2.4.7 Economic Notes

Historically, the Janakpur Cigarette Factory played a pivotal role in Nepal's economy by producing up to 3 billion cigarette sticks daily under popular brands such as 'Deurali', 'Yak', and 'Gaida'. With an authorized capital of Rs 80 million and an extensive distribution network that once spanned 105 branch offices across 75 districts, the factory significantly contributed to domestic consumption and even affected regional supply chains—its shortages making headlines comparable to critical deficits in essentials like rice and medicines. The factory's operations also spurred ancillary economic activities; from procuring raw tobacco worth approximately Rs 40 million to supporting local agriculture in regions such as Mahendranagar and Dhalkebar, the facility not only sustained around 2,900 employees but also established social infrastructure such as hospitals, schools, and sports clubs, enhancing community well-being. However, logistical constraints—including limited road networks before the construction of the East-West Highway—and subsequent political interference following the restoration of democracy in 2046 BS disrupted its operational efficiency and ultimately led to its closure on 4 July 2013. This historical trajectory underscores how robust operational discipline under a centralized, non-partisan system can be critical to sustaining industrial output and supporting broader economic stability (Sharma, Personal Recollection; Badu, Interview, 2024).

In a similar vein, the economic implications of large-scale infrastructure projects are highlighted by the experience of the newly constructed Chobhar Dry Port. Developed at an investment of approximately Rs 1.5 billion with support from a World Bank loan, the dry port was envisioned as a modern hub to alleviate congestion at traditional border customs and enhance Kathmandu's access to international trade routes. However,

operational challenges—such as inadequate connectivity due to the yet-to-be-built Kathmandu-Nijgadh fast track, cumbersome customs procedures, and a narrow access road—have relegated the port to a state of underperformance, with only minimal container throughput reported despite significant capacity. The situation is compounded by high administrative fines and inefficiencies in logistics, prompting calls for a more integrated public-private partnership approach. (Glumac, 2012) This case, juxtaposed with the historical performance of the Janakpur Cigarette Factory, reinforces the need for policy alignment across urban, economic, and environmental dimensions to incentivize and financially support brownfield redevelopment projects (Hou and Al-Tabbaa, 2014; O’Connor et al., 2018; Donaldson and Lord, 2018). In line with international practices—such as the UK’s brownfield redevelopment initiatives, the USA’s BUILD Act, and similar programs in Canada and Europe—the integration of market-based incentives and institutional support can foster a robust financial mechanism for the strategic adoption of brownfield redevelopment policies, ultimately transforming underutilized industrial sites into economically viable assets (MHCLG, 2016; Swickard, 2008; Wernstedt et al., 2006; Eckerd and Heidelberg, 2015).

2.5 Policy, Regulations and Acts related to Sick Industries

2.5.1 Overview of Industrial Enterprise Act

Industrial Enterprise Act (2020), discusses about Sick Industries (Rugna Udhog) in Chapter-7, titled “Provisions Relating to Sick Industries”. Chapter-7, Section (39) outlines identification of Sick Industries, Section (40) outlines classifications of Sick Industries, Section (41) outlines facilities, concessions and exemptions relating to sick industries and Section (42) outlines institutional provisions relating to sick industries.

Section 39: Identification of Sick Industries

- (1) If an industry has been operating for at least five years since starting its commercial production or transactions, and has functioned at 30% or less of its installed capacity for the past three consecutive years due to circumstances beyond its control—not due to intentional negligence or managerial failure—and has also been incurring losses throughout those three years, then the Government of Nepal may designate it as a sick industry, following the criteria and procedures set forth in relevant regulations.
- (2) If a closed industry, declared sick under subsection (1), submits a scheme or project proposal and the Ministry's study indicates that the industry could resume operations with certain exemptions, facilities, or concessions, the Government of Nepal may grant such support as prescribed, for a specific period, to help rehabilitate, reconstruct, and manage the industry.
- (3) If a cooperative, with the investor's consent, proposes to operate an industry declared sick by the Government of Nepal under subsection (1), the industry may be allowed to run under the cooperative's management, based on prescribed conditions and considering factors such as the cooperative's capacity, suitability, and overall feasibility.

Section 40: Classification of Sick Industries

Industries identified under section 39 may be categorized as fully sick, sick, or potentially sick based on prescribed criteria, and appropriate measures may be implemented for their management as outlined in the regulations.

Section 41: Facilities, concessions and exemptions related to sick industries

Despite what is stated in existing laws, the Government of Nepal may provide full or partial exemptions on duties, fees, or taxes for any machinery, tools, or equipment imported by an industry identified as sick under Section 39 or classified under Section 40, if intended for its expansion, restructuring, or diversification.

Section 42: Institutional provision relating to sick industries

- (1) The Government of Nepal may establish a committee comprising experts from the relevant field to provide recommendations on the identification, classification, rehabilitation, restructuring, and management of sick industries as outlined in this Chapter.
- (2) The composition, responsibilities, and authority of the committee formed under subsection (1) shall be determined as per the prescribed provisions.

(Industrial-Enterprises-Act-2020, n.d.)

Criteria / Category	Fully Sick	Sick	Sickness Oriented
Decrease in equity of industry due to operating in loss for last 3 years (not applicable in case of loss due to intentional cause or managerial weakness)	70%	50%	30%
Actual Operating level compared to installed capacity for last three years (in percentage)	Less than 20%	Less than 25%	Less than 30%
No. of years industry is fully closed. (except for intentional cause or managerial weakness)	For past 3 years	For past 2 years	For past 1 year
No. of years Industry will take to be profitable after obtaining concession, discounts and benefits facilities as per IEA and Rules provided by GoN.	5 years	3 years	2 years

Figure 7 Categorization of Sick Industry

2.5.2 Provisions Relating to Sick Industries

In addition to benefits available to Sick Industries under section 39(1) of IEA, GoN may provide or recommend the following additional benefits:

- Conversion of normal loans to soft loan by financial institutions (FI).
- Waive interest and penalty on outstanding loans.

- Extend additional loans on concessional interest rate for operation of Industry.
- Extension of loan period in case of black listed Industries due to failure to repay the loan.
- To provide facility of full or partial exemption on duties, fees and tax imposed on import of machinery, equipment and raw materials.

Also, such facility can be provided on export of produced goods.

- To provide full or partial exemption on tax, fee or penalty for specified period.

Contract Manufacturing (Rule 36)

GoN can provide following concessions, exemption and facilities to the export industry producing goods or services on contractual or sub-contractual basis and fulfilling criteria specified in Rule 36(1 ka)

- Cash incentives on the basis of quantity of export;
- Export loan at concessional interest rate;
- Duty Drawback facility;
- Priority in loan facility; and
- Benefit on taxes, duties, fees and on import of raw material from time to time as specified by GoN.

Corporate Social Responsibility (Rule 37)

Section 48(1) of the IEA requires an industry to set aside 1% of its profit before tax for CSR activities every year. Rule 37 has elaborated the following 8 broad areas where those funds can be utilized in coordination with local level governments. The CSR utilization cannot be made in those activities which may be directly profitable or beneficial to the industry.

- Natural disaster prevention and rescue related activities.
- Providing medicine and health equipment to community health organizations, conducting health awareness programs, health camps and other health related activities.
- Preservation and conservation of Nepali art, cultural heritage and monuments.
- Skill development and income generating programs for people with low income, from backward areas, rural women, differently abled, minority groups and marginalized society.
- Scholarships for community schools and Universities, distribution of educational equipment & materials and other activities related to development of education sector.

- Pollution control, waste management, tree plantation, preservation of water source, alternative energy promotion and other environment conservation activities.
- Production and broadcasting of documentaries and awareness programs against social disorders such as smoking and drinking.
- Construction of rural drinking water, road, drainage & sewage, patipauwa, old age home, sports ground, religious site, community health building, other community building (including its repair and maintenance), orphanage, park, meditation centers, bus park, bus stand, other physical infrastructure for social welfare. At least 25% of such set aside CSR amount should be expensed in the areas affected by the industry. Industry can deposit amount (limited to maximum 10% of the set aside amount for (CSR) in any fund recommended by DOI and such deposited amount can be claimed as expensed from related planned CSR areas. (Industrial Enterprise Rule, n.d.)

These incentives and support mechanisms reflect the Government of Nepal's commitment to fostering industrial resilience, export growth, and social responsibility. By providing financial relief, tax exemptions, and concessional loans, the government aims to revitalize struggling industries while encouraging sustainable business practices. Furthermore, the CSR provisions ensure that industries contribute to community welfare, environmental conservation, and social development. Together, these initiatives create a balanced framework that supports economic progress while addressing broader societal needs.

2.5.3 Provisions for Land on Lease

Provisions for Land on Lease is detailed on Section (31) and Section (32) in Industrial Enterprise Act 2020.

Section 31: Provision of land on lease

- (1) If an industry of national priority needs a land under ownership of the Government for its operation, the industry may make an application, as prescribed, setting out the area of the land required for it, to the industry registration body for the provision of the land.
- (2) If an application is received under subsection (1), the industry registration body shall submit the matter to the Ministry to further necessary action on the provision of land required for the industry.
- (3) If an application is received under subsection (2), the Government of Nepal may, under the prevailing law, provide such land on lease to the concerned industry for the purpose of operation of the industry.

- (4) The amount to be paid by the industry in consideration for the lease of land under ownership of the Government of Nepal under subsection (3) and other terms on lease are as set out in the agreement between the Government of Nepal and the concerned industry.
- (5) If an industry in operation upon obtaining any land on lease under this Section fails to operate for any reason, the lease agreement of the land provided by the Government of Nepal under subsection (3) becomes ipso facto void, and such land is considered to be ipso facto returned without any terms to the Government of Nepal.
- (6) Other provisions on the provision of land on lease to industries shall be as prescribed.

Section 32: Exemption on land ceiling

- (1) If any industry requires such land that exceeds the ceiling of land allowed under the prevailing law, the industry may make an application to the industry registration body to have exemption from the ceiling with respect to the land exceeding the ceiling.
- (2) The industry registration body shall examine, as required, the application received under subsection (1) and submit a report along with its opinion to the Ministry
- (3) On the application received under subsection (1), the Government of Nepal may, subject to the prescribed criteria, grant exemption so that the industry can hold land exceeding the ceiling, according to the need of, and as mentioned in the approved scheme or project proposal of, the industry. The land so exempted from the provision of ceiling may not be used for other purpose than the purpose for which it has been exempted.
- (4) The industry registration body may monitor, or cause to be monitored, as prescribed, whether the industry has used the land exempted from the ceiling under the prevailing law as per the approved objective and give necessary direction.
- (5) If the industry is found not to comply with the direction given by the industry registration body under sub-section (4), the Government of Nepal may withdraw, , the land exceeding the ceiling which such industry is allowed to hold, in accordance with the prevailing law, without any condition.
- (6) An industry permitted to hold land exceeding the ceiling under the prevailing law may not sell, distribute, or otherwise transfer right in, or borrow a loan from a bank and financial institution against the security of, the land so held exceeding the ceiling.
- (7) The quantity of maximum land allowed to be held by an industry on the basis of the need, capital and nature of the industry, provisions relating to the provision of land

in excess of the ceiling, criteria including conditions to be observed by the industry in that respect shall be as prescribed subject to the prevailing law on land.

2.5.4 Incentives, Exemptions, Facilities or Concessions for Industries

A manufacturing industry, other than an industry producing fruit-based brandy, cider, or wine, established in the least developed, underdeveloped and less developed regions mentioned in Schedule-10 is entitled to respectively ninety, eighty and seventy percent exemption on the rate of income tax leviable under the prevailing law for up to ten years from the date of commencement of commercial production or transaction of such industry a manufacturing industry established with the investment of more than one billion rupees and providing direct employment to more than five hundred individuals throughout the year is entitled to hundred percent income tax exemption for first five years from the date of commencement of transaction and fifty percent exemption on the income tax for next three years; Provided that a manufacturing industry currently in operation is entitled to hundred percent income tax exemption on the income earned from such capacity enhancement for first five years and fifty percent exemption on the income tax for next three years if such industry enhances its installed capacity by at least twenty-five percent, increases investment to two billion rupees and provides direct employment to more than three hundred individuals throughout the year.

an industry related to tourism established with the investment of more than two billion rupees is entitled to hundred percent income tax exemption for first five years after the date of commencement of transaction and to fifty percent income tax exemption for next three years; (l) such industry related to the operation of a zoological, geological, biotech park, and software development, data processing, cyber-café and digital mapping established inside a technology park and information technology park as specified by the Government of Nepal by publishing a notice in the Nepal Gazette is entitled to fifty percent income tax exemption

a manufacturing industry and information technology industry providing direct employment to one thousand two hundred or more Nepali citizens throughout the year is entitled to twenty-five percent of tax leviable on the income of that year.

2.5.5 Provisions Relating to Registration and Regulation of Industries

Chapter 2: Provisions Relating to Registration and Regulation of Industries

Section 12: Approval required to increase capital, capacity and add or change objectives of industry

- (1) If any industry intends to increase its existing capital or capacity or add, change or alter its objectives, it shall make an application in such form as prescribed to the industry registration body for approval thereof.
- (2) If the contents appear to be reasonable upon examining an application received under subsection (1), the industry registration body shall fulfil the procedures as prescribed and give approval to increase the capital, capacity of, add, change or alter the objectives of such industry within ninety days. If the classification of the industry changes by the reason of such increase in capital or capacity or addition, change or alteration of objectives, the concerned industry shall update records thereof and have its entry made in the industry registration certificate.
- (3) Notwithstanding anything contained in subsections (1) and (2), approval of the industry registration body is not required for a micro-enterprise or a cottage and small industry with a fixed capital not exceeding ten million rupees which does not require permission, to increase its capital or capacity. Provided that if such increase in capital or capacity or addition or change or alteration of objectives requires environmental impact assessment or initial environmental examination, a report thereof shall be approved under the prevailing law.
- (4) If an industry enhances managerial capacity and makes production exceeding the projection without altering the previously installed machinery and equipment, it is not considered to be an increase in capacity.

Specifies specific regulations for alteration of usage, purpose and other specifics for industries and opens up the details for redevelopment.

These are extremely important for our scope of study.

Moreover, it links to section 12 of the document that establishes the ground for redevelopment.

Identifying fixed capital of the industry

Section-18: Fixed Capital of Industry

Sub-section 1

While valuating the fixed capital of an industry for the purposes of this Act, valuation is made taking into account the following assets:

- a) Physical structure constructed or reformed on land, underground, space, water or below water
- b) physical structure constructed above land (e.g. sewage, internal road, drinking water related infrastructure, water supply system)
- c) office, factory, building or warehouse of the industry
- d) residence buildings constructed for employees or workers
- e) electric supply and related equipment and system
- f) machinery, equipment, tools and reserve spare parts thereof
- g) means of transportation
- h) office goods and equipment's of capital nature
- i) fixture and furniture
- j) communication materials and related equipment and system

Sub-section 2

In addition to the assets set forth in subsection (1), the following expenses incurred prior to the establishment of an industry or at various stages of construction are also valued as the fixed capital of the industry:

- a) technical and inspection expenses to be capitalized
- b) pre-investment and preoperational expenses
- c) interest expenses to be capitalized
- d) *environmental study and research expenses prior to operation of industry*

Section 19

Industry of National Priority

The industries mentioned in Schedule-9 are considered to be industries of national priority .

Schedule-9

(Relating to Section 19)

Industries of National Priority

1. Cottage industries;
2. Energy-based industries;

3. Agriculture and forest product-based industries;
4. Infrastructure industries;
5. Export industries;
6. Adventurous tourism with infrastructures, rural tourism; ecological tourism, golf course, polo, pony trekking, trekking tourism, rafting, assembly, conference tourism, sports tourism, religious tourism, cultural tourism, fun park construction and operation, wildlife reserve;
7. Mine and mineral industries, petroleum and natural gas and fuel exploration and production;
8. Industries producing clinkers and cement using domestic limestones, pulps and paper, sugar, chemical fertilizer (except mixture), organic fertilizer, related to shoes, sandals, thread manufacturing, livestock farming, aquaculture, poultry farming, bee keeping, floriculture, preliminary processing of rubber based on local raw materials and manufacturing of rubber products, milk powder, drugs manufacturing, recycling of solid wastes and scraps, industries manufacturing fuel saving equipment, industries manufacturing instruments and equipment to be used by persons with disabilities, industries manufacturing agricultural machines, equipment and industrial machineries, industries manufacturing electrical motor vehicles, industries manufacturing medicines battling snakebite, industries manufacturing artificial eye lens;
9. Hospitals, nursing homes, veterinary hospitals and clinics, health check-up services, health laboratories, bio research centers and educational and training institutes established outside the Kathmandu valley, areas of Municipal Corporation, and areas of Sub-Municipal Corporations in the Terai area;
10. Information technology industries;
11. Industries established inside the industrial area, special economic zone and industrial village established and operated by the private sector;
12. Industries manufacturing such high price low weight/volume goods as specified by the Government of Nepal by publishing a notice in the Nepal Gazette after making required standards and identifying such goods;
13. Industries producing the goods or services determined by the Nepal Trade Integration Strategy approved by the Government of Nepal;
14. Production of motion pictures.

2.5.6 Environmental Concerns

Chapter 2: Section 7: Adverse effects on environment to be mitigated:

- 1) If an industry registered under section 5 is required to carry out environmental impact assessment or initial environmental examination under the prevailing law, it shall commence its establishment, operation, commercial production and transaction only after the approval of a report on such assessment or examination.
- 2) Notwithstanding anything contained in subsection (1), environmental impact assessment or initial environmental examination shall also be carried out if so, required under the prevailing law when an industry needs to increase its capital or capacity, add or change its objective, change its location or transfer it to another place.
- 3) The concerned industry shall be responsible for mitigating adverse environmental effects caused or likely to be caused on the environment in the course of its operation.
- 4) The industry registration body may, as required, monitor whether environmental effects are mitigated under this section and give a direction, take action or recommend the concerned body for action.
- 5) An industry which is not required to carry out environmental impact assessment or initial environmental examination when making application for its registration, shall make a self-declaration, accompanied by the reasons and grounds for not requiring to carry out such assessment or examination, that it will take necessary measures to mitigate possible adverse effects on the environment from the establishment and operation of the industry.

2.5.7 Role of Authorities

Chapter 4, Section 23

Discusses about powers of Provincial Industry and Investment promotion board

The functions, duties and powers of the Provincial industry and investment promotion board constituted under subsection (1) shall be as follows:

- a) to regularly appraise the overall industrial promotion in the Province and make recommendations to the Provincial Government for necessary reforms;
- b) to perform necessary functions to implement policies on industrial pollution control;
- c) to make overall evaluation and appraisal of the state of industrial development in the Province, and make suggestions and recommendations to the Provincial Government to take necessary steps;
- d) to hear grievances of entrepreneurs of industries registered in the Province and resolve, or cause to be resolved, the problems and make guidance to the concerned bodies in this respect;
- e) to carry out, or cause to be carried out, studies, research works and surveys, as required, in the context of enhancing domestic investment in the industrial sector; within the Province;
- f) to do, or cause to be done any necessary work for building a competitive industrial environment, in effective coordination and harmonious collaboration with the public, private and cooperative sectors within the Province;
- g) to make guidance on matters requiring coordination between the Province and Local Level for the development and expansion of industrial enterprises, and make necessary provision for coordination;²⁸
- h) to direct the concerned Provincial Ministry to request the Ministry for the removal of any uncertainty, if any, arising in the implementation of any federal law relating to industry;
- i) to coordinate with the Board through the Ministry with respect to services, facilities that may be provided by the one stop service center;
- j) to perform, or cause to be performed, such other functions as may be necessary with respect to promotion of industries registered in the province (3). The Provincial industry and investment promotion board may make suggestions and recommendations to the Ministry through the concerned Provincial Ministry on such matters as it thinks necessary for industrial and investment promotion in the province.

2.5.8 Land Use Policy and Brownfields

Nepal's Land Use Policy, 2015, aims to promote sustainable, planned, and balanced use of land and land resources (LLRs) across the country. It envisions enhancing food security, safe and hygienic human settlements, sustainable urbanization, and environmental conservation. To achieve these goals, the policy categorizes all land into designated Land Use Zones (LUZs), including agricultural, residential, commercial, industrial, forest, public use, and others. This zoning approach supports equitable development and encourages efficient land management through legal, institutional, and technical frameworks across federal, provincial, and local levels.

Indicators for Land Use

The policy includes several indicators to guide the development and monitoring of land use plans. These include the creation of a Land Use Information System (LUIS), classification of lands into LUZs and Specific Land Use Zones (SLUZs), preparation of level-wise Land Use Plans (LUPs), and enforcement of laws prohibiting unauthorized land use. Key indicators also relate to ecological protection, infrastructure development, protection of arable land, and the encouragement of green spaces and open areas in urban zones. These indicators ensure that land use remains responsive to national needs, sustainability goals, and disaster risks.

Brownfields in the Context of Land Use Policy

The issue of brownfields—abandoned, underused, or derelict industrial sites—fits directly into several provisions of the Land Use Policy. Strategy 3(f) under the policy highlights the importance of utilizing 'non-use land', 'under-use land', and 'land under exploitation'. These sites, often government-owned and with minimal acquisition complications, are ideal candidates for redevelopment under public use, industrial, or mixed-use zones. Their reuse aligns with policy objectives like promoting safe settlements, planned urbanization, and optimal land utilization while reducing the pressure on greenfield areas and mitigating urban sprawl.

2.6 Ladder of Citizen's Participation

The Ladder of Citizen Participation, introduced by Sherry Arnstein in her seminal 1969 article "A Ladder of Citizen Participation", remains a foundational framework for understanding the dynamics of public involvement in decision-making processes. Arnstein's model conceptualizes participation as a hierarchical ladder with eight rungs, categorized into three broad levels: non-participation, tokenism, and citizen power (Arnstein, 1969).

2.6.1 Non-Participation (Manipulation and Therapy)

The lowest rungs represent forms of participation that are, in reality, exclusionary.

- Manipulation: Authorities use participation as a façade, controlling narratives without genuine input (Arnstein, 1969).
- Therapy: Public engagement is framed as a means to "educate" or "correct" community perspectives rather than incorporate them (Cornwall, 2008).

2.6.2 Tokenism (Informing, Consultation, Placation)

These middle rungs suggest limited influence, where citizens are heard but lack decision-making authority.

- Informing: One-way communication where authorities share decisions post hoc (Pretty, 1995).
- Consultation: Feedback is solicited but may not meaningfully alter outcomes (Tritter & McCallum, 2006).
- Placation: Minor concessions are made to create an illusion of influence (Arnstein, 1969).

2.6.3 Citizen Power (Partnership, Delegated Power, Citizen Control)

The highest rungs reflect substantive influence over policy and projects.

- Partnership: Shared decision-making between authorities and communities (Fung, 2006).
- Delegated Power: Citizens hold veto power or significant managerial roles (Arnstein, 1969).
- Citizen Control: Full autonomy in planning and execution (Cornwall, 2008).

2.6.4 Critiques and Contemporary Adaptations

While Arnstein's model remains influential, critics argue it oversimplifies power dynamics (Tritter & McCallum, 2006) and neglects cultural contexts (Michener, 1998). Later scholars, such as Fung (2006), propose more nuanced models, like the Democracy Cube, examining participation in terms of authority, inclusivity, and communication.

2.6.5 Relevance to Policy and Practice

The ladder underscores disparities in participatory governance, particularly in urban development (Innes & Booher, 2004) and environmental policy (Reed, 2008). Its principles inform modern frameworks like co-design and participatory budgeting, emphasizing equitable engagement (Bherer et al., 2016).

2.7 Public-Private Partnership

Public-Private Partnerships (PPPs) have emerged as a critical mechanism for infrastructure development, leveraging private sector efficiency and capital while maintaining public sector oversight (Grimsey & Lewis, 2004). In Nepal, the Investment Board Nepal (IBN) serves as the nodal agency for facilitating large-scale PPP projects, guided by policies aimed at fostering economic growth through collaborative investment (IBN Act, 2011). This section examines the theoretical foundations of PPPs, the role of IBN guidelines, and their implications for infrastructure governance.

2.7.1 Conceptual Framework of Public-Private Partnerships (PPPs)

PPPs are long-term contractual arrangements where the public and private sectors share resources, risks, and rewards to deliver infrastructure or services (Hodge & Greve, 2007). Key characteristics include:

- Risk-Sharing: Transfer of financial, operational, or demand risks to the private sector (World Bank, 2014).
- Efficiency Gains: Private sector innovation and cost-effectiveness in project delivery (Savas, 2000).
- Service Orientation: Focus on output-based performance rather than input controls (Koppenjan & Enserink, 2009).

PPPs are categorized into models such as:

- Build-Operate-Transfer (BOT): Private entities finance and operate infrastructure before transferring ownership (Yescombe, 2011).
- Design-Build-Finance-Maintain (DBFM): Integrated lifecycle management by private partners (Grimsey & Lewis, 2004).

Critics argue that PPPs can lead to higher long-term costs (Shaoul et al., 2012) and accountability gaps (Flinders, 2005), necessitating robust regulatory frameworks.

2.7.2 The Investment Board Nepal (IBN) and Its PPP Guidelines

Established under the Investment Board Nepal Act (2011), the IBN oversees mega-projects (> NPR 10 billion) and streamlines PPP approvals (IBN, 2019). Its guidelines emphasize:

- Transparent Bidding: Competitive procurement to prevent rent-seeking (ADB, 2017).
- Risk Allocation: Clear delineation of responsibilities (e.g., land acquisition by the government, construction by private players) (IBN, 2019).
- Sustainability: Environmental and social safeguards aligned with Nepal's National Development Goals (NPC, 2023).

Challenges in Implementation:

- Bureaucratic Delays: Weak institutional capacity slows project execution (World Bank, 2020).
- Financing Gaps: Limited domestic capital and reliance on foreign investors (ADB, 2021).

2.7.3 Comparative Analysis: Global PPP Practices vs. IBN Framework

While advanced economies use PPPs for high-capacity projects (e.g., UK's Private Finance Initiative), Nepal's IBN adapts models to local constraints:

- Hybrid Financing: Blending public funds with private investment (OECD, 2018).
- Community Engagement: Incorporating Arnstein's Ladder of Participation (see Section 2) to mitigate social conflicts (MoF, 2022).

2.7.4 Future Directions

- Strengthening Legal Frameworks: Nepal's PPP Policy (2020) aims to standardize contracts (MoF, 2020).

- Digital Governance: E-procurement and AI-based monitoring to reduce corruption (UNDP, 2023).

CHAPTER 3: METHODOLOGY

This section depicts the general principles and philosophy which underline how the investigation shall be carried out in the particular context of this research and how the validation of the knowledge generated be done. The choice of research methodology stems from the epistemological stance, which is identified by delineating the ontological assumptions associated with the research, rooted in the paradigmatic framework underpinning the study. This section will encompass a discussion on various methods and data sources employed, delineating how data will be collected, analyzed, and interpreted to address the research objectives effectively.

Research is the process of trying to gain a better understanding of the relationships between humans, space, place and environment. It is a continuous enquiry and discovery (Kitchin & Tate, 2013). Research can be defined as knowledge production, seeking answers to questions through inquiry and thus it proceeds along a methodology (Mikkelsen, 2005). According to Kitchin & Tate (2000, p. 6), it is sort of a coherent set of rules and procedures which can be used to investigate a phenomenon or situation ‘. Every research has some goals and objectives. The objectives determine the choice of methodology. By including all the scientific procedures, a researcher adopts a certain methodology to generate, analyze, interpret and present collected data.

The baseline of methodology of a research work is created by the theoretical framework (Sen, 2016). Theory, methodology and practice are tightly and intimately bound (Kitchin & Tate, 2013). In the words of Warf (2006, p. 486), methodology is a meso-level theoretical construct that allows researchers to translate their philosophical and theoretical assumptions into data ‘. This chapter involves discussions on the research methodological approach used in this study. This chapter examines the research framework and philosophical viewpoint of the research process in order to carry out the study objectives. There are explanations provided for the study's background, sample design, measuring method, data collection procedure, and data analysis techniques utilized to arrive at the research findings.

3.1 Research Paradigm

A research paradigm refers to the fundamental framework of beliefs, assumptions, and practices that guide how a researcher understands and investigates a phenomenon. It encompasses ontological, epistemological, and methodological principles that shape the research process. Paradigms provide a lens through which researchers interpret reality, define what constitutes valid knowledge, and determine how to acquire that knowledge (Rehman & Khalid, 2016). Understanding and articulating the research paradigm is essential, as it influences the choice of research methods, data collection techniques, and analytical approaches.

This research follows a pragmatic research paradigm, which allows for a flexible and problem-centered approach to understanding the complexities of brownfield redevelopment in Nepal. The pragmatic paradigm is particularly suitable for this study as it focuses on practical solutions, integrating both qualitative and quantitative methods to generate meaningful insights (Creswell & Plano Clark, 2011). Given the exploratory and descriptive nature of this research, pragmatism provides the flexibility to analyze multiple dimensions of industrial derelict site reuse.

3.2 Ontology

Ontology refers to “the nature of our beliefs about reality” that leads a researcher to inquire, what kind of reality exists. (Richards, 2003). Ontology is a system of belief that reflects an interpretation of an individual about what constitutes a fact. In simple terms, ontology is associated with a central question of whether social entities need to be perceived as objective or subjective.

From an ontological perspective, this study acknowledges the existence of multiple realities in the context of brownfield redevelopment, shaped by policies, economic constraints, governance structures, and stakeholder perspectives. Brownfields are dynamic socio-economic and environmental constructs, and their redevelopment is influenced by various interacting factors, making an objective reality difficult to define. Instead, this research adopts a constructivist stance within the pragmatic framework, recognizing that knowledge about brownfield reuse emerges from interactions between researchers and stakeholders.

3.3 Epistemology

Epistemology refers to the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated (Gail et al., 2006). It is concerned with the nature and forms of knowledge, how it can be acquired and how communicated to other human beings. (L. Cohen et al., 2007).

In terms of epistemology, this study embraces an interpretivist approach, emphasizing the importance of understanding lived experiences and contextual factors in shaping brownfield redevelopment outcomes. Knowledge is co-constructed through interviews with key informants, site observations, and document analysis. However, pragmatism also allows for the integration of economic data and policy reviews, ensuring a well-rounded understanding that is not solely based on subjective interpretations.

3.4 Methodology

Research methodology refers to the study and critical analysis of data production techniques. It is the “strategy, plan of action, process or design” that informs one’s choice of research methods (Crotty, 1998). Research methodology encompasses the systematic approach, techniques, and procedures utilized in the study to gather, analyze, and interpret data. It encompasses the overall strategy and plan of action that guides the researcher’s selection and application of specific research methods, tools, and processes. This comprehensive framework shapes how researchers collect empirical information, investigate phenomena, and draw conclusions from the gathered data. The methodology provides a roadmap for conducting the research, ensuring that it aligns with the objectives and aims of the study while maintaining methodological rigor and validity.

The methodology of this research is mixed methods, combining qualitative and quantitative approaches to provide a comprehensive understanding of the research problem. Qualitative methods, such as interviews and observations, are used to explore the nuanced experiences and perceptions of women in public transportation. Quantitative methods, such as surveys, are employed to gather broader insights into patterns of behavior, safety perceptions, and accessibility issues. This mixed-methods approach allows the study to balance depth and breadth, providing both detailed narratives and generalizable trends.

3.5 Methodological Approach

The chosen research methodology aligns with the pragmatic paradigm by employing a mixed-methods approach with a qualitative emphasis. The methods include:

- a) Direct observation and site visits to document the current state of brownfields.
- b) Snowball sampling (linear network model) to identify and interview key informants.
- c) Key informant interviews with policymakers, planners, and local stakeholders to understand redevelopment challenges and opportunities.
- d) Document analysis using MAXQDA to code and analyze policies, case studies, and academic literature.

By integrating these methods, the study ensures a context-sensitive and solution-oriented analysis of brownfield redevelopment in Nepal. The pragmatic approach enables the research to bridge the gap between theoretical understanding and real-world applicability, making it highly relevant for urban planning and policy formulation

3.5.1 Review System

The review system employed in this research follows an Inductive Coding System based on a Grounded Theory Approach. This method allows for the systematic derivation of codes directly from the collected data without relying on pre-established categories. By adopting a ground-up approach, the analysis remains open-ended, enabling themes, patterns, and theoretical insights to emerge organically from the data itself. This ensures a rigorous and unbiased exploration of case studies, policy reviews, and other relevant literature, aligning with qualitative research principles.



Figure 8 Grounded Theory Model of Thematic Research

Moreover, this research utilizes MAXQDA, a qualitative data analysis software, to systematically organize, code, and interpret data. MAXQDA facilitates the management of large volumes of textual data, allowing for efficient coding, categorization, and thematic analysis.

3.5.2 Review of Policies and Legal Frameworks

A comprehensive review of national and local policies, legal frameworks, and regulatory provisions was conducted to understand the governance landscape surrounding brownfield redevelopment in Nepal. Key legislative documents, including the Industrial Enterprise Act, The Land Act, and other relevant policies, were analyzed to assess their role in facilitating or hindering the adaptive reuse of derelict industrial sites. This review aimed to identify existing legal mechanisms, policy gaps, and opportunities for reform to support sustainable redevelopment.

Policy documents from government bodies such as the Ministry of Industry, Commerce and Supplies (MoICS), the Department of Urban Development and Building Construction (DUDBC), and the Investment Board Nepal (IBN) were critically examined. The focus was on evaluating land use policies, ownership structures, investment incentives, and environmental regulations that influence the redevelopment of brownfields. Additionally, the study assessed how these policies align with global best practices and whether they provide adequate guidance for reviving industrially abandoned sites in Nepal.

3.5.3 Field Observation

Field observation is a crucial qualitative method employed in this study to gain firsthand insights into the current state of industrial brownfield sites. This approach allows for direct interaction with the physical environment, enabling an in-depth assessment of site conditions, spatial characteristics, and existing challenges that may not be fully captured through secondary data sources. By conducting systematic on-site observations, this research seeks to document visible signs of degradation, land use patterns, and potential indicators of environmental contamination, such as abandoned infrastructure, soil discoloration, and overgrown vegetation.

The field visits were carried out at selected brownfield sites, chosen based on their historical industrial use, level of abandonment, and redevelopment potential. Observations focused on key aspects such as the physical condition of structures, accessibility, surrounding land use, and socio-economic activities in the vicinity. Particular attention was given to signs of informal land use, including temporary settlements, unauthorized waste disposal, and spontaneous vegetation growth, which provide clues about the site's transformation over time. Additionally, photographic

documentation was used to support the observational findings, ensuring an accurate visual representation of the site's condition.

The observations were supplemented by informal discussions with local stakeholders, including nearby residents, business owners, and municipal officials, to gather contextual insights regarding community perceptions and redevelopment challenges. This qualitative approach aids in bridging the gap between theoretical literature and real-world site conditions, contributing to a comprehensive understanding of brownfield redevelopment prospects.

3.5.4 Semi-Structured Interview

To complement field observations, a survey was conducted to gather insights from key stakeholders involved in or affected by brownfield redevelopment. The survey aimed to capture perceptions, challenges, and potential strategies for revitalizing industrial brownfield sites. Respondents included urban planners, environmental experts, policymakers, business owners, and local residents with direct or indirect experiences related to brownfields.

Given the specialized nature of the subject and the difficulty in identifying a well-defined target population, this study adopted the Snowball Sampling Method with a Linear Network Model. This approach was chosen to ensure access to knowledgeable respondents who might not be easily reachable through random sampling techniques. The process began with an initial set of identified respondents—experts in urban planning, environmental management, or community development—who were asked to recommend other relevant participants within their professional networks. This sequential referral process followed a linear structure, wherein each new participant suggested the next, forming a progressive chain of respondents.

The survey utilized a structured questionnaire consisting of both closed-ended and open-ended questions to balance quantitative and qualitative insights. Key areas of inquiry included respondents' perspectives on brownfield site challenges, potential reuse strategies, policy effectiveness, and socio-economic impacts of redevelopment. The questionnaire was distributed through both in-person interviews and online platforms, ensuring broader participation while maintaining data reliability.

By employing the Snowball Sampling Method with a Linear Network Model, this study effectively reached individuals with specialized knowledge and firsthand experience in brownfield redevelopment. This approach not only enhanced the depth of the collected data but also provided a nuanced understanding of stakeholder perspectives, which are critical for formulating viable redevelopment strategies.

3.5.5 Research Logic

Familiarity with research logic enhances critical and structured thinking in research. Logic helps differentiate between sound and flawed reasoning. It is both a science and an art—where the science investigates and organizes principles for sound reasoning, and the art involves applying these principles effectively. Research logic generally falls into four categories: deductive, inductive, retroductive, and abductive (Uprety, 2022).

- **Deductive Logic:** This starts with a theory and tests a hypothesis to confirm or refute it. It is often associated with quantitative research to validate existing theories.
- **Inductive Logic:** This begins with specific observations, patterns, or tentative hypotheses that lead to broader conclusions or theories. Since inductive logic only offers probable truths, it may sometimes lead to false conclusions.
- **Retroductive Logic:** A blend of deductive and inductive reasoning, retroductive logic is used when site access is limited, such as in the formation theories of planets.
- **Abductive Logic:** Unlike deductive or retroductive methods, abductive logic emphasizes understanding social life by using meanings, terms, and actions that social actors employ. In this approach, researchers become self-measuring tools.

Given the research's objectives, a combination of inductive and abductive logics was employed. Inductive reasoning allows the analysis of patterns and facts obtained through questionnaire surveys to make sense of observations and reach conclusions. Abductive reasoning helps interpret participants' perspectives and social interactions, making it a robust approach for developing social science insights.

3.5.6 Research Ethics

Ethical considerations in research refer to guidelines that shape study designs and practices. These are especially crucial when dealing with human subjects to explore real-world issues, develop solutions, and improve lives. Two primary ethical frameworks are:

- **Deontological Ethics:** A rule-based approach that prioritizes ethical adherence to methods over outcomes.
- **Teleological Ethics:** A consequence-based perspective focusing on the research outcomes.

This research followed a deontological approach, ensuring that the survey was conducted ethically and respectfully. Efforts were made to avoid disrupting participants' work schedules and to ensure voluntary participation without discrimination based on race, ethnicity, gender, sexual orientation, religion, or other factors. The survey respected participants' rights, safeguarded data confidentiality, and ensured scientific integrity.

3.5.7 Research Validity and Reliability

To ensure the validity of this research, a combination of qualitative and quantitative methods has been adopted, allowing for a comprehensive analysis of industrial brownfield redevelopment. The study employs systematic literature review techniques to establish a strong theoretical foundation, ensuring that findings are grounded in existing research. Qualitative Text Analysis (QTA) is conducted using MAXQDA, a qualitative data analysis software that enables systematic coding, thematic categorization, and pattern recognition within academic texts, policy documents, and case studies. This enhances the reliability and depth of qualitative insights. Additionally, Quantitative Trend Analysis (QTT) is applied to evaluate urban redevelopment patterns, environmental indicators, and socio-economic impacts using statistical data and GIS mapping where applicable. By integrating these methodological approaches, the research achieves methodological triangulation, reducing bias and increasing the credibility of findings. The combination of qualitative and quantitative tools ensures a rigorous and balanced assessment of brownfield reuse scenarios, supporting the study's validity and reliability.

the prospects of adaptive reuse. By analyzing these sites, the research aims to explore viable redevelopment scenarios that align with urban sustainability, economic revival, and heritage conservation.

4.2 Industrial Brownfields in Madhesh Pradesh

Two cases are studied in Madhesh Pradesh:

- 1) Birgunj Sugar Mills
- 2) Janakpur Churot Karkhana

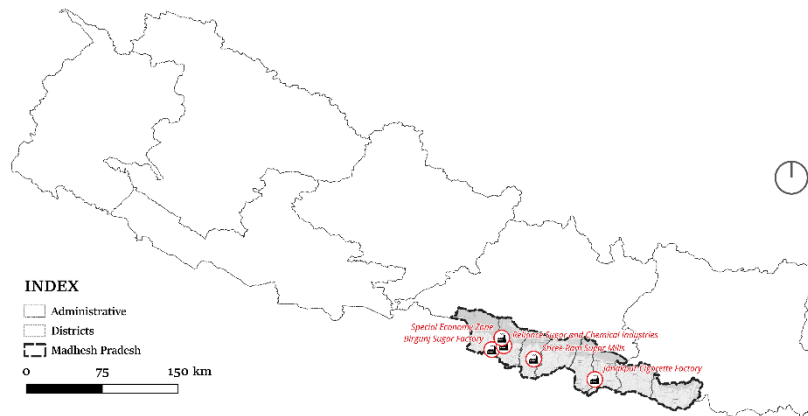


Figure 10 Location of Case Area in Madhesh Pradesh in Nepal

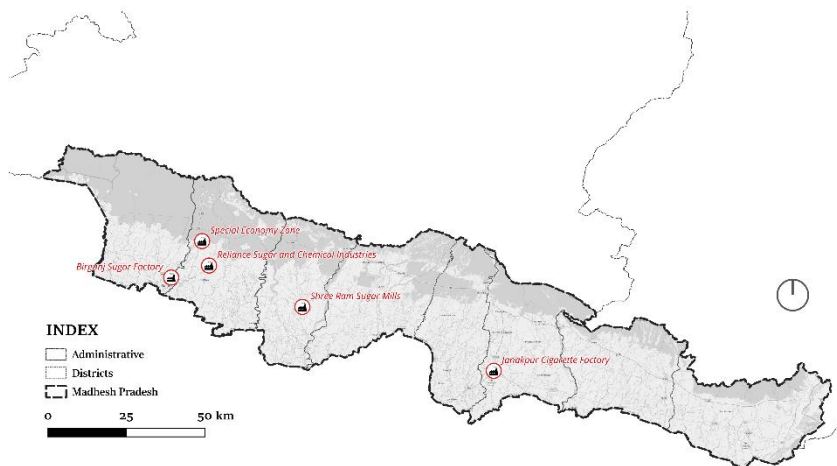


Figure 11 Location of Sugar Mills and JCF in Madhesh Pradesh

4.2.1 Brigunj Sugar Mills

4.2.1.1 Background

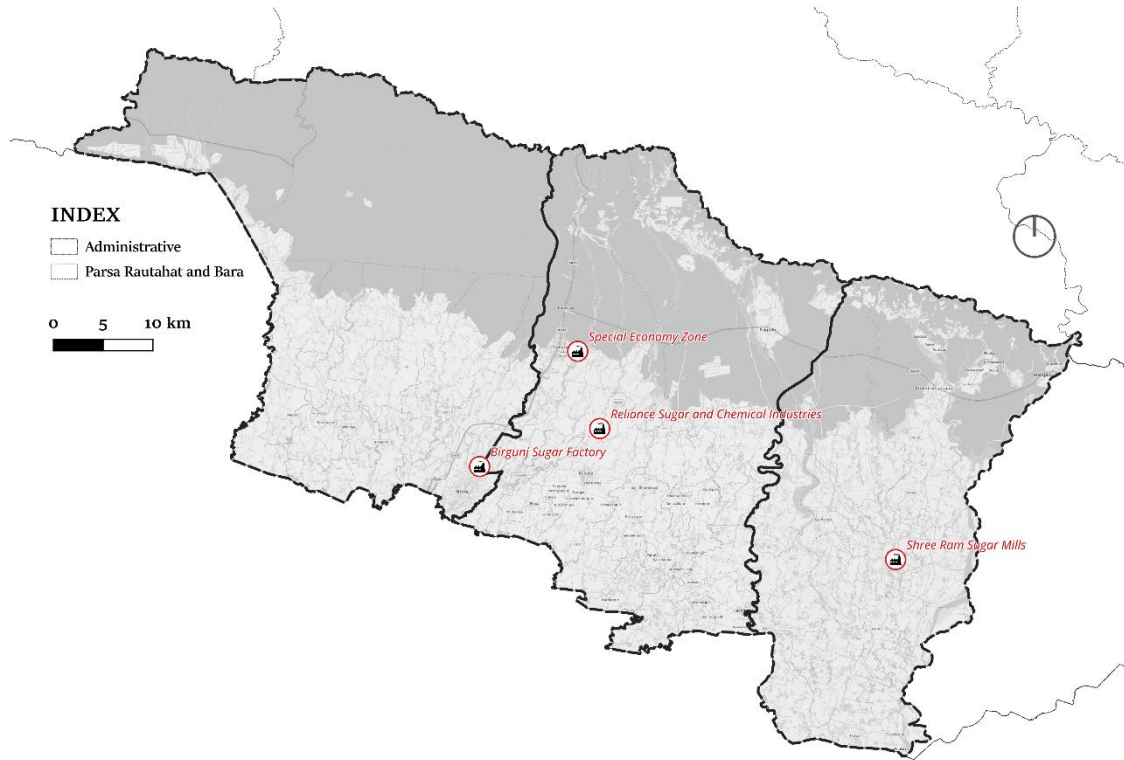


Figure 12 Location of Operating Sugar Mills around Birgunj Sugar Mills

Birgunj Sugar Factory Ltd. (BSF), established in 1964 and fully owned by the then His Majesty's Government (HMG) of Nepal, was one of the country's earliest and most prominent state-owned industrial enterprises. It was set up as part of Nepal's early industrialization strategy to promote self-sufficiency in sugar production and reduce reliance on imports. Strategically located in the industrial hub of Birgunj, in the south-west of Madhesh Pradesh, near the Indian border, the factory was well-positioned for efficient transportation, trade, and access to the Terai region's sugarcane-producing belt. With a daily crushing capacity of 15,000 quintals (1,500,000 kg) of sugarcane, BSF was once among the largest sugar mills in Nepal. The factory operated seasonally from November to March, with the rest of the year allocated for repairs and maintenance. An on-site distillery was later added to diversify production, including molasses and spirits as by-products of sugar manufacturing.

In 1992, following the deregulation of sugar prices in Nepal, BSF transitioned to purchasing sugarcane and selling sugar and by-products at market-determined rates.

Despite a growing domestic demand for sugar, national production continued to fall short—covering only about 60% of the need—leaving the remainder to be filled through imports from India. Over the years, the factory began to suffer from a range of issues, including outdated machinery, financial mismanagement, labor disputes, and increased competition from private sugar mills. After intermittent periods of production and long spells of inactivity, the factory ceased operations entirely in 2003. Since then, the premises have remained closed, leaving behind vast idle infrastructure, symbolizing the broader challenges faced by Nepal’s public sector industries.

4.2.1.2 Challenges and Operations

A major operational challenge for Birgunj Sugar Factory Ltd. (BSF) throughout its years of operation was its aging and poorly synchronized equipment, particularly the lack of integration between the milling and refining processes. This inefficiency significantly hampered productivity and increased operational costs. Over time, the emergence of private sugar mills with modern machinery and more efficient management practices intensified competition in the market, putting additional pressure on BSF’s profitability and sustainability.

The procurement of sugarcane was another critical operational factor. BSF’s Cane Division coordinated with local farmers to secure a consistent supply of sugarcane, often facilitated through financial arrangements with the Agricultural Development Bank of Nepal (ADBN). Payments to farmers were channeled through ADBN, which also deducted outstanding loans from their dues. However, annual fluctuations in sugarcane availability—due to weather conditions, market prices, and farmer preferences—caused instability in raw material supply, directly affecting production volumes and planning.

At its operational peak, BSF employed around 1,200 workers, with approximately half serving as permanent staff and the remainder working seasonally during the crushing period from November to March. Seasonal workers received 60% of their wages during the off-season, providing a modest level of financial continuity. Despite these employment provisions, ongoing financial losses, mismanagement, labor unrest, and irregular payments to farmers and workers gradually crippled the factory. These compounded issues contributed to its final closure in 2003, after which BSF has remained shut, representing a larger narrative of industrial decline in Nepal’s public sector enterprises.

4.2.1.3 Privatization Prospects and Economic Viability

BSF formerly operated within a liberalized sugar market where private competitors held a dominant position. However, the company consistently struggled with financial instability, outdated machinery, and an uncertain profit outlook. These persistent challenges ultimately led to its. Since then, discussions have continued around the economic prospects of the now-defunct enterprise. Given its strategic location on valuable industrial land in Birgunj, proposals have emerged regarding potential privatization or liquidation. While the plant and equipment hold limited resale value due to deterioration and obsolescence, the land itself is considered a significant asset that could generate substantial revenue if sold or repurposed by private investors.

4.2.2 Janakpur Churot Karkhana

4.2.2.1 Background

Janakpur Cigarette Factory (JCF) is located at South-East Part of Madhesh Pradesh and South-West part of Dhanusha District. JCF once a thriving industrial enterprise in Nepal, played a crucial role in meeting the nation's demand for cigarettes. During its peak, the factory was not just an economic hub but also a symbol of industrial pride and discipline. The production of cigarettes was so integral to daily life that media reports on cigarette shortages in remote areas like Humla and Jumla were treated with the same urgency as the lack of essential supplies like rice and medicine. This highlights the deep-rooted smoking culture in Nepal at the time and the significant dependence on JCF's products.

Timeline:

2022BS : Factory established; assistance from the Soviet Union as a STATE OWNED ENTERPRISE

2037-2047: Leading cigarette manufacturer in Nepal; dominating local market; high production rate and strong distribution

2050-2068: DECLINE

2068: Factory ceased operations entirely; financial difficulty; operational inefficiencies

The factory operated for 46 years



Figure 13 Location of Janakpur Cigarette Factory in Dhanusha District

4.2.2.2 Scale of Production and Market Reach

Established with an authorized capital of Rs 80 million and a paid-up capital of over Rs 4.8 million, the factory started by producing 2 billion cigarette sticks per day, later expanding to 3 billion sticks daily to meet growing demand. It marketed cigarettes under the well-known brands ‘Deurali,’ ‘Yak,’ and ‘Gaida,’ which became household names. The demand for its products was so high that supply constraints emerged due to inadequate road networks before the construction of the East-West Highway. Initially, cigarettes were transported to major cities like Kathmandu, Pokhara, Nepalgunj, Mahendranagar, and Dhangadhi through Indian transit routes such as Jaynagar, Raxaul, and Birgunj. The factory also utilized railways, moving products from Janakpur to Raxaul and Birgunj for further distribution. Once the East-West Highway was completed, JCF distributed its products efficiently using 10 containers for transportation.

4.2.2.3 Employment and Economic Contribution

At its height, JCF employed approximately 2,900 people, including permanent staff, contract workers, and daily wage laborers. Being associated with the factory was considered a matter of prestige and economic security, as it provided stable employment

and ensured financial transactions through Rastriya Baniya Bank, later shifting to Nepal Bank Limited, which even opened a branch near the factory to facilitate operations.

The factory's economic influence extended to tobacco farmers, as it purchased raw tobacco worth Rs 40 million annually. Tobacco was cultivated in areas such as Mahendranagar, Dhalkebar, Godar, and Mirchaiya, but since domestic production was insufficient, the factory also imported tobacco leaves from India.

4.2.2.4 Social and Cultural Impact

Beyond its industrial function, JCF actively engaged in corporate social responsibility (CSR). It established a hospital and a school for employees and their families, supported upgrading religious sites, managed public electricity, and even founded a sports club. These initiatives positioned the factory as more than just a production unit—it was a key contributor to local development.

4.2.2.5 Discipline and Industrial Culture

During the Panchayat era, the factory was known for its strict discipline and punctuality. Employees adhered to a rigid work schedule, marked by a 6 AM siren, which not only regulated factory operations but also influenced the daily routine of Janakpur city itself. This factory-imposed discipline created a structured urban environment, making its legacy extend beyond its walls. As one former employee nostalgically remarked, "It feels that sound is still ringing in my ears." This statement metaphorically represents the lasting influence of the factory, both as an industrial establishment and a cultural force that shaped the city's rhythm.

4.2.2.6 Figurative and Symbolic Significance

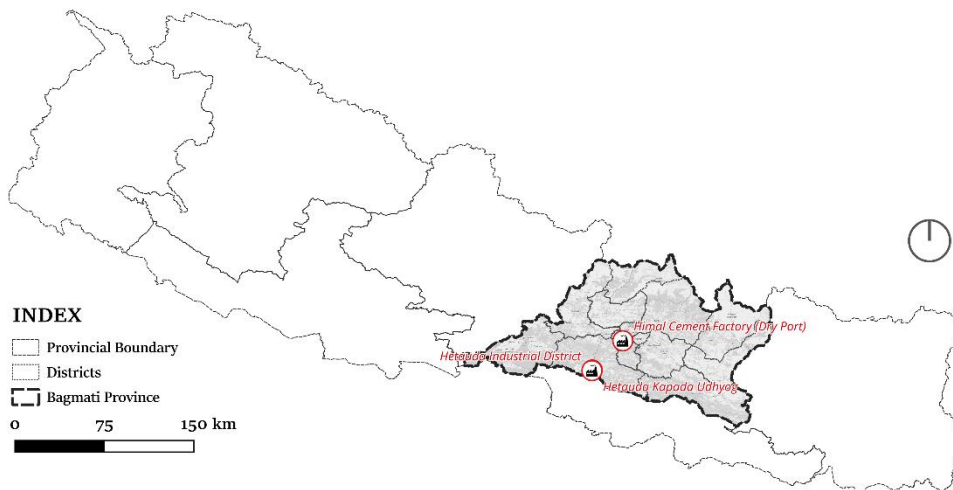
The story of JCF is intertwined with Nepal's industrial past, reflecting both the economic ambitions and infrastructural limitations of the time. The imagery of cigarette shortages being equated to food and medicine shortages underscores how deeply ingrained smoking was in society and how central the factory was to national consumption patterns. Similarly, the siren that structured daily life is a powerful symbol of industrial discipline, evoking nostalgia for a time when work ethic and factory culture defined the city's character.

4.3 Industrial Brownfield in Koshi Province: Biratnagar Jute Mills

Biratnagar Jute Mills is situated at south part of Koshi Province. In reference to Morang district it lies in south-west of the region with close proximity to border.



Figure 14 Location of BJM and Koshi Province in Nepal



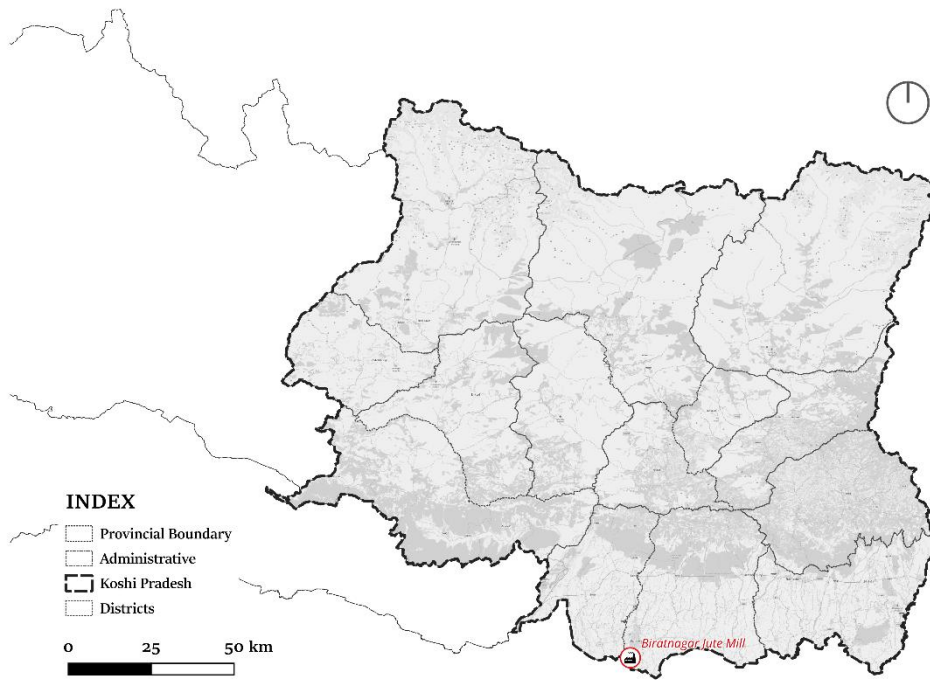


Figure 15 Biratnagar Jute Mills in Koshi Province

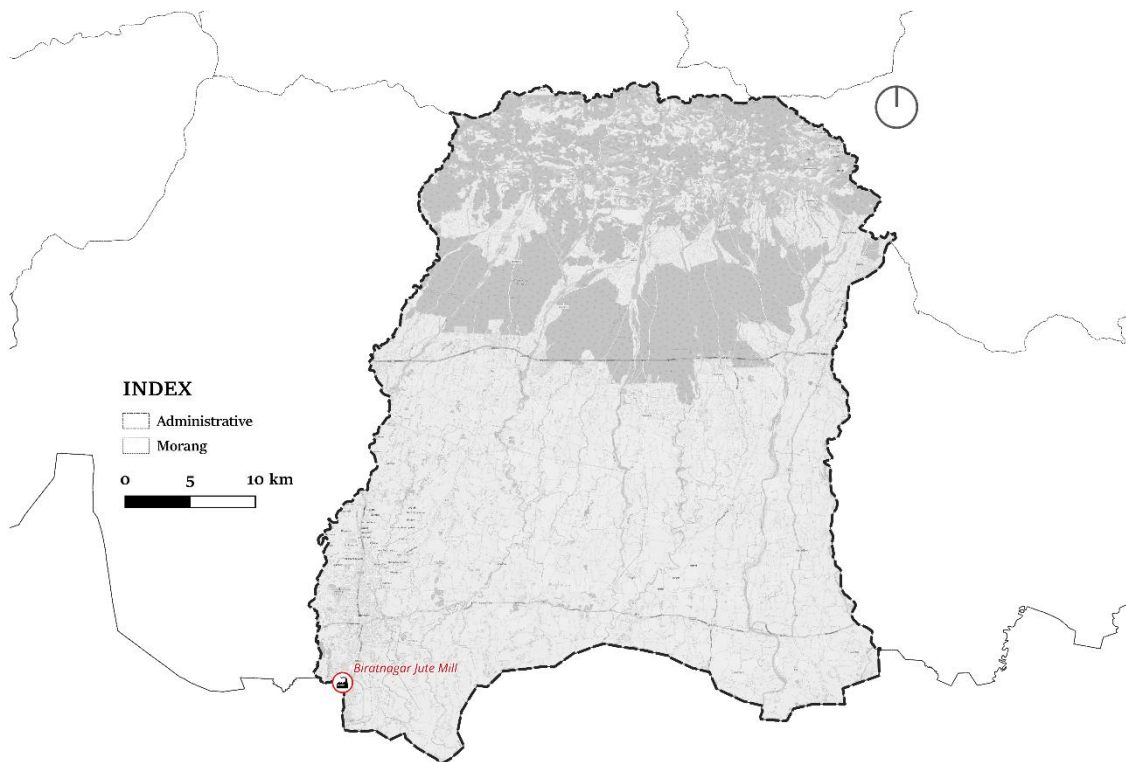


Figure 16 Biratnagar Jute Mills in Morang District

4.3.1 Timeline of Biratnagar Jute Mills

1936 – Establishment of Biratnagar Jute Mills

Biratnagar Jute Mills (BJM) was established in 1936 as Nepal's first large-scale industrial enterprise. The mill was set up with financial and technical assistance from Indian industrialists, facilitated by Nepal's Rana government. Positioned strategically in Biratnagar, near the Nepal-India border, the mill had access to both raw jute from Nepal and export markets in India. The establishment of BJM marked a crucial step in Nepal's early industrialization, making jute one of the country's most valuable export commodities.

1937–1950s – Early Operations and Expansion

Following its establishment, BJM quickly became a major contributor to Nepal's economy. The mill produced jute sacks, ropes, and other processed jute products, which were primarily exported to India and beyond. During this period, Biratnagar flourished as an industrial hub, attracting workers from different parts of Nepal. The expansion of industrial activities boosted local businesses and infrastructure development in the region. However, despite its success, the industry remained heavily dependent on foreign investment and market fluctuations in the global jute trade.

1951 – Political Change and Impact

The political transformation in 1951, with the end of the Rana regime and the advent of democracy in Nepal, brought significant changes to the country's economic policies. While the new government emphasized industrialization, management inefficiencies in state-controlled enterprises, including BJM, started to emerge. Increased political intervention in labor policies and production management began affecting operational efficiency. Despite this, jute remained a key export product, contributing significantly to Nepal's foreign exchange earnings.

1960s–1970s – Nationalization and Growth Challenges

During the 1960s, the Nepalese government took steps to nationalize several industries, including BJM, as part of its strategy to strengthen the domestic industrial sector. The

nationalization process aimed at improving production efficiency and retaining profits within Nepal. However, mismanagement, lack of investment in modern technology, and excessive bureaucratic control led to declining productivity. At the same time, competition from jute industries in India and Bangladesh, which had more advanced manufacturing techniques, posed challenges to BJM's competitiveness. Despite these challenges, the jute sector remained a vital part of Nepal's industrial framework, providing employment to thousands.

1980s – Gradual Decline Begins

By the 1980s, BJM began facing severe challenges due to the rising popularity of synthetic fiber alternatives, which reduced global demand for natural jute products. Additionally, internal issues such as outdated machinery, inefficient labor practices, and frequent labor disputes weakened the factory's operations. The Nepalese government continued providing subsidies to keep the mill operational, but profitability declined sharply. The industry struggled to adapt to changing market dynamics, making it increasingly difficult to sustain large-scale jute production.

1990s – Privatization Attempts and Further Decline

With the introduction of economic liberalization policies in Nepal during the 1990s, efforts were made to privatize state-owned enterprises, including BJM. Several domestic and international investors showed interest in acquiring the mill, but persistent labor issues and outdated infrastructure deterred investment. Additionally, the government's inability to implement effective industrial reforms further complicated the privatization process. By this time, Nepal's jute industry was losing its competitive edge to more efficient jute producers in India and Bangladesh. Consequently, BJM's production levels continued to decline, and financial losses mounted.

2000s – Production Halts and Factory Closure

By the early 2000s, operational inefficiencies, rising production costs, and continued financial losses forced BJM to cease production. The closure of the mill resulted in massive unemployment, affecting thousands of workers who had relied on the industry for their livelihoods. The factory premises, once a thriving industrial site, were left largely

abandoned, transforming into an industrial brownfield. The decline of BJM symbolized the broader challenges faced by Nepal's manufacturing sector, particularly in state-run industries that struggled to modernize and compete in a liberalized economy.

2010s–Present – Discussions on Reuse and Redevelopment

In recent years, various proposals have been put forward to repurpose the extensive land and infrastructure of the former BJM site. Ideas have ranged from establishing an industrial park to developing commercial and residential complexes. Despite these discussions, large portions of the site remain underutilized. Policymakers and urban planners continue to debate the best strategies for redeveloping the brownfield, balancing economic revitalization with historical preservation. The case of BJM serves as a critical example of industrial decline and the challenges of transitioning former industrial sites into new urban uses.

4.3.2 Brief History of Trade Union Movement in Nepal: Biratnagar Jute Mills Testaments

Biratnagar Jute Mills (BJM), Nepal's first large-scale industrial enterprise, stands as a significant landmark in the country's industrial and socio-economic history. Established in 1936, BJM was not only a cornerstone of Nepal's early industrialization but also the birthplace of the nation's labor movement, marking a pivotal chapter in workers' rights and democratic struggles. Despite its decline and eventual closure, the mill's physical infrastructure, machinery, and surrounding industrial landscape hold immense industrial heritage potential.

Early Industrialization and the Birth of Trade Unions (Pre-1947)

The trade union movement in Nepal traces its origins to the establishment of industrial enterprises such as Biratnagar Jute Mills (BJM) in the early 20th century. During this period, industrial workers faced poor working conditions, low wages, and lack of labor rights. Since Nepal was under a feudal and autocratic system, workers had little to no means to voice their grievances.

The 1947 Biratnagar Jute Mills Strike – Foundation of the Trade Union Movement

The first organized labor movement in Nepal began with the Biratnagar Jute Mills Strike of 1947. This movement was a landmark event, as it marked the first-time workers collectively demanded better wages and working conditions. The strike also had strong political implications, as it was linked to the broader democratic movement against the Rana autocracy. The success of the strike set the foundation for future trade union activism in Nepal.

Expansion of Trade Union Activities (1950s–1960s)

With the fall of the Rana regime in 1951 and the introduction of democracy, trade union activities expanded. Several labor unions were formed, and workers began advocating for legal recognition of their rights. However, political instability and lack of clear labor policies limited the effectiveness of trade unions. Despite these challenges, this period saw increased labor awareness and participation in Nepal's democratic movements.

State Control and Suppression of Trade Unions (1960s–1980s)

During the Panchayat era (1960–1990), political parties were banned, and trade unions faced strict government control. The state established a government-controlled trade union system, limiting independent labor activism. Despite restrictions, underground trade union activities continued, with workers organizing protests against unfair labor policies.

Revival of Trade Unions in the Democratic Era (1990s–2000s)

The 1990 People's Movement restored multi-party democracy in Nepal, leading to a resurgence of independent trade unions. Several national labor federations emerged, including the General Federation of Nepalese Trade Unions (GEFONT) and Nepal Trade Union Congress (NTUC). The new democratic government introduced labor laws, improving workers' rights and conditions.

Trade Unions in the Post-Conflict and Federal Nepal (2006–Present)

After the 2006 People’s Movement, trade unions became more influential in shaping labor policies. With Nepal transitioning to a federal system, trade unions played a role in advocating for workers' rights in new labor laws and industrial policies. However, challenges such as political interference, informal labor practices, and economic shifts continue to affect trade union activities today.

4.4 Industrial Brownfields in Bagmati Province

Two Cases are studied in Bagmati Province:

- 1) Hetauda Textile Factory

Chobhar Dry Port (Previously Himal Cement Factory)

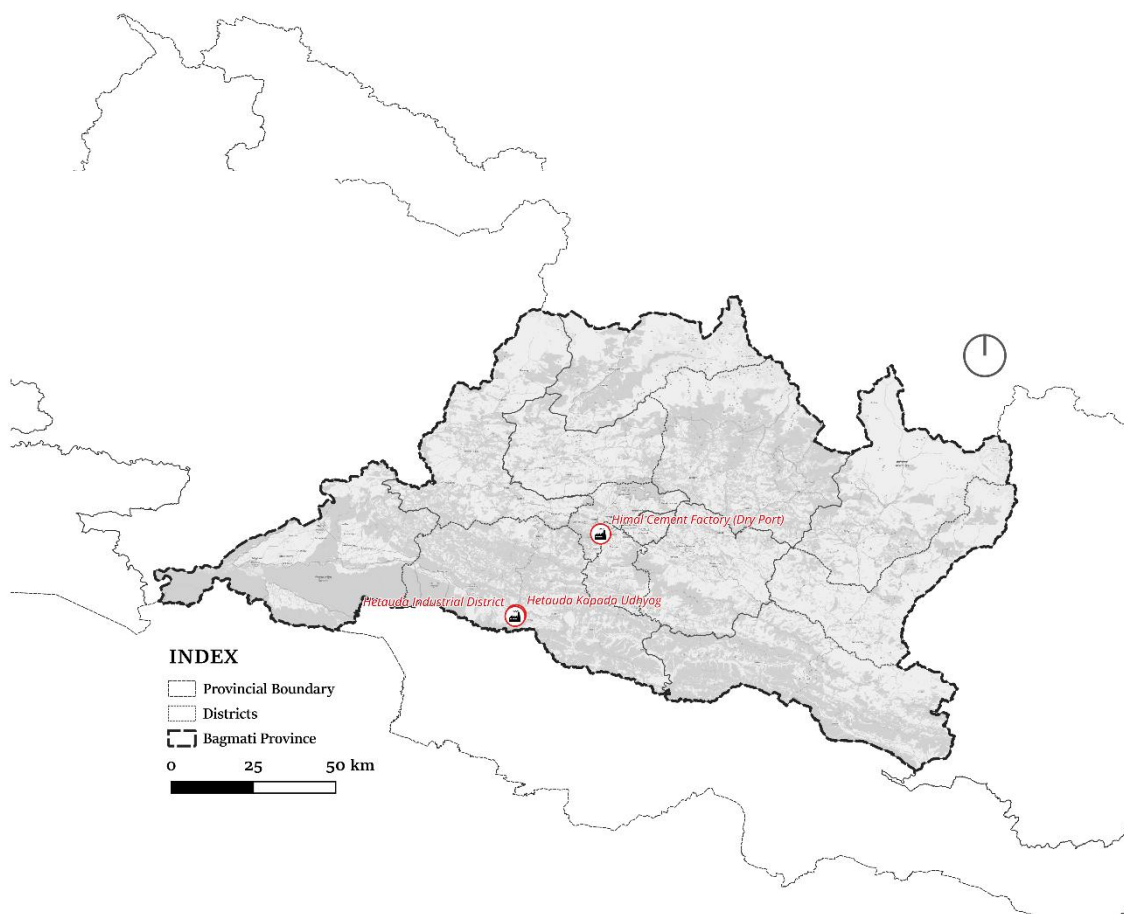
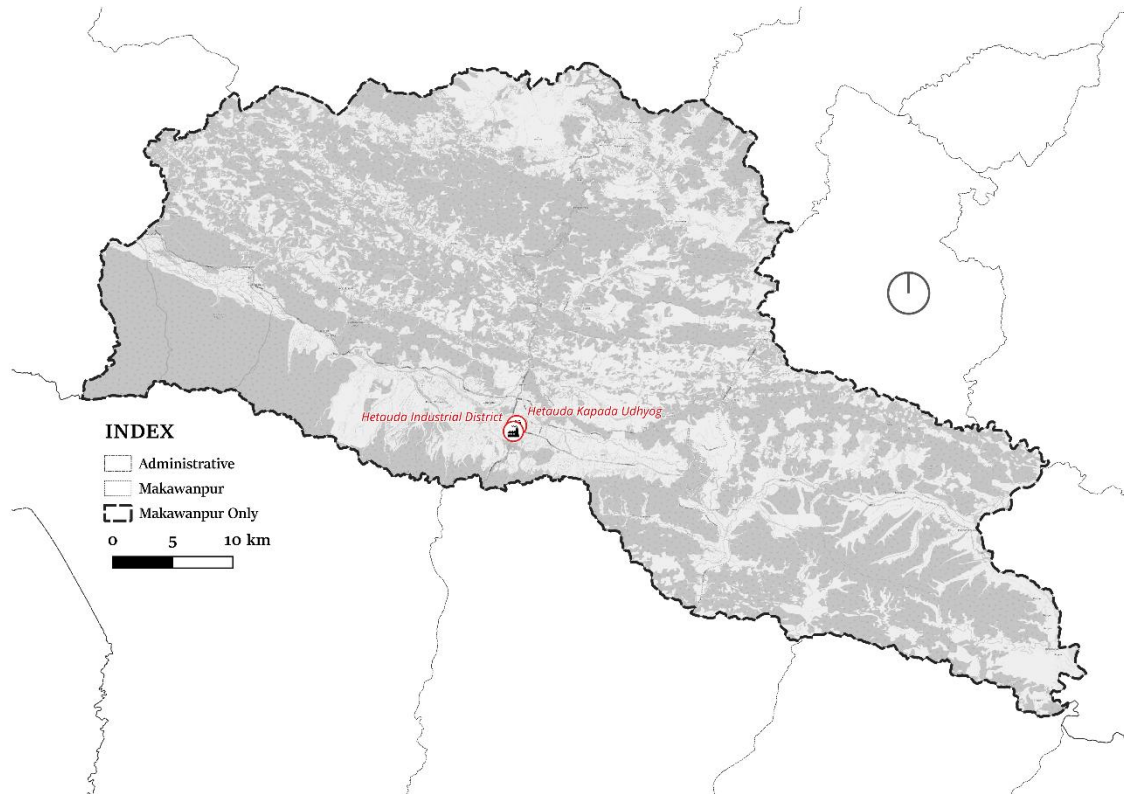


Figure 18 Location of Hetauda Kapada Udhyog and Himal Cement Factory in Bagmati Province

4.4.1 Hetauda Textile Industry



4.4.1.1 Background

Hetauda Textile Industry Ltd. (HTI) is a state-owned enterprise wholly owned by the Government of Nepal (GoN), operating a cotton textile factory in the industrial city of Hetauda. It is situated in southern part of Makwanpur District. Established in 1978 with factory equipment supplied through Chinese aid, HTI has played a significant role in Nepal's textile industry, catering primarily to the domestic market. The factory specializes in low to medium-grade cotton fabric (10, 20, 30, and 40 count fabric), targeting low and middle-income consumers. The company's operations were designed for three-shift production, with a maximum capacity of 11 million square meters of cloth per year. However, since 1989, only two shifts have been in operation. In 1995/96, the company produced over 6.2 million meters of fabric, though only 5.8 million meters were sold.

HTI's market presence was substantial, with over 60% of its sales occurring in Western Nepal. The company sold around 200,000 meters of fabric annually to the government, and its distribution network included five field offices and about 85 independent dealers. However, despite this extensive reach, the company faced increasing challenges. By

September 1996, most of HTI's operations were shut down due to a shortage of cotton lint, the factory's primary raw material. HTI typically sourced cotton lint from the Cotton Development Board, another government-owned enterprise, but supply disruptions forced the factory to await deliveries from India. Despite the halt in production, employees continued to receive salaries, even though there was no active manufacturing. The shutdown did not immediately affect deliveries, as the company maintained a stock of Rs 120 million worth of products.

HTI employed around 980 laborers and 235 administrative staff, but management estimated that 15% of the administrative workforce was excess. The factory's machinery, originally sourced from China, had become obsolete, with spare parts no longer available. Additionally, the factory's production capacity was constrained by its maximum fabric width of 60 inches, whereas the market demanded 90-inch fabric rolls. Nepal's textile industry had also become increasingly competitive, with imports from India and China entering the market with a mere 5% import duty, making it difficult for HTI to compete effectively.

Given these circumstances, privatization emerged as a viable option for HTI. The industry operates in a competitive commercial environment, and private investors could potentially improve profitability through better marketing and diversified raw material sourcing. A direct sale to an investor appeared to be the most suitable privatization approach, possibly with provisions for employee shareholding. However, unless a new investor significantly expanded sales and production—such as resuming three-shift operations—some degree of staff retrenchment would be necessary to optimize efficiency and profitability.

4.4.1.2 Timeline of Hetauda Textile Industry

1978 – Hetauda Textile Industry Ltd. (HTI) is established with factory equipment supplied through Chinese aid.

1980s – Operates at full capacity with three-shift production, producing up to 11 million square meters of cotton fabric annually.

1989 – Production is reduced to two shifts due to operational inefficiencies.

1995/96 – Production reaches 6.2 million meters, but only 5.8 million meters are sold, highlighting market challenges.

1996 – Factory shuts down most operations due to a lack of cotton lint supply, although employees continue receiving salaries.

Late 1990s – HTI faces stiff competition from Indian and Chinese textile imports. Machinery becomes obsolete, limiting its competitiveness.

2000s-Present – HTI is identified as a potential candidate for privatization, with discussions on restructuring and modernization.

4.4.2 Himal Cement Factory (Chobhar Dry Port)

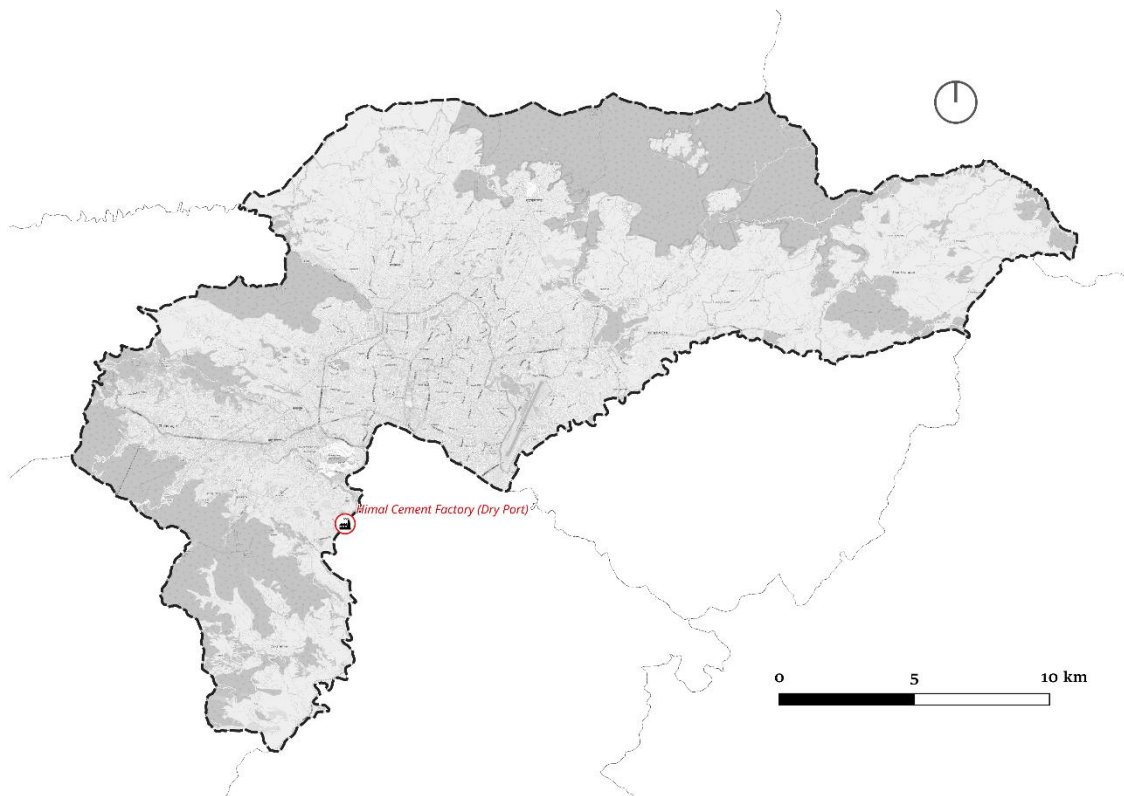


Figure 19 Himal Cement Factory in Kathmandu District

4.4.2.1 Timeline and Brief Background of Chobhar Dry Port

1974: The Himal Cement Factory was established in Chobhar with German aid, requiring the acquisition of 285 houses.

2000-2002: Protests over pollution led to a government agreement for compensation (which never materialized), and the factory was shut down in 2002 due to mismanagement and environmental concerns.

2006-2007: Courts ruled in favor of returning excess acquired land, but orders remained unimplemented.

2013: The Nepal-India Regional Trade and Transport Project (US\$101M) was approved, with US\$15.5M allocated for the Chobhar Dry Port.

2017: The government decided to acquire the factory land for the dry port and an exhibition center.

2018: Environmental assessments were conducted, but public concerns over land rights and pollution remained unresolved. Protests delayed construction.

2019: Amid strong local opposition, Prime Minister KP Sharma Oli laid the foundation stone. Police arrested protestors, and complaints were filed with the World Bank.

2020: The Chobhar Protection Committee filed a formal complaint with the World Bank's Inspection Panel, citing lack of community consent and unresolved grievances.

2021-2022: The Inspection Panel assessed concerns but did not recommend an investigation. Despite opposition, Prime Minister Sher Bahadur Deuba inaugurated the dry port in April 2022.

2022: Traders showed little interest in using the facility, raising concerns over its viability.

2023-2024: In November 2023, TransNepal Freight Services won a five-year contract to operate the port. The lease agreement was finalized in March 2024.

CHAPTER 5: Discussions, Analysis and Findings

5.1 Findings and Analysis of Observations

5.1.1 Birgunj Sugar Mills



Figure 22 Badminton Court in Warehouse



Figure 20 Sugarcane Processing Plants



Figure 21 Storage Block



Figure 23 Structure to house crane

The former premises of the Birgunj Sugar Mill (BSM) remain in a derelict state, having been left unused since its closure. The once-functional machinery now lies old, rusted, and inoperable, reflecting years of neglect. Despite the site's decline, certain structures have been repurposed, with a warehouse being transformed into a badminton court and the administrative building temporarily housing the district court. However, the site has

also been plagued by cases of theft, prompting the mobilization of staff to mitigate the issue. A significant portion of BSM’s former assets has undergone a major transition, with nearly **833 bighas of land in Simara**—once under BSM’s ownership—now designated as a **Special Economic Zone (SEZ)**, marking a shift from industrial decay to potential economic revitalization.

5.1.2 Janakpur Churot Karkhana

The main factory building of the Biratnagar Jute Mill remains closed to the public, restricting access to its industrial heritage. Despite years of inactivity, officials have indicated that much of the machinery within the facility remains reusable, presenting possibilities for future redevelopment. Currently, the premises have been repurposed, serving as the Pradesh Mantralaya, with old staff quarters now allocated as residences for government ministers. This shift in function reflects a significant transformation of the site from an industrial landmark to an administrative center. Additionally, the responsibility for maintenance has been assigned to the Mantralaya, ensuring upkeep of the premises, albeit with a focus on its new governmental role rather than industrial revival.



Figure 24 Factory Building JCF



Figure 25 Current: Ministry Building of Madhesh Province

5.1.3 Biratnagar Jute Mills

The Biratnagar Jute Mill, once a thriving industrial hub, now stands largely stagnant, with its resources left unused and deteriorating over time. The site holds historical significance, not only for its role in Nepal's industrial past but also for its deep association with the emergence of labor unions, whose struggles and political influence have left a lasting impact—making it a compelling subject for a museum. Despite the decline, many of the machines remain reusable, offering potential for revival if integrated into future redevelopment plans. However, the site has also faced numerous challenges, including frequent cases of theft, loss of machinery, and widespread land encroachments. In response to these issues and as part of efforts to facilitate redevelopment, an official audit is currently being conducted, aiming to assess existing conditions and chart a path forward for the mill's potential reuse.

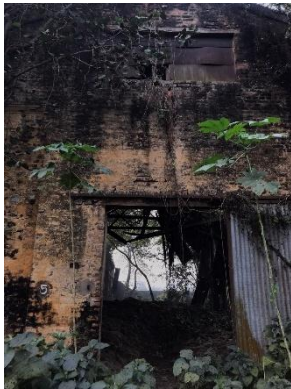


Figure 28 Occurance of Theft



Figure 27 Traditional Coal and Diesel Operated Turbine



Figure 26 Jute Mills Main Building



Figure 29 Turbine House BJM

5.1.4 Chobhar Dry Port

The Chobar Dry Port is a well-maintained and fully operational facility, playing a crucial role in Nepal's logistics and trade network. Beyond its functional significance, it has also emerged as a prominent landmark, shaping the identity of the surrounding area. However, its redevelopment has not been without controversy. Historical narratives of the site's transformation highlight instances of public backlash, with disputes over land use, community concerns, and governance issues occasionally leading to protests and riots. Additionally, the imposing structure of the dry port has overshadowed the historical essence of the area, altering its visual and cultural landscape. This reflects the broader tension between modernization and heritage preservation in Nepal's urban redevelopment efforts.



Figure 30 Himal Cement Factory Derelicts

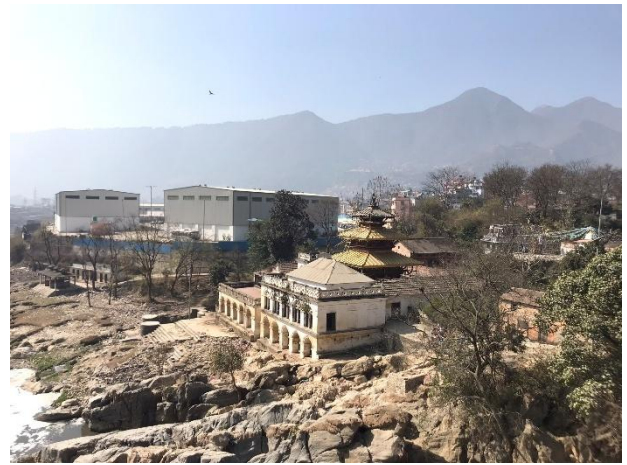


Figure 31 Outlook of Chobhar Dry Port

5.2 Findings and Analysis from Interviews

5.2.1 Thematic Analysis: Questions, Theme and Theories Analysis (QTT)

This section presents the findings and analysis derived from interviews conducted as part of the study. To systematically organize and analyze the collected data, MAXQDA was employed, allowing for efficient coding, categorization, and visualization of key themes. The Qualitative Text Analysis (QTT) process began with the development of codes and themes through inductive coding, ensuring that insights emerged organically from the interview responses.

Once the coding structure was established, responses were carefully analyzed to extract meaningful patterns. Important segments were highlighted, and key takeaways were compiled. To enhance clarity and coherence, findings have been summarized in tabulated form, presenting relevant excerpts from individual transcripts. Additionally, visuals, statistics, and concept maps are incorporated to illustrate relationships between themes and provide a comprehensive understanding of the data. These analytical steps culminate in well-founded conclusions, offering critical insights into the research focus and its broader implications.

5.2.1.1 Related Codes and Themes

Following are related codes and themes that were derived using inductive coding.

- Cost of Redevelopment
 - Personal Experience of Space
 - Why Redevelop
 - Challenges for Redevelopment
 - Redevelopment Priority
 - Policy Remarks
 - Potential Redevelopment Schemes
 - Acts towards Brownfields
 - Brownfield Phenomenon

5.2.1.2 Insights drawn

Following insights were drawn from the derived themes:

- 1) Under cost of Redevelopment, we can note that if we want to redevelop properties on scale of Dry Port, it cost around 1Arba44Crores.
- 2) Interviewee experienced the glory and changing image of society when industry ran
- 3) Redevelopments creates opportunities, opens scope for research and development, addresses social responsibility, counter social problems and uplifts society. What's why redevelopment is necessary.
- 4) Recurring issues of Policy and Implementation delays, lack of proper record keeping, ownership debates and conflicts, riots and backlashes accusing false claims, limited availability of land, Pandemic, running industries of same category and competence, outdated machineries etc. are major challenges to redevelopment
- 5) Redevelopment priorities should be based on its potential to generate job opportunities, revive the glory of enterprise. Most interviewee prioritized to revive the industry rather than adopting entirely new plans.
- 6) Policy regarding ownership, project's execution model, PPP initiatives, assessment of local needs, incentive model to agriculture, capacity building of government should be addressed.
- 7) Other potential redevelopment schemes should be explored.
- 8) Conceptualizing project, redevelopment routes, project integration with running and funded projects, Government forming BoD to discuss revival of sick industries are some acts towards brownfield

5.2.1.3 Important segments form Interview

- 1) *“Biratnagar Jute Mill used to be in a very very good condition. The enterprise was very profitable, market was good, production was good and exports were good too. Authorities and Local Administration changed overtime, now this Jute Mill lies in Ward No. 16. Talking about Jute, we need to grow Patsan(Pat) plant to produce Jute. Pat was cultivated widely in three regions, Morang, Sunsari and Jhapa. The mill used to buy them in huge quantity to produce Jute. Farmers were motivated to cultivate Pat, since it was a cash-crop with high demand. Later when governance started to fail, farmers started to get low value for the crop, then they chose to cultivate other crops over Jute.”*

- 2) *“If the Mill revives, it creates huge Job Opportunity. Public are under same expectations. Public around here have to travel long distances to work for other factories and mills. If Biratnagar Jute Mill is brought back to operation, all these workers will definitely work here.”*
- 3) *“In the past when Jute Mill was marking its perimeter and making boundary walls, it was the time of Jimdars, Patwari. Land parcel that belonged to Utin Lal Jimdar at the time was also acquired by the Mill in the process. In year 2018/19, Supreme Court gave its verdict such that, the debated land can't be sold and the institute has to pay certain amount to Utin Lal as compensation (Kud ko rup maa baali ko rakam bujhauna parne). Land Use Plans, Land Improvement Plans etc were imposed and revised in different manners in due course of time. Eventually, he could sell his land property. The land area is total of 2 Bigha 5 Kattha 16 Dhur. He claimed them and he sold around One Bigha of Land to buyers. In this manner Biratnagar Jute Mill area was segmented and it is one of the reasons why our boundary is open. There used to be Dispensary and other supporting structures, now dismantled and gone. But as I mentioned earlier, the land was not sellable as decided by Supreme Court. Now you can see the real-time scenario yourselves.”*
- 4) *“World Bank was conducting studies on identifying probable location to open Container Freight Station(CFS) that caters to storage needs for Kathmandu Valley. CFS and Dry Port are somewhat similar, however their terminologies differ. Big portion of land was required to operate CFS. Bhaktapur, Balaju (Industrial District Area), and Chobhar were listed as feasible options, among with Chobhar was identified as best fit. The World Bank funded the project.”*
- 5) *“The project is listed under the Project NIRTTP (Nepal-India Regional Trade and Transport Project), the evaluation of proposals for building the Mugling-Narayanghat road section was in the final leg around the time and this project was conducted under same project.”*
- 6) *“We encountered cases where local claimed that they didn't get any compensation during government's land acquisition that they were entitled to. Lack of proper record keeping posed an issue where both government and previous land owner had Land Ownership Registration Certificate(Lal-Purja) for same parcel of land”*

- 7) *“Multiple plans were conceptualized to what can be done with remanent factory properties. Plans to relocate Sukumbasi Basti, Waste Treatment Plant etc. were envisioned but public backlashed against these plans. The company decided to auction the property for alternative use and after discussing use cases for the property; plans to develop ICT was put forward”*

These interview segments suggests that brownfield redevelopment presents significant economic potential, particularly in reviving industries and creating employment opportunities. The case of Biratnagar Jute Mill highlights how past industrial success was linked to strong market demand, local agricultural integration, and exports. Revitalizing such sites can generate jobs, reducing the need for migration in search of work.

However, governance failures, policy gaps, and land ownership disputes have hindered redevelopment efforts. Issues such as poor record-keeping, compensation conflicts, and fragmented land parcels complicate legal and administrative processes. Historical acquisitions and court rulings have further contributed to uncertainties, delaying redevelopment initiatives.

Community resistance and social concerns also play a crucial role in brownfield projects. Proposals like relocating squatter settlements or setting up waste treatment plants have faced strong public opposition, emphasizing the need for inclusive planning and stakeholder engagement. Redevelopment should align with community needs to ensure public acceptance and long-term sustainability.

Strategic planning and global investments influence brownfield transformations, as seen in Chobhar’s selection for a Container Freight Station (CFS) with World Bank funding. Large-scale redevelopment often integrates with national infrastructure initiatives, requiring coordinated policies and financial backing.

Finally, alternative redevelopment pathways must be explored to maximize land use efficiency. Industrial reuse, commercial hubs, and technology-driven projects—such as an ICT hub proposal for a former mill site—demonstrate the importance of adaptive reuse strategies. A successful brownfield redevelopment approach requires clear policies, proactive governance, and a balance between economic growth and social responsibility.

5.2.1.4 Summary of Analysis

The summary of insights drawn from the interviews highlights several key aspects of brownfield redevelopment across various sites.

Officials from the Ministry of Industry, Commerce, and Supplies (MoICS) emphasized that the revival of industries remains a debated subject, with differing views on whether the government should directly run industries or facilitate private sector involvement. The government is considering public-private partnerships (PPP) as a way forward, especially given the prevalent interest from private parties in operating public enterprises. Notably, TATA's interest in operating Biratnagar Jute Mill has spurred further discussions, with experts indicating that such a venture was studied for 20 days by technicians from TATA. This interest underscores the revitalization potential that private sector involvement can bring to brownfield sites.

Minister Joshi highlighted the importance of redeveloping industries to guide market trends, ensure product quality, and maintain pricing control, suggesting that redevelopment should focus on product-oriented goals. On the other hand, Sunil Bahadur Thapa argued that the government should not run industries, but should create an environment conducive to business. This reflects a growing consensus that PPP models are necessary to drive industrial growth.

Minister Damodar Bhandari acknowledged the policy issues at the three-tier government level, which continue to hinder the effective implementation of redevelopment projects. However, he mentioned efforts to introduce new policies to promote domestic consumption and ensure that every province has at least one industrial area. Despite these efforts, fraudulent practices by industrialists have been noted, particularly in schemes designed to revive sick industries.

Officials from the Federation of Nepalese Chambers of Commerce and Industry (FNCCI) pointed out the existence of over 400 sick industries awaiting assessments, which presents a significant opportunity for redevelopment. Moreover, the Ministry of Industry (MOI) has formed a 15-member high-level committee to identify such sick industries, which could potentially benefit from redevelopment initiatives.

Bishnu Kumar Mahat from the Department of Land Management and Archive (DoLMA) emphasized that land use regulations are still in their early stages, with the government slow to adopt effective policies for systematic urban development and production-based

economies. This creates challenges in properly managing brownfield sites, where land acquisition and use remain contentious issues.

Personal experiences of space within brownfield sites were also shared, such as the case of Biratnagar Jute Mill, where debates over land acquisitions have persisted. Mr. Shyam Lama highlighted the job creation potential of reviving such mills, while also noting the boundary issues that complicate redevelopment efforts. The audit of Biratnagar Jute Mill is currently underway to address these concerns.

Pramod Acharya from the Chobar Dry Port pointed out that while the cost of redevelopment for large-scale projects like the Dry Port is high, such redevelopment can dramatically change the spatial dynamics of surrounding areas. However, riots and backlashes often hinder progress, and careful consideration of market needs should guide the repurposing of such sites. Additionally, World Bank studies on similar projects like the Container Freight Station (CFS) underline the importance of global funding in driving redevelopment initiatives.

Lastly, Yateen from Birgunj Sugar Mill emphasized that the priority should be to re-operate existing industries rather than pursue entirely new developments. He pointed to the importance of providing job opportunities for local farmers and aligning redevelopment with local needs, such as agricultural incentives and municipal capacity for funding. These insights reflect the complex factors influencing brownfield redevelopment and underscore the need for a coordinated approach that balances economic, social, and policy considerations.

5.2.1.5 Visuals and Statistics

Code Relation Browser

The Code Relation Browser in MAXQDA is a powerful visualization tool that helps researchers analyze relationships between codes in qualitative data. It provides an interactive, network-style representation where codes are displayed as nodes, and their connections are shown through lines, with the thickness of the lines indicating the strength of their co-occurrence. This allows us to easily identify patterns and thematic connections within their dataset.

The tool is particularly useful for thematic analysis, concept mapping, and comparative studies, where understanding the interrelations between different themes is crucial. It

helps researchers detect hidden patterns, validate theoretical frameworks, and even generate new research questions. The ability to export the visualization for reports and presentations makes it a valuable asset for communicating research findings effectively.

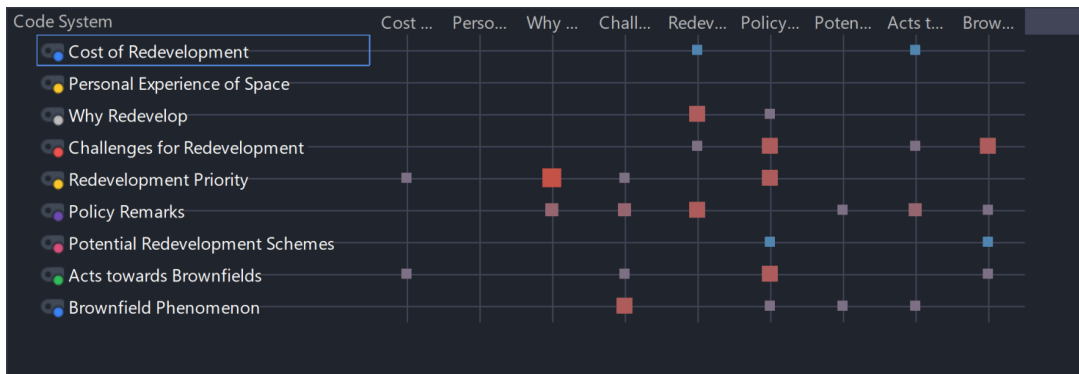


Figure 32 Code Relation Browser

Here we can see strong correlation between codes ‘Why Redevelop’ and ‘Redevelopment Priorities’. Based on coding system, it signifies redevelopment priorities should be strongly complementing to reasons to redevelop and vice-versa. Similar co-relation among ‘Redevelopment Priority’ and ‘Policy Remarks’ can be seen. The relation remarks that same statements, sentiments and jests are co-occurrent. Color codes and square size denotes the degree of co-occurrence and relation among the code.

Code Trend in Documents

The Code Trend in Documents feature in MAXQDA is a valuable tool for analyzing how codes evolve across different documents or sections within a dataset. It provides a graphical representation of code distribution over time or across multiple sources, helping researchers track thematic developments, emerging patterns, and shifts in discourse.

One of the key strengths of this tool is its ability to display trends quantitatively. By plotting codes along a timeline or across sequential documents, researchers can observe when and where certain themes gain prominence or decline. This is particularly useful for longitudinal studies, media analysis, or tracking changes in interview responses over time. The visualization enables users to compare multiple codes simultaneously, revealing correlations between different topics.

Another significant advantage is its customization options, allowing researchers to filter specific codes, adjust visualization settings, and analyze trends within selected document

groups. This flexibility makes it easier to focus on specific research questions and detect nuanced variations in thematic occurrences. Additionally, users can export these trend graphs for reporting, making the tool ideal for presenting findings in a clear and visual format.

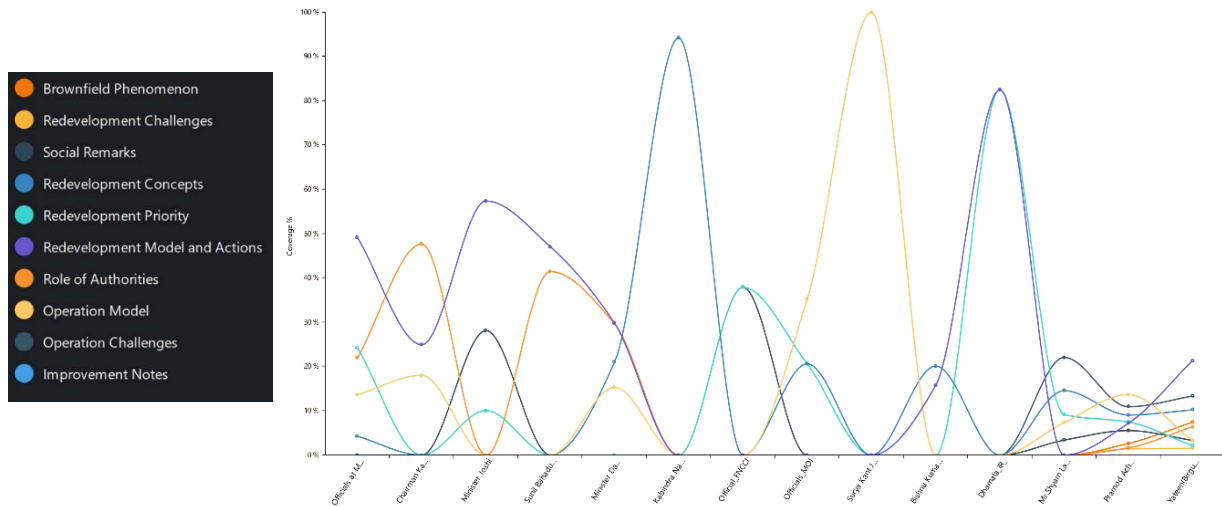


Figure 33 Code Tend in Documents

Here we can see ‘Redevelopment Priority’ is discussed consistently through the interview. Meanwhile ‘Personal experience of Space’ is lacking consistency. ‘Policy Remarks’ are often discussed, however, discussions on brownfield phenomenon seems to miss in transcripts suggesting that brownfield is not yet pursued as a phenomenon or not the major topic of discussion.

Code Theory Model

Code Relations with respect to code re-occurrence

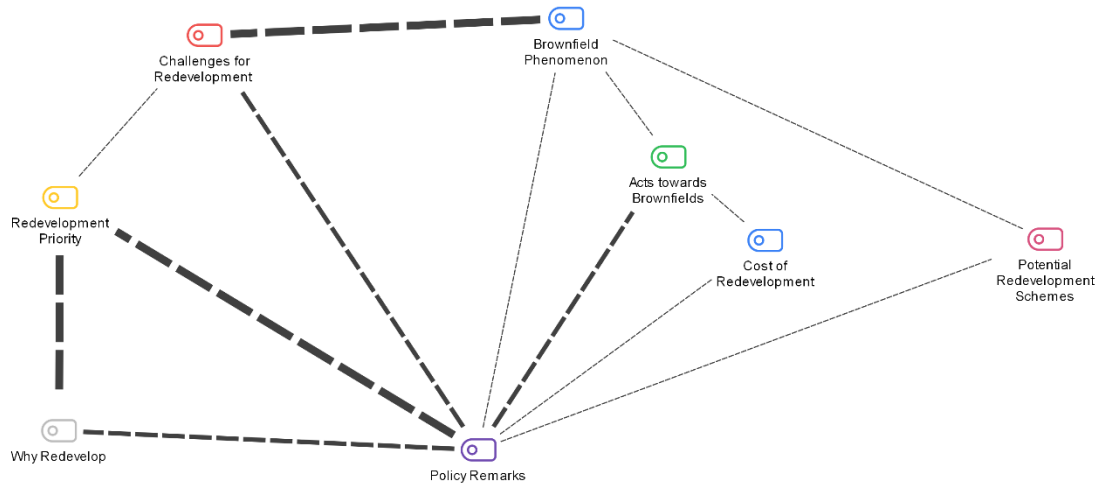


Figure 34 Policy Remarks: Code Theory Model

5.2.1.6 Conclusion: Integration of Insights

- 1) Industries revival depends on agriculture, so incentive model should be developed
- 2) Revival and Redevelopment creates Jobs, uplifts society and has potential to change the architecture and economics of the area
- 3) Glory of Industries should be conserved

5.3 Comparative Matrix: Citizen’s Participation Vs Inspection Request

This analysis examines two distinct yet interconnected frameworks for evaluating community engagement and project outcomes: the Ladder of Citizen Participation and an Inspection Report. The Ladder of Citizen Participation serves as a theoretical model to assess the degree of influence communities wield in decision-making processes, while the Inspection Report provides a practical lens to evaluate the resolution of environmental, social, and cultural grievances.

The juxtaposition of these frameworks reveals critical insights into the challenges of balancing project advancement with meaningful community involvement. Despite efforts to address local concerns, the outcomes often fall short of fostering genuine participation or fully alleviating dissatisfaction. This analysis underscores the persistent gap between

theoretical ideals of empowerment and the realities of implementation, inviting reflection on how to bridge this divide for more equitable and sustainable outcomes.

Criteria	Ladder of Citizen Participation	Inspection Report
Level of Involvement	Limited to Tokenism	Reactive opposition
Key Concerns	Lack of Direct Community Control	Environmental, Social and Cultural grievance
Institutional Response	Minimal Participation in decision-making	Two-tier grievance redress mechanism
Outcome	Project proceeded with limited community influence	Local concerns partially addressed, but dissatisfaction remained

Table 1 Participation Dynamics of Chobhar Dry Port

By exploring these themes, we can aim to contribute to a broader conversation about the importance of inclusive governance and the need for mechanisms that ensure community voices are not merely heard but actively shape the decisions that affect them.

5.4 Performance Indicators for Evaluating Brownfield Policy

This analysis evaluates the effectiveness of brownfield redevelopment policies through a set of key performance indicators, including tax relief, private investment, site end use, cleanup costs, and public investment. Brownfield redevelopment plays a crucial role in urban regeneration, transforming underutilized or contaminated land into productive spaces while addressing environmental and economic challenges.

Performance Indicators of Case Areas				
Indicators	Birgunj Sugar Mills	Janakpur Churot Karkhana	Biratnagar Jute Mills	Hetauda Kapada Udhyog
Property Value	High Value	High Value	High Value	Within Industrial District Jurisdiction
Tax Relief	Yes	Yes	Yes	Yes
Parcel Size	Large	Medium	Large	Large
Private Investment	Not Approached	Not Approached	Approached	Approached
Market Condition	Good	Good	Medium-Good	Good
End Use of Site	Repurposed Development	Revive/Repurpose	Revive	Revive
Return on Investment	High	High	High	High
Cleanup Cost	High	Medium-High	Medium-High	Medium-High
Agency or Administrative Program Familiarity	Not Familiar	Not Familiar	Not Familiar	Not Familiar
Public Investment	No	No	No	No

Table 2 Performance Indicators of Case Areas

The data presented highlights trends in policy implementation, such as the consistent provision of tax relief and the gradual increase in private sector engagement over time. However, it also reveals persistent challenges, including high cleanup costs and a lack of public investment, which may hinder broader progress. By examining these indicators,

this analysis seeks to identify strengths, gaps, and opportunities for improving brownfield policies to ensure sustainable and equitable urban development.

The findings aim to inform policymakers, stakeholders, and practitioners, offering insights into how to enhance the efficiency and impact of brownfield redevelopment initiatives for the benefit of communities and the environment.

5.5 Redevelopment Strategy Using Code Theory Model

This Code Theory Model for Redevelopment Strategy presents a structured approach to brownfield redevelopment by identifying key elements such as redevelopment priorities, challenges, social management plans, policy remarks, and reasons for redevelopment. Based on this model, a comprehensive development strategy can be derived for the redevelopment of brownfields, particularly industrial derelict sites, ensuring economic, social, and environmental sustainability.

5.5.1 Development Strategy for Brownfield Redevelopment

5.5.1.1 Establishing Redevelopment Priorities

Redevelopment should be prioritized based on economic necessity, urban expansion needs, and industrial revival potential. The model highlights that brownfield restrict the natural growth of urban areas, such as in Birgunj, where industrial decline has impacted the surrounding economic activities. The strategy should focus on:

- a) Reintegrating brownfields into urban and regional economies by utilizing their strategic locations.
- b) Encouraging agricultural-industrial linkages, as seen in the sugar mill example, where farmers can supply raw materials to redeveloped industries.
- c) Aligning redevelopment with high-budget infrastructure projects to ensure financial viability.

5.5.1.2 Addressing Key Challenges in Redevelopment

Brownfield redevelopment is often hindered by land ownership disputes, outdated machinery, and financial constraints. The strategy must include:

- a) Clear land acquisition policies to resolve disputes and encourage private investment.
- b) Modernization of industrial infrastructure through financial incentives and technical support.

- c) Government facilitation in land transfer and funding mechanisms, especially in state-owned enterprises.
- d) Conflict resolution frameworks to handle potential social unrest, especially in communities reliant on these industries.

5.5.1.3 Implementing Social Management Plans

The redevelopment process should be inclusive, addressing social challenges and employment generation:

- a) Job creation as a primary goal—redeveloped brownfields should provide employment opportunities for displaced workers and new labor forces.
- b) Community-driven industrial revitalization, ensuring that redevelopment meets local needs.
- c) Strengthening governance frameworks to guide market quality, ensuring sustainable economic benefits.

5.5.1.4 Policy and Governance Frameworks

For effective redevelopment, the government must establish strong policy frameworks that promote collaboration between public and private entities:

- a) Public-Private Partnerships (PPP) should be leveraged to fund large-scale redevelopment efforts.
- b) Defining a model for redevelopment project identification to streamline decision-making.
- c) Government participation in redevelopment to regulate and ensure quality outcomes.

5.6 Assessing extent of Brownfields

The first objective of this research—to *assess the extent of brownfields in Nepal*—has been explored through a multi-scalar and multi-method approach, combining site-specific analysis with broader policy and institutional review. The study began by engaging with existing literature, national policy documents, and historical records to understand how the concept of brownfields is interpreted, or overlooked, in the Nepali context. It was found that Nepal lacks a formal recognition or classification system for brownfields. While international definitions generally describe brownfields as previously developed

land that is no longer in active use and may be contaminated, such a category does not explicitly exist in Nepali urban or environmental planning frameworks. This absence in policy and terminology has led to limited documentation of such sites, making it necessary for this research to identify and define brownfields based on observed characteristics, industrial history, and current land use status.

To further assess the extent of brownfields, five case study sites were selected based on their industrial legacy and present condition: Chobar Dry Port, Hetauda Kapada Udhyog, Birgunj Sugar Mill, Janakpur Churot Karkhana, and Biratnagar Jute Mill. These sites were investigated through field visits, photographic documentation, stakeholder engagement, and review of municipal-level planning data where available. In all five cases, the sites exhibited characteristics commonly associated with brownfields—namely, they were inactive or underutilized, often fenced-off or decaying, and no longer contributing meaningfully to the local economy. The scale of these sites ranged from a few hectares to large parcels of urban-industrial land, revealing the significant footprint that these underused lands occupy in Nepal’s urban landscape. The spatial dispersion of these sites across different regions further emphasizes that the brownfield phenomenon in Nepal is not isolated but rather indicative of a broader post-industrial condition.

Assessing Extent of Brownfields				
Sites	Birgunj Sugar Mills	Janakpur Churot Karkhana	Biratnagar Jute Mills	Hetauda Kapada Udhyog
Locations	Birgunj, Parsa	Janakpur, Dhanusha	Biratnagar, Morang	Hetauda, Makwanpur
Ownership Status	Government Owned	Government Owned	Government Owned	Government Owned
Physical Condition	Derelict Industrial Infrastructure	Semi-decayed, partially reused	Large-site,	Closed, Semi-reused

Assessing Extent of Brownfields				
			Partially dialapidat ed	
Level of Contaminati on	Medium(assumed)	Low to Medium	Medium to High	Low
Historic Use	Sugar Production/ Distillery	Cigarette Manufacturing	Jute Processin g, Products and Exports	Textile Manufacturing
Present Use/Status	a) Abandoned/ Non- functional b) Administrati ve Building currently used as District Court	a) Factory Block Abando ned b) Currentl y used as Provinc e Ministry	Abandone d/ Functiona l	a) Factory Block Abando ned b) Used as Armed Police Force Base
Redevelopm ent Potential	High	Moderate	High	Moderate to High

Table 3 Assessing Extent of Brownfields

In addition to documenting the physical state of the sites, the research also explored their locational contexts, patterns of urban encroachment, and the nature of interim land uses, if any. It was observed that several of these brownfields are located in rapidly urbanizing areas, making their inactive status more pronounced in contrast to their surrounding growth. For instance, the Chobar Dry Port site, situated close to the Kathmandu Valley's

southern edge, remains largely unused despite its strategic positioning. Similarly, Hetauda Kapada Udhyog, once a symbol of industrial vitality, now stands derelict amidst a growing urban settlement. These findings suggest that the extent of brownfields in Nepal is not only significant in physical terms but also in terms of their lost potential within evolving urban systems. By establishing a working understanding of brownfields in Nepal through field-based evidence and contextual analysis, the research fulfills its first objective and lays the foundation for deeper inquiry into barriers and redevelopment possibilities.

5.7 Barriers to Brownfield's Reuse

The second objective of this research—to *understand the barriers to the reuse of brownfields*—was addressed through qualitative thematic analysis of stakeholder perspectives, particularly insights gathered from interviews with government officials, policy experts, and local stakeholders. The findings reveal a complex, layered set of challenges that span institutional, legal, socio-political, and economic domains. These barriers do not merely delay the process of brownfield reuse but often entrench abandonment and disinterest among potential actors. Through the application of QTT coding, several recurrent themes emerged that illustrate the systemic and situational obstacles in reactivating these post-industrial landscapes.

A recurring theme was the lack of policy clarity and coordination across Nepal's three-tiered governance structure. According to Minister Damodar Bhandari, ambiguities in roles and responsibilities among federal, provincial, and local governments have created friction and inaction. This institutional dissonance has obstructed coherent planning and stalled initiatives aimed at industrial revival or land repurposing. Furthermore, officials at the Ministry of Industry, Commerce and Supplies (MOICS) indicated that the very question of reviving certain industries remains a *debatable subject*, with divergent views within government circles on whether such efforts are economically or socially viable. Even when policies exist, they are in an infancy phase—insufficiently developed and poorly implemented. The slow pace of adoption was cited as a major concern by multiple informants, reflecting a lack of administrative readiness to steer brownfield projects forward.

Another key barrier is the exploitation of revival programs by fraudulent industrialists, as noted by Kabindra Nath Thakur. The absence of strong accountability mechanisms has

allowed certain actors to take advantage of government subsidies or incentives without demonstrating genuine intent to operate or repurpose the sites. This has created mistrust and further discouraged legitimate investors or partners from engaging. Additionally, land acquisition remains a contentious issue, particularly evident in the case of Biratnagar Jute Mill, where long-standing debates and unresolved ownership questions have hindered progress, as pointed out by Shyam Lama. Pramod Acharya highlighted how frequent riots and backlashes, often sparked by labor disputes or local dissatisfaction, continue to destabilize redevelopment efforts, creating an atmosphere of uncertainty. Moreover, the presence of same-sector industries in close proximity to former public enterprises has sometimes created competitive disincentives, where neighboring industrial actors view redevelopment as a threat to their market share or workforce dynamics. These barriers collectively form a web of structural and situational impediments that complicate any forward momentum in brownfield reuse.

5.8 Opportunities for redevelopment

The third objective of this research is *to explore and identify opportunities for the redevelopment of industrial brownfields* in Nepal. This objective moves the focus from constraints to possibilities, framing brownfields not only as derelict liabilities but also as underutilized assets capable of supporting a range of urban, economic, and community needs. Analysis of interview data and field observations revealed a variety of pathways through which brownfield sites can be reactivated to benefit both local communities and broader urban systems. The findings show that while institutional hurdles exist, opportunities can be unlocked through policy innovation, multi-stakeholder partnerships, and adaptive reuse frameworks.

Developing brownfield sites—previously used or underutilized urban land—offers significant advantages over new developments on undeveloped land. One of the primary benefits is the presence of existing infrastructure, including roads, electrical grids, water systems, and sewage networks, which can substantially reduce construction costs and project timelines. Additionally, many brownfield sites contain existing structures that can be repurposed or renovated, further lowering development expenses. These sites are often owned by government entities or have clear ownership, minimizing the complexities and disputes associated with land acquisition. Moreover, redeveloping brownfield areas contributes to environmental sustainability by reducing urban sprawl and preserving

greenfield sites, while also revitalizing communities through job creation and improved property values. Overall, brownfield redevelopment leverages existing assets to promote efficient, cost-effective, and sustainable urban growth

One significant opportunity lies in the conversion of brownfields into multi-use urban spaces. Vacant industrial plots, due to their size and location, present viable land banks for integrated redevelopment into mixed-use neighborhoods, educational institutions, logistic centers, or public amenities. Several respondents emphasized that these lands are often strategically located in growing urban peripheries, offering spatial advantages for transit-oriented development or decentralization of services. Additionally, redevelopment could help relieve pressure on greenfields by redirecting investment towards already disturbed land, thus aligning with principles of sustainable urban growth.

Moreover, policy reforms and institutional restructuring were frequently mentioned as key enablers. Stakeholders suggested that the transition of public enterprises to private or community-led models could stimulate interest and investment. Interviewees proposed that Public-Private Partnerships (PPPs), special economic zone designations, and land readjustment strategies could incentivize redevelopment. In cases like Chobhar Dry Port and Birgunj Sugar Mill, there is potential for repositioning these sites as regional economic hubs, logistics parks, or innovation zones with the right mix of infrastructure and regulatory support. Lastly, local government willingness to collaborate—particularly in areas where municipal leadership is proactive—was recognized as a critical asset. The presence of nearby educational and industrial institutions further enhances the contextual relevance and practical feasibility of brownfield reuse.

Opportunities Assessment			
S.N.	Study Area	Component	Description
1	Janakpur Churot Karkhana	Reuse Strategy	a) Adaptive reuse of factory structure for cultural museum, gallery, and market b) Build structure for Office of Secretariat catering the need of Province Ministry
		Land Use Mix	Cultural + Commercial + Open/Public Space
		Economic Driver	Local Crafts market, event venues, creative incubators
		Environmental Input	Green Buffer zone, water harvesting systems
		Governance Model	Municipality-led private operator for commercial components
2	Hetauda Kapada Udhyog	Reuse Strategy	Adaptive reuse of factory structure as training hub
		Land Use Mix	Vocational Training + Public amenities
		Economic Driver	Livelihood Centers, tailoring units, small businesses
		Environmental Input	Eco-Retrofit
		Governance Model	Co-operative-led model supported by provincial government and Industrial District Management Limited

Table 4 Opportunity Assessment (1)

Opportunity Assessment			
S.N.	Study Area	Component	Description
3	Birgunj Sugar Mills	Reuse Strategy	Demolish unsafe structure, rehabilitate viable ones for incubation hubs
		Land Use Mix	Agro-Industrial + Educational + Residential
		Economic Driver	Agro-tech research centers, farmers co-operatives, sugar processing
		Environmental Input	Biomass energy reuse
		Governance Model	Cooperative-led model supported by provincial government
4	Biratnagar Jute Mills	Reuse Strategy	Preserve Historic Buildings for museum and educational use
		Land Use Mix	Industrial Heritage + Educational + Business Incubators
		Economic Driver	Startups in eco-textiles, museum
		Environmental Input	Air Quality and Noise Buffering Zones
		Governance Model	Federal cultural agency and NGO partners for training

Table 5 Opportunity Assessment (2)

CHAPTER 6: Conclusion

The research presented in this thesis, titled *"Urban Reuse of Brownfields: Exploring Brownfield Phenomenon and Redevelopment Scenarios for Industrial Brownfields,"* has systematically examined the challenges and opportunities associated with the redevelopment of industrial brownfields in Nepal. Focusing on five historically significant sites—Birgunj Sugar Mills, Janakpur Churot Karkhana, Biratnagar Jute Mills, Hetauda Kapada Udhog, and Chobhar Dry Port—the study has provided a comprehensive analysis of the socio-economic, environmental, and policy dimensions of brownfield redevelopment.

Key Findings

- 1. Extent of Brownfields:** The study confirmed the prevalence of industrial brownfields across Nepal, characterized by abandonment, underutilization, and varying degrees of environmental and infrastructural degradation. These sites, once pillars of Nepal's industrial economy, now represent untapped potential for urban regeneration.
- 2. Barriers to Redevelopment:** The research identified multiple barriers, including unclear policies, institutional fragmentation, land ownership disputes, financial constraints, and community resistance. These challenges are compounded by a lack of coordinated governance and accountability mechanisms.
- 3. Opportunities for Revitalization:** Despite the barriers, the study highlighted viable pathways for redevelopment, such as adaptive reuse, public-private partnerships (PPPs), and integration with broader urban and economic strategies. The strategic locations of these sites offer opportunities for mixed-use development, logistics hubs, and cultural or economic revitalization.

Contributions

Policy and Practice: The findings underscore the need for a structured national framework to classify and manage brownfields, incorporating incentives for private investment and community engagement.

Methodological Rigor: The use of qualitative and mixed-method approaches, including field observations, stakeholder interviews, and policy analysis, provided a nuanced understanding of the brownfield phenomenon in Nepal.

Global Relevance: While contextualized to Nepal, the study contributes to the global discourse on sustainable urban development by addressing the unique challenges faced by developing economies in brownfield redevelopment.

Final Reflection

The transformation of industrial brownfields into vibrant urban spaces is not merely a planning challenge but an opportunity to redefine Nepal's urban future. By addressing systemic barriers and leveraging the inherent potential of these sites, Nepal can turn its industrial relics into engines of sustainable growth, cultural preservation, and community well-being. This research serves as a foundational step toward that vision, advocating for context-sensitive, inclusive, and forward-thinking redevelopment strategies.

In conclusion, the revitalization of brownfields is a critical component of Nepal's urban sustainability agenda. It requires collaborative efforts from policymakers, private investors, and local communities to unlock the socio-economic and environmental benefits of these neglected landscapes. The lessons drawn from this study can inform similar initiatives in other developing contexts, contributing to the global pursuit of equitable and resilient urban development.

CHAPTER 7: Recommendations

The findings of this research underscore a complex landscape of political ambiguity, institutional stagnation, and socio-spatial contestation that inhibits the productive reuse of industrial brownfields in Nepal. In light of these insights, the following recommendations are proposed to address the systemic and site-specific barriers identified through qualitative trend tracking (QTT) and stakeholder consultations.

S.N.	Recommendation Area	Description
1	Institutional Framework	<ul style="list-style-type: none"> a) Establish dedicated Brownfield Redevelopment Authority under MoUD b) Develop standardize guidelines for brownfield's identification, classification and redevelopment protocol
2	Policy and Regulation	<ul style="list-style-type: none"> a) Introduce brownfield-specific clauses in National Land Use Policy b) Implement tax incentives and FDI provisions to encourage redevelopment projects
3	Community Engagement and Cultural Integration	Ensure that redevelopment plans are sensitive to local heritage and incorporate community needs through participatory planning
4	Public-Private Partnership	Participate PPP models, particularly for large-scale, with performance-based incentives
5	Capacity Building and Knowledge Dissemination	Initiative training programs for planners, architects and local government in brownfield regeneration methodology

Table 6 Recommendations

First, there is an urgent need for clarity and coordination in policy frameworks across Nepal's three tiers of government. The prevalence of fragmented governance and jurisdictional overlap has consistently hindered the progress of brownfield revitalization. A central recommendation is to establish a dedicated intergovernmental task force or regulatory cell focused specifically on industrial brownfield redevelopment. This unit should harmonize objectives between federal, provincial, and local governments, outline clear procedural pathways, and facilitate faster decision-making for land use transformation. The development of a national brownfield inventory and a corresponding redevelopment roadmap would provide both direction and transparency to future initiatives.

Secondly, the research calls for a review and strengthening of institutional safeguards to prevent the misuse of revival programs. Loopholes in government initiatives have enabled fraudulent industrialists to exploit state support without delivering tangible revival outcomes. To combat this, it is recommended that the Ministry of Industry, Commerce and Supplies (MOICS) and other responsible agencies implement monitoring mechanisms, project audits, and beneficiary vetting processes. Integrating third-party evaluations and public disclosure protocols can build accountability and public trust in redevelopment efforts. Simultaneously, capacity-building programs targeting municipal and provincial officials would enhance the implementation of policies still in their infancy, as noted in observations from various informants.

Thirdly, resolving land-related disputes and improving community engagement is central to easing redevelopment. The case of Biratnagar Jute Mill reveals the friction created by land acquisition debates and local resistance. Therefore, a participatory land readjustment model could be introduced—where stakeholders, including former employees, local residents, and private investors, jointly negotiate the distribution of land value and post-redevelopment benefits. Transparent land transfer mechanisms and conflict-resolution forums must be institutionalized within these processes. Furthermore, redevelopment plans must be accompanied by robust stakeholder communication strategies, co-design workshops, and grievance redress mechanisms to manage tensions and mitigate backlash. Lastly, brownfield planning should incorporate contextual spatial analysis, especially regarding the proximity of same-sector industries near former public enterprises. In locations where existing industries already cater to the same production niche, the scope for re-industrialization may be limited. Instead, redevelopment plans should consider

adaptive reuse options more attuned to the local urban economy, such as logistics, education, or community-oriented infrastructure. This approach would promote functional diversity, reduce sectoral redundancy, and enhance integration into urban systems.

In sum, the reuse of industrial brownfields in Nepal requires a multi-pronged approach that addresses legal, institutional, spatial, and community challenges simultaneously. Policy reforms, transparent governance, inclusive planning, and strategic repurposing of land can together unlock the latent potential of these neglected spaces and contribute meaningfully to Nepal's urban and economic renewal.

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Annex A- Interview Transcripts Samples

Wednesday, 22 January 2025

INTERVIEW - AR. YATEEN KISHOR LABH [SEED]

Nearby Resident at Birgunj Sugar Mill

Former Architect at PUDBC (Project Office of Urban Development and Building Construction)
Seed(1)

Link 1: Mr. Hari Shrestha (Local Resident)

Link 2: Mr. Surendra Jha (Employee at Birgunj Sugar Mill)

Q. As you've experienced, what do you personally feel about the issue of industrial derelicts? What differences have you seen in local and economic scene around here?

R. Should I specifically take about Sugar Mill or others as well ?

Q. Since we're discussing local scene, Let's talk about Sugar Mill.

R. The market is dense around Ghantaghar, the growth stopped there. Reason being, the vacant land that once belonged to Railways. Let me show you in Google Maps. There used to be railway track there, things of past. You've seen the vacant land in stretch of Ghantaghar right? The market only grew till there.

Q. Oh yes, thanks for the new insight. Who has the ownership of this portion of land?

R. Its Municipality's property now. Birgunj Municipality bought it from Railway.

Q. Do we have a railway unit here?

R. No. The railway later turned into a Transport Company or something, then municipality bought it from that entity. The masterplan for the land is prepared, actually.

Q. Oh, really? What were the plans?

R. Plans for Khulamanch, Parking Space, Pani Pokhara, Convention Center, Central Park etc. were conceptualized.

Q. What do you think is the most appropriate use for this piece of land?

R. If we combine two portions of land along the stretch, Central Park is the best fit for the land. We have nothing of such around here, also the the locational benefits of the land can be a good landmark for Birgunj. Its so dense around the area, unused land only seems to acts like a buffer.

Q. Isn't it good to have a buffer, since it serves as a buffer?

R. Its better we limit the use of land as buffer without using the land as buffer in entirety. I believe the market growth should not be restricted just because we couldn't figure what we should do with the land. In terms of economic potential of area, we can see huge number of businesses can be run, even in limited portion of this land.

Q. Moving ahead, is there any cases of contamination around the site area of Birgunj Sugar Mill ? Are people hesitant to use the land because its contaminated and safety concern?

R. No, the mill has been closed for long and there is no trace of contamination so far, however I cannot say for sure.

Q. In your opinion, what is the best use case for the Mill Site?

R. The best case is to use the site for its original purpose, i.e re-operating the Sugar Mill again. If you see the local scenario, 3 new Sugar Mill is being established in this year alone. One is being constructed in Supauli, Parsa. Another in Kalaiya. These are private run mills.

Q. Are you familiar with existing and running Sugar Mill around here?

R. One is in Garuda, Rautahat named Shree Ram Sugar Mills and another Reliance Sugar and Chemical Industries Private Limited in Kalaiya are the ones I'm aware of.

Q. What do you think, the development of these unused Mill Sites can bring to Local Community?

R. Major advantage would be, creation of Job Opportunities of-course. Opportunities for farmers will be open, since they can sell sugarcanes and similar.

Q. What is employment dynamics in industries around here?

R. We can take Surya Nepal for example, many farmers farm and supply tobacco to them. Also many are employed within factory, so it has directly and indirectly employed number of people around here. Same can be seen for Sugar Mill, if the mill operates, I can be guaranteed that sugarcane will be bought from me.

Q. Do you know of stories relating to Sugar Mill? That you've seen/heard or anything from memory.

R. Not particularly. But I remember hearing sirens from Sugar Mill while I was in school.

Q. Having worked in PUDBC and participated in redevelopment discussions, what do you think are major challenges for redevelopment of Mill Site?

R. We have to do it all over again, all machineries are old, rusty and outdated as well. Also investment is a challenge.

Q. Is Birgunj Municipality financially capable to fund the restoration and set-up new plants?

R. No I don't think Municipality is capable of it. I am not sure if Nepal Government can too. Haha. I think it depends on if Government is at all interested in reviving it.

Q. Thank you for your time and insights.

R. If there is more I can help you with, please let me know.

Monday, 10 February 2025

INTERVIEW: MR. SHYAM LAMA [SEED]

Former Employee at Biratnagar Jute Mill [Present: Contract Employee]

Seed: Mr. Shyam Lama

Link 1: Mr. Himal Gautam

Q. Can I record this interview?

R. Yes.

Q. Let me introduce myself; I am Saroj, a student at Pulchowk Campus. I am pursuing my Master's degree in Urban Planning and I am here to learn the scenario of Biratnagar Jute Mill as a part of my Thesis Research. I am currently conducting a research about Brownfields and potential reuse of Industrial Derelicts. I am here to learn present condition of the mill and what people have to say about closed mill. I came to know that you have spent significant years of your life in this Jute Mill and you're directly exposed to stories of its time. Can you please share your views and experiences of Biratnagar Jute Mill?

R. My name is Shyam Lama. I entered Jute Mill at 2038 B.S. as Junior Employee. I work here on contract basis now. Based on my personal views, Biratnagar Jute Mill used to be in a very very good condition. The enterprise was very profitable, market was good, production was good and exports were good too. Authorities and Local Administration changed overtime, now this Jute Mill lies in Ward No. 16.

Talking about Jute, we need to grow Patsan(Pat) plant to produce Jute. Pat was cultivated widely in three regions, Morang, Sunsari and Jhapa. The mill used to buy them in huge quantity to produce Jute. Farmers were motivated to cultivate Pat, since it was a cash-crop with high demand. Later when governance started to fail, farmers started to get low value for the crop, then they chose to cultivate other crops over Jute.

The present scenario is such that other Jute Mills around here buy raw Jute from India and Bangladesh and produce Jute Products. They prepare finished goods and are able to supply to India and Bangladesh as well. You may have observed that this area is named Mills Area, because there used to be other factories, mills, workshops etc. surrounding

Biratnagar Jute Mill. Biratnagar Jute Mill structured the scene of Mills Area and set an identity for this place.

Q. Now that the Mill is closed, what perception is common among people around here?

R. If the Mill revives, it creates huge Job Opportunity. Public are under same expectations. Public around here have to travel long distances to work for other factories and mills. If Biratnagar Jute Mill is brought back to operation, all these workers will definitely work here.

Government has somewhat decided to stop running factories and industries under its name. Many Public Enterprises are planned to re-operate under Privatization model now. Biratnagar Jute Mill is a government owned enterprise, plans for its privatization is rumored for long. Plans and Policies are devised for the same, but there is no concrete conclusions that we know of. Mills Area has an identity for itself, and to retain it, factories and mills need to be established and operated.

Moreover, we need job opportunities to counter prevailing social problems as well. Here we are in boarder area and cases of stealing, theft, drug addiction etc. is in large scale. I personally believe we can uplift the society out of these scenes; if industries are run.

Q. As a former employee, I heard you were in sports as well, can you detail me how the environment used to be in and around the Jute Mill Area while it was in full operation?

R. Its better if we talk about specific circumstances and time in history. We'll have to talk about Panchayat era, talking about which is a little unsettling. During the monarchy, there used to be lot of mills and factories, as I said before. You are an Architect and you've toured the area, I think you can imagine how the work environment could have looked like. But sports environment around the mill was different and exceptional. Biratnagar Jute Mill, Raghupati Jute Mill and Sugar Mill had reputation for creating and bringing out athletes. We had our jobs/duties, and we could play sports too, scenario was like such. I didn't enter Biratnagar Jute Mill as sportsman however, I came here as a Junior Employee to work. All my seniors came to Jute Mill as employees, supervisors and labors, they were not hired as sports person. Later, Mill used to hire sportsmen as employees too. Sports represented the institute, so there were provisions for athletes.

Q. What sports were you in?

R. I played Soft-Tennis. I represented Nepal in International matches, so I am automatically a national player. I went and played in 4-5 international matches. I went Doha to play Asian Games; Japan, Korea and Thailand.

Q. I observed couple of residential buildings built inside Jute Mill's premises while entering the area. How is this encroachment issue addressed by Jute Mills administration?

R. In the past when Jute Mill was marking its perimeter and making boundary walls, it was the time of Jimdars, Patwari. Land parcel that belonged to Utin Lal Jimdar at the time was also acquired by the Mill in the process. In year 2018/19, Supreme Court gave its verdict such that, the debated land can't be sold and the institute has to pay certain amount to Utin Lal as compensation (Kud ko rup maa baali ko rakam bujhauna parne). Land Use Plans, Land Improvement Plans etc were imposed and revised in different manners in due course of time. Eventually, he could sell his land property. The land area is total of 2 Bigha 5 Kattha 16 Dhur. He claimed them and he sold around One Bigha of Land to buyers. In this manner Biratnagar Jute Mill area was segmented and it is one of the reasons why our boundary is open. There used to be Dispensary and other supporting structures, now dismantled and gone. But as I mentioned earlier, the land was not sellable as decided by Supreme Court. Now you can see the real-time scenario yourselves.

Q. Sir I visited the Turbine Area, Workshops and others spaces and it feels like we had huge feat in field of mechanical engineering.

R. The Turbine Power Plant was closed in 2039/40, if I recall. The plant used genuine coal as fuel. We used to get the coal from India. Power generated from Turbine used to provide electrical supplies to whole of Biratnagar. I don't recall the exact issue but it was related with NEA's power supply and something. There was huge layoffs around the time too and eventually the plant was permanently closed. Its design and history can be traced back to times of Titanic, it has history of its own.

Q. The Jute Mill completes its 100th year in 2036 I.e 11 years from now. I guess it'll potentially be listed as Industrial Heritage. In that case, how do you think this place should be transformed or what do you think will be best alternate use for Mill?

R. Primary need of the place is creation of Jobs. As I discussed earlier, there are many prevailing social problems in this border area. So I think it should be operated in its intended use. Government is also interested in reviving the industry. New Board of Directors is formed and are in act from Ashad,2081, they are given minute and are mobilized to implement them. They are required to prepare necessary documents required to accelerate the revival process. We are here to assist and prepare detailed audit report for the same. Auditors are going to be here anytime. After all documents are prepared, it will be reviewed by Department of Industry, Department of Finance and finally decisions from Council of Ministers will lead the way to Mills revival.

Q. That will be all sir. Thank you for your time and for sharing your insights.

R. Thank you too. We are indeed in need of research like yours. Hope you'll do well on your Thesis Research and hopefully it will be useful for institutions and decision making bodies.

Friday, 7 February 2025

INTERVIEW: ER. PRAMOD ACHARYA [LINK 4]

Civil Engineer at Nepal Intermodal Transport Development Board(NITDB)

Seed: Ms. Santa Budhathoki

Link 1: Mr. Laxman Bahadur Basnet

Link 2: Mr. Sharad Bikram Rana

Link 3: Mr. Ashish Gajurel

Link 4: Mr. Pramod Acharya

Link 5: Mr. Hemanta

Q. Can you please brief me backgrounds of Himal Cement Factory(HCF), Dry Port and stories surrounding redevelopment?

R. Sure. Initially the land(jagga) belonged to Himal Cement Factory. Government decided to shut the factory as it was located close to nearby settlements and pollution posed major problem. While the factory was closed, administration still operated. Multiple plans were conceptualized to what can be done with remanent factory properties. Plans to relocate Sukumbasi Basti, Waste Treatment Plant etc. were envisioned but public backlashed against these plans. The company decided to auction the property for alternative use and after discussing use cases for the property; plans to develop ICT was put forward.

The company had loan liability with NIDC(Nepal Industrial Development Corporation), NIDC is merged with Rastriya Banijya Bank now. NIDC decided to acquire and auction sell lands to recover the loan. Then, Nepal Government decided to pay loan amount to NIDC and bring land ownership under government's name. Now, its owned by Nepal Government. I cannot recall the actual area, but its huge. You see, the hills surrounding this area, NITDC Office, NEA's Substation, etc lies within property's periphery. The Government decided to provide us this portion of land to open and operate ICT Office. In other portions, The Government plans to build an International Exhibition Venue (IEV) and such others.

Q. Do we have physical evidence of HCF structure and buildings? Is Dry Port constructed on portion of land where HCF was originally run and situated?

R. Yes, the Dry Port Area is accurately where previous factory was situated. Building and Factory Structures were dismantled.

Q. As you said, many plans were conceptualized previous to developing land as Dry Port, what course led to these decisions?

R. What happened was, World Bank was conducting studies on identifying probable location to open Container Freight Station(CFS) that caters to storage needs for Kathmandu Valley. CFS and Dry Port are somewhat similar, however their terminologies differ. Big portion of land was required to operate CFS. Bhaktapur, Balaju (Industrial District Area), and Chobhar were listed as feasible options, among with Chobhar was identified as best fit. The World Bank funded the project.

Q. Moving forward to implementing this project, what works on Focused Group Discussion(FGD), Public Consent, EIA were conducted? What problems did you face?

R. We encountered cases where local claimed that they didn't get any compensation during government's land acquisition that they were entitled to. Lack of proper record keeping posed an issue where both government and previous land owner had Land Ownership Registration Certificate(Lal-Purja) for same parcel of land in areas except for Factory Area. That's were one policy came to an act, it detailed a rule that after land acquisition process is complete with proper distribution of compensation to listed owners, no complaints shall be registered and claimed. Riots and backlashes emerged to stop the implementation telling that Dry Port causes pollution and etc.

Q. What percentage of land does the current dry port occupy of the total land area ?

R. The total land area is around 1100 ropanies approximately, I don't know the exact figure. I can recommend you someone who can provide you with these details.

Q. Can you provide me reports, or anything that can be of help, that details about plans and procedures of this redevelopment?

R. Nepal Government tasked us with developing this particular parcel of land only. Following decisions made by Council of Ministers, we moved forward with preparing development plans for the Dry Port area only.

Some lands are still disrupted and debatable and therefore we cannot provide you with cadastral details of land. However, we will provide you with anything that can be of your use.

Q. Since I am also analyzing spatial attribute of the Dry Port, can you provide me with masterplans, design reports or anything of such?

R. Yes, we can share masterplans and design reports for your use.

Q. What was the projected budget for redevelopment, how much did it actually cost and how is Dry Port currently operating?

R. Our estimated project cost was 1.63 Billion Rupees (1Arba 63Crores), after tender processes project was completed in 1.44 Billion Rupees (1Arba 44 Crores). These are approximate figures, you'll be provided accurate data later. There was no cost over-run in this project, it was completed below the projected cost.

Q. How much time did project preparation take, what was project implementation time-frame and how long has it been operating since completion?

R. It has been operating for nearly 2 years now. We planned on operating the Dry Port in Public-Private Partnership model and therefore we developed the Chobhar ICD(In-Land Container Depot) and chose private party for its in-management and operations. Private Party handles all management operations of Dry Port.

Q. So you basically lease-out the property for term period? What is the contract period?

R. Yes, we lease out. The contract period is 5 years. After 5 years, we call in bidders again. Selection criteria highlights the eligibility, proficiency and revenue sharing models.

Q. What year can we mark as start point?

R. We can mark 2014 as commencement year. Works relating EIA, Design Preparation, Discussions with Donors etc. started around the time. The project is listed under the Project NIRTTP (Nepal-India Regional Trade and Transport Project), the evaluation of

proposals for building the **Mugling-Narayanghat road section** was in the final leg around the time and this project was conducted under same project.

Q. What were major hurdles in development process?

R. Major challenge in implementation of such projects in Kathmandu can be based off the fact that availability of land is limited and public perception of large scale projects; they are always doubtful.

The project lies in a swampy area, so technical works (Design, Drawings and Details) had to be revised multiple times that increased time-cost for the project. Pandemic and Social Hurdles halted project initiations for 7-8 months. Now that project is successfully completed, locals around the area came to understand value of this project. The project has indeed backed the changing face of area.

Q. What has the Dry Port offered to locals? Incentives/Opportunities?

R. Yes. We've worked with local representatives, appointed staffs, security guards and local labors are employed in loading/unloading works whenever necessary. Moreover, many locals who own trucks or any vehicles are employed in ground logistics works. Since we have to hire other parties for these works anyway, its a win-win for us both. Also, we conduct locality improvement programs like adding streets lights, road improvements and others under Social Management Plan. It's an act of social responsibility.

Q. Are there any innovations adopted in the Dry Port project?

R. Yes. EIA suggested that there can be potential noise pollution around the area, so noise barriers are installed in boundary walls. It might be first of its kind in Nepal. In foreign countries, the technology is being used in residential areas to reduce noise where railway track passes through.

Q. Did you employ technical manpower to develop the design in-house or did you hire consulting services?

R. We hired services for design development works. A consultancy named Fullbright Consultancy was appointed for the task, and we had an expert consultant from India as well.

Q. Based on your personal experience, what were the major factors for project's success?

R. Major advantage of this location is its road connectivity to Fast Track. Fast Track runs along the site across the river, as previously planned, and therefore it had huge advantage of road connectivity. We have proposed a road extension plan for the same, but its implementation responsibility falls under Department of Roads, so we are waiting to see how it goes.

Q. I've reviewed some articles that said, because all customs have to be cleared in boarders itself, specific purpose for Dry Port is not clear and it had huge locational disadvantage. Is the case true?

R. The thing is, this is the first ever In-House CFS,ICD(Inland Container Depot) in Nepal. All other ICDs are situated in border area, Tatopani, Rasuwa, Birgunj etc. It was planned to seal and transport Kathmandu Bound Cargos to Chobhar Dry Port directly, to reduce congestions in border ICDs. There were delays were due to Administrative hurdles, but now there are rules that permit transports. Previously only Indian borders were open and permitted, now Northern boarders are open as well and its upto businesses to choose the service as per their relative profit.

There are two major areas in this Dry Port, one EXIM Area and another is Domestic Area. It seems like we have shortage of Domestic Area already because Kathmandu has a huge supply, and importers are in need of Warehouse that has sufficient capacity and can offer cheap storage fare. Importers are more inclined to store supplies here cause we offer cheapest rate. Also, its convenient for them to sort and control supply of imported goods as per their demand and supply models. Regarding the use of EXIM area, certain rules and regulations are unclear and some put businesses at high risks, in case anything is tampered; businesses have to bear all the loss and such. Basically its the lack of understanding, they will be used to it with time.

Q. Are there any plans for expansion ?

R. Apparently no. We've don't have open space for expansion around the Dry Port Area. Discussions about the need of additional Domestic Terminal is emerging, but there is no conclusive statements yet.

Q. My study concerns are about what can we do about similar industrial derelict areas. I've somewhat studied about Birgunj Sugar Mill, Janakpur Churot Karkhana, Biratnagar Jute Mill etc. What are your suggestions for these cases?

R. We can see difference in project scale if we compare Dry Port area to these public enterprises. Unlike Himal Cement Factory, other factories are not shut down due to pollution issues. I personally feel that public enterprises should be brought back to its intended use, they should be revived. I've heard news of private parties interested in running some of these industries, I think its better that we support such initiatives.

Q. Is it necessary that project like such should be passed from Council of Ministers first and all the rest follow?

R. No. This Dry Port is a trade facilitation project, named NIRTTP(Nepal Inter-Regional Trade and Transport Project). Under this project, a study was conducted. It showed that Kathmandu had grown significantly, yet there was no logistics hub. Moreover businesses incurred losses due to lack of proper logistics. Scenarios like: after clearing customs; there were no depots to cater the valley, big vehicles are allowed in ring-road for limited hours, high time costs etc. prevailed. So it was concluded that we are in need of in-land customs here. Following preparations, we held discussions with Department of Finance and came to an agreement to execute the project.

Q. Can you share Detailed Project Report(DPR) prepared by NITDB for research purpose?

R. Yes we can. I request you to maintain the confidentiality. However, we cannot share cadastral details with you.

Q. Thank you for your time sir, it was really insightful.

R. I hope you've found what you came here for. If you need help with anything, we're here for you.

Annex B : Comments from Jury

Jury	Comments	How addressed	Page No.
Mr. Kishore Thapa	a) Discuss why its preferable to develop Brownfield Sites over new developments	A paragraph is added in section 5.8 <i>Opportunities for redevelopment</i> discussing advantages	P.103 (para. 2)
	b) To stick to research objectives and justify how this research fulfills it	Three sections 5.6, 5.7, 5.8 is added being specific to research objectives	P.99 to P.104
	c) Discuss the alignment of research with Land Use Policy	A section 2.4.8 Land Use Policy and Brownfields is added	P.48 P.49
Mr. Kumar Prasad Lohani	a) Discuss different approaches to Brownfield's Redevelopment	<ul style="list-style-type: none"> • Section 2.2 Redevelopment: Concept and Significance is added • Reuse Strategy is discussed as components in Opportunity Assessment 	P.14 to P.16 P. 107 P.108

Jury	Comments	How addressed	Page No.
Mr. Kumar Prasad Lohani	<p>b) Graphics should be visually clear and discussed in detail</p> <p>c) Discuss land acquisition issues with evidence if there is any</p> <p>d) Update Policy Recommendations</p>	<p>Graphics has been enhanced</p> <p>Section 5.2.1.3 Important Segment from Interviews (No.3) specifically portrays limitations in land acquisitions</p> <p>Chapter 7: Recommendations has been updated</p>	<p>P. 94 to P.96</p> <p>P. 90</p> <p>P. 110</p>

Annex C: IOE GC ACCEPTANCE

Notifications



[IOEGC16] Editor Decision

2025-04-02 08:53 PM

Saroj Bohara:

We are pleased to inform you that your manuscript titled "Urban Reuse of Brownfields" submitted to 16th IOE Graduate Conference is **Accepted** for presentation in the Conference as well as inclusion in the Peer-Reviewed Proceedings. Please note that inclusion in hard copy proceedings is contingent upon your timely response to further edits, if any, during the publication process.

With Warm Regards,
IOEGC-16 Editorial Team

Annex D: IOE GC RESEARCH PAPER

IOE Graduate Conference
 (Placeholder for
 Publication
 Information)

Urban Reuse of Brownfields: Assessing Redevelopment Model of Chobhar Dry Port

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Abstract

A crucial component of urban transformation is the redevelopment of industrial brownfields, especially in areas where defunct industrial sites impede environmental sustainability and economic growth. This study examines the redevelopment of the Himal Cement Factory into the Chobhar Dry Port, a key logistics hub in Nepal. Grounded Theory Research, inductive coding, and Qualitative Thematic Analysis (QTA) in MAXQDA are used in this qualitative study to investigate themes pertaining to public-private partnerships (PPP), brownfield redevelopment, land acquisition difficulties, and citizen participation. Significant issues are revealed by the findings, such as land disputes, sociopolitical opposition, and logistical inefficiencies, all of which were resolved by government interventions and a PPP model. The study also analyzes the Inspection Request procedure and the Ladder of Citizen Participation to identify gaps in community engagement. In order to ensure the sustainable and equitable redevelopment of industrial brownfields in Nepal and comparable contexts, the research emphasizes the necessity of inclusive governance, structured policy frameworks, and stakeholder collaboration.

Keywords

Brownfield, Redevelopment, MAXQDA

1. Introduction

Brownfield sites are areas and facilities in urban areas that have lost their original intended use or are underused. Understanding what is and what is not brownfield depends on local circumstances. (Method of Identification and evaluation of BFR). Significant number of industries are derelicts in Nepal. Industries like Biratnagar Jute Mills, Gorkhali Rubber Udhog, Janakpur Churot Karkhana, Hetauda Kapada Udhog etc. have been closed since long. Socio-political issues, low competitive power, inadequate human resource development etc caused many industries to close leaving them derelict and unused. Such occurrence signifies the reality of brownfield phenomenon. In case of Nepal, brownfields can be perceived as areas and industrial/commercial facilities that have lost their intended use, are stagnant and abandoned. Considering the increased number of brownfields across the globe, brownfield redevelopment projects (BRPs) have gained significant attention. Currently most of the developed countries are welcoming BRPs and consider it an effective urban policy instrument. Whereas, the adoption of BRPs is in its beginning due to confronting challenges. Therefore, identifying sustainable solutions that could facilitate BRPs in developing countries is necessary.

In 1974, German Government built Himal Cement Factory. The government had acquired 285 houses in Chobhar Area for the factory. In August 2000, protest emerged from locals over the pollution caused by cement plant and hence Himal Cement Factory officially closed in 2002[7]. The area stood

disputed and debatable for acquisition issues until redevelopment officially initiated in June 2013 when Nepal-India Regional Trade and Transport Project (P144225) was approved from World Bank under International Finance Corporation's South Asia Regional Trade and Integration Program.[1]

With no direct access to sea, Nepal has 14 Dry Ports, among which, Chobhar Dry Port is the latest and modern facility. Most of the Dry ports are constructed at borders with China and India. The dry port is spacious for as many as 500 containers[2]. Such a large dry port was constructed in Chobhar to facilitate the import and export of goods to and from Kathmandu, the largest city of the country, as well as reduce congestion at major customs such as Birgunj, and Bhairahawa.[2] This research emphasizes on analyzing the brownfield phenomenon bordering Himal Cement Factory and its redevelopment into Dry Port. Moreover, the research aims to develop a thematic ground to understand redevelopment dynamics of industrial brownfields.

Urban Reuse of Brownfields: Assessing Redevelopment Model of Chobhar Dry Port



Figure 1: Location of dry port in Bagmati Province



Figure 2: Location of dry port in Kathmandu valley

2. Research Objective

To analyze the redevelopment scenario of industrial brownfields in Nepal through an in-depth exploration of the Chobhar Dry Port project.

3. Scope and Limitations

Researches in industrial brownfields in Nepal is highly limited. In fact, the issue is rarely acknowledged or even recognized as a significant phenomenon. By conducting fundamental research, this study hopes to close that gap and pave the way for future research in this area.

The Chobhar Dry Port is the only case study examined in this study, which may not accurately reflect the larger industrial brownfield redevelopment. Additionally, while snowball sampling allowed for in-depth insights, the reliance on one interview and five interview-based articles means the findings are shaped by a specific set of perspectives. However, since the interview reached saturation, the data sufficiently captures key themes relevant to this case.

4. Methodology

With a focus on the conversion of the Himal Cement Factory into the Chobhar Dry Port, this study uses a qualitative methodology based on constructivist and interpretivist approaches to investigate the redevelopment of industrial brownfields in context of Nepal. The study is grounded in “Grounded Theory Research” allowing for an “Inductive coding process” to generate codes and themes from collected data. This approach ensures that findings emerge organically from the data rather than being predetermined by existing frameworks. “MAXQDA” was utilized as the primary research tool to facilitate the analysis, particularly for coding, thematic exploration, and visualization of patterns. A “Qualitative Thematic Analysis (QTA)” was conducted within MAXQDA, where data from interviews and interview-based articles were systematically coded to identify recurring themes and insights. With the use of the inductive coding method, important categories pertaining to brownfield redevelopment, land acquisition difficulties, public-private partnerships, and community involvement were established. In order to strengthen the study’s analytical depth, the Code Relations Browser, Word Cloud, and Concept Maps in MAXQDA assisted in visualizing the connections between important themes. Additionally, this research integrates a comparative literature review to assess theoretical perspectives alongside actual redevelopment practices. The “Ladder of Citizen Participation” framework was employed as a comparative tool to evaluate the extent of public involvement in the redevelopment process. This study critically analyzes the discrepancies between policy intentions and implementation by contrasting theoretical participation models with actual engagement practices. Through the combination of qualitative coding, thematic analysis, and a comparative literature review, this methodological approach guarantees a thorough understanding of the redevelopment process. In this way, the study provides a systematic understanding of how to successfully transform industrial brownfields while tackling socio-political issues in urban redevelopment.

5. Literature Review

5.1 Brownfields

Brownfield sites lack a universally accepted definition, as their characterization varies based on local contexts and circumstances (Cabernet, Concerted Action on Brownfield and Economic Regeneration). In most European countries, brownfields are primarily associated with pollution-related challenges and the need for environmental remediation. Cabernet Sauvignon (2010) and Miljuš & Vujošević (2012) state that although human activity once influenced these locations, they have since been neglected or underutilized, necessitating intervention to return them to their former usefulness[3]. Brownfields, which are often found in developed urban areas, are areas that have either lost their original purpose or are still underutilized, requiring redevelopment plans that are specific to the needs of the local community.[3]

5.2 Chobhar Dry Port Project

The structured summary and table provide a clear overview of the project's funding, objectives, challenges, and the operational framework that enabled the successful completion of the Chobhar Dry Port, highlighting its role in enhancing Nepal's trade and transport infrastructure.

Table 1: Project Aspects

Aspect	Details
Total Funding	US\$101 million (US\$2 million from IFC, US\$69 million in IDA Credit, US\$30 million in IDA Grant)
Project Approval Date	June 28, 2013
Primary Objective	Reduce transport time and logistics costs for bilateral trade along the Kathmandu-Kolkata corridor; address infrastructure bottlenecks and implement modern border management practices
Components and Budget	(A) Modernizing transport and transit: US\$18 million; (B) Strengthening institutional capacity: US\$23 million; (C) Improving trade-related infrastructure: US\$69 million. Chobhar Dry Port falls under Component C2 with a US\$15.5 million allocation
Purpose of Chobhar Dry Port	To address logistical inefficiencies (e.g., inadequate truck parking, cargo storage, traffic jams, delays, and safety hazards) in Kathmandu
Location Selection Criteria	Logistical benefits, low environmental/social impact, ease of land acquisition; Chobhar selected for its connectivity and future improvements (e.g., Tarai-Madhesh Expressway, Fast Track)
Key Requirement	Government must obtain land allocation in accordance with World Bank guidelines before commencing construction
Obstacles Faced	Unsystematic land acquisition, unresolved compensation claims, local resistance due to historical land rights and environmental issues, delays in land transfers; construction halted between August 2018 and January 2019; World Bank withheld payments until grievances were resolved
Grievance Redress Mechanism	Two-tier GRM established by the Nepalese government to address and resolve local grievances, enabling project progression (confirmed by the December 2019 Bank Restructuring Paper)
Operational Model	Public-Private Partnership (PPP) model: five-year lease agreement with TransNepal Freight Services for management and operations
Expected Impact	Improved trade facilitation and reduced transportation costs when combined with other infrastructure projects like the Kathmandu-Terai Expressway

5.3 Ladder of Citizen Participation

A key element in determining the inclusivity and success of brownfield redevelopment projects is citizen participation in urban redevelopment. Arnstein's Ladder of Citizen Participation (1969) is a well-known framework for classifying the different degrees of public participation in decision-making.

5.3.1 Comprehending Arnstein's Participation Ladder

Arnstein (1969) defines citizen participation as the process through which power is redistributed from official authorities to the public. The ladder has eight rungs that are divided into three groups:

1. Non-Participation:

- (a) Manipulation – Authorities use participation as a tool to placate citizens without real influence.
- (b) Therapy – Authorities “educate” the public without meaningful engagement.

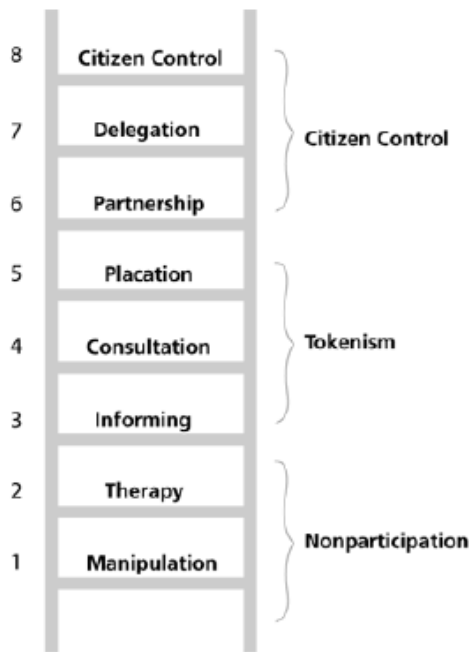
2. Tokenism:

- (a) Informing – Citizens receive information but cannot influence decisions.
- (b) Consultation – Citizens provide opinions but do not have decision-making power.
- (c) Placation – Public is involved but still lacks direct authority.

3. Citizen Power:

- (a) Partnership – Citizens share power with officials.
- (b) Delegated Power – Public has majority control in decision-making.
- (c) Citizen Control – Complete control by citizens.

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Arnstein's Ladder (1969)

Degrees of Citizen Participation

Figure 3: Ladder of Citizen's Participation

Achieving socially inclusive and sustainable redevelopment outcomes in the context of brownfield redevelopment requires higher levels of participation (partnership and beyond). Tokenistic projects frequently fall short of meeting local needs, which causes resistance and disputes [4].

5.3.2 Ladder of Participation in Brownfield Redevelopment

Research indicates that the involvement of citizens in brownfield redevelopment is frequently restricted to the consultation and placation phases, during which community members are consulted or consulted but do not have actual authority [5]. Effective brownfield conversions, like Hamburg's Hafencity project, show that a partnership model, in which communities co-create the project vision, results in more socially acceptable and sustainable redevelopment [6].

Below is a comprehensive analysis that integrates the theoretical framework of the "Ladder of Citizen Participation" with the observed dynamics of citizen engagement in the Chobhar case, as detailed in the Inspection Panel Report. This analysis explains the different degrees of participation, highlights why some levels were absent or ineffective, and offers suggestions for improvement.

5.4 Public-Private Partnerships in Brownfield Redevelopment

PPPs, or public-private partnerships, have become a popular tool for dealing with the challenges of brownfield redevelopment. Brownfields, which are frequently characterized by contamination, obsolete infrastructure, and underutilization, require not only significant capital investment but also sophisticated management approaches to be transformed into productive urban assets [7]. PPPs can help to repurpose these sites efficiently while reducing financial risks and optimizing resource allocation by leveraging the strengths of both the public and private sectors [5].

Yescombe (2017) emphasizes that PPPs allow governments to reduce fiscal burdens while ensuring that projects are developed with commercial discipline and operational efficiency [8]. This balance is especially important in brownfields, where unanticipated environmental liabilities and redevelopment costs can jeopardize project viability [9].

In Nepal, the Public-Private Partnership and Investment Act of 2019 establishes a strong legal framework to guide such collaboration. Redevelopment of existing infrastructure assets is one of the PPP models that are specifically outlined in Section 17 of the Act. Models such as Rehabilitate-Operate-Transfer (ROT) and Rehabilitate-Own-Operate (ROO) are especially relevant to brownfield projects, which focus on restoring and repurposing underutilized properties. For example, the Chobhar Dry Port redevelopment used elements from the Lease-Develop-Operate (LDO) and ROT models, demonstrating how tailored PPP arrangements can address the unique challenges of brownfield redevelopment [10].

The strategic application of PPP models in brownfield redevelopment offers several advantages. First, it promotes innovation by encouraging the private sector to design and manage modern infrastructure solutions. Second, it enables the implementation of performance-based contracts, which can improve operational efficiency and service quality throughout the project's life cycle [11].

PPPs represent a transformative approach to brownfield redevelopment by combining public oversight with private innovation. The structured frameworks provided by both international best practices and national legislation, such as Nepal's PPP Act, have the potential to convert derelict urban sites into dynamic hubs of economic activity. Future research should focus on hybrid models that combine participatory planning with strong financial and operational strategies. It ensures that brownfield redevelopment not only revitalizes urban landscapes but also contributes to long-term community development.

5.4.1 Summary of the Public-Private Partnership and Investment Act, 2019

The Public-Private Partnership and Investment Act, 2019 provides a legal and institutional framework for attracting private investment into Nepal's infrastructure and public service sectors. It facilitates collaborative development by

defining models through which the public and private sectors can share risks, responsibilities, and benefits. This law establishes mechanisms for project selection, approval, and implementation, ensuring transparency and accountability in public private ventures. It mandates that PPP projects be executed in a manner that balances risks between the government and private investors, aligning with Nepal's national development policies. The Act also introduces investment incentives, including tax exemptions, subsidies, and regulatory support, to attract both domestic and foreign investment.

Section 17 of the Public-Private Partnership and Investment Act, 2019 outlines the specific models under which PPP projects can be structured in Nepal. These include:

1. Management Contract
2. Lease Contract
3. Service Contract
4. Build-Transfer (BT)
5. Build-Operate-Transfer (BOT)
6. Build-Own-Operate-Transfer (BOOT)
7. Build-Lease-Transfer (BLT)
8. Build-Transfer-Lease (BTL)
9. Rehabilitate-Operate-Transfer (ROT)
10. Rehabilitate-Own-Operate (ROO)

These models provide flexibility for structuring PPP projects based on project requirements, financial viability, and risk distribution. The Chobhar Dry Port redevelopment follows a Lease-Develop-Operate (LDO) model, which aligns closely with Lease Contract and Rehabilitate Operate-Transfer (ROT) provisions under the Act.

6.1 Participation Dynamics in Chobhar Case

6.1.1 Comparing the Ladder Levels with the Chobhar Case

Table 2: Comparison Matrix

Ladder Level	Ideal Outcome	Chobhar Case Evidence	Comments
Therapy	Citizens are used for legitimizing decisions	There is an undercurrent of top-down decision-making, with the government and Bank framing community input as a formality	Some actions (e.g., rushed public hearings) may reflect tokenism
Informing	Citizens are informed of decisions and policies	Basic project information was provided; however, it was often in a language or format that did not fully engage affected groups	Information dissemination was one-way with minimal follow-up
Consultation	Citizens are asked for feedback, but power remains centralized	Limited consultation meetings (e.g., only two residents attended) and delayed access to final project documents	Feedback was collected but not effectively incorporated
Placation	Citizens share in decision-making and influence outcomes	There is no evidence of genuine shared power or partnership, as decisions	The absence of structures for shared decision-making is notable
Citizen Control	Full empowerment in decision-making	No mechanisms were in place that allowed citizens to have control or delegated decision-making power	High-level citizen control was completely absent

In the context of Dry Port redevelopment, the Comparative Matrix provides an organized means of examining the differing levels of institutional reaction and public involvement during the transition. The matrix shows the degree of public involvement, the main issues brought up, and the efficiency of grievance redress procedures by contrasting the local community's Inspection Request with Arnstein's Ladder of Citizen Participation. This comparative study sheds important light on how redevelopment initiatives handle governance frameworks, social acceptance, and conflict resolution. The analysis comes to the conclusion that

6. Findings, Analysis and Discussions

Urban Reuse of Brownfields: Assessing Redevelopment Model of Chobhar Dry Port

mid-level tokenism was visible and evident during the redevelopment of Chobhar Dry Port.

6.1.2 Observed Degree of Participation

In the Chobhar case, several key observations point to a level of participation that falls primarily between “Informing” and “Consultation” (levels 3 and 4):

1. Tokenistic Information Sharing:

The Management Response and EIA documentation indicated that project details were disclosed (in Nepal) and consultation meetings were held. However, affected citizens, including indigenous Newar communities, reported not receiving timely or comprehensive information. The fact that a translation into Nepal Bhasa was offered but deemed unnecessary by participants may have masked deeper communication gaps.

2. Limited and Ineffective Consultation:

The report notes that consultations were rushed and, in some cases, inaccessible (e.g., the meeting location being far from the affected community, or only a few residents attending). Community members expressed that they received only a draft of the EIA report and did not have a chance to engage meaningfully with decision-makers. The grievance redress mechanism (GRM) received hundreds of grievances but seemingly did not translate into substantive policy modifications or project changes.

3. Absence of Higher Participation Levels:

There was little evidence of shared decision-making (levels 6 to 8). No clear mechanism empowered citizens to influence or control project outcomes. While the project claimed broad community support based on consultations with municipal representatives, direct input from local and indigenous groups appeared largely neglected.

6.1.3 Suggested Improvement

• **Enhanced Engagement through Targeted Interviews:**

Future studies should include detailed interviews or focus group discussions that capture citizens’ direct experiences. These qualitative insights would substantiate claims regarding limited citizen participation.

• **Integration of Policy Documents:**

Analyses could benefit from a side-by-side comparison of the official consultation records (e.g., GRM reports, minutes of meetings) with independent interviews to better understand gaps between policy and practice

• **Adopting Higher Participation Structures:**

To improve outcomes, it is recommended that the project establish forums where affected communities are given shared decision-making roles—such as community advisory boards or local committees empowered to influence final decisions. This would move the project from mere consultation (level 3–4) toward partnership (level 6) or even delegated power (level 7).

6.2 Thematic Analysis using QTT (Question, Theme and Theories) method using MAXQDA

The Question, Theme, and Theory (QTT) Analysis is a thematic analysis technique designed to identify key themes and establish a foundation for theory development. Conducted in MAXQDA, a qualitative analysis tool, this process involves reviewing interview transcripts and related articles. It provides insights into people’s perceptions of Dry Ports and facilitates the unbiased generation of themes related to redevelopment dynamics. The coding process is inductive, meaning that all themes and codes emerge organically from the transcripts and interviews.

6.2.1 Coding and Theme Development

Transcriptions are coded line by line using an inductive coding system, and themes are derived from the transcripts themselves. Following codes and themes were extracted :

1. Brownfield Phenomenon
2. Redevelopment Challenges
3. Social Remarks
4. Redevelopment Concepts
5. Redevelopment Priority
6. Redevelopment Model and Actions
7. Role of Authorities
8. Operation Model
9. Operation Challenges
10. Improvement Notes

6.2.2 Concept Map

The concept map visualizes the relationships among identified codes and themes. This code-theory model indicates a strong interconnection between Redevelopment Priority, Challenges, Models and Actions, and the Role of Authorities, as these codes frequently co-occur, highlighting their close association.



Figure 4: Code Theory Model

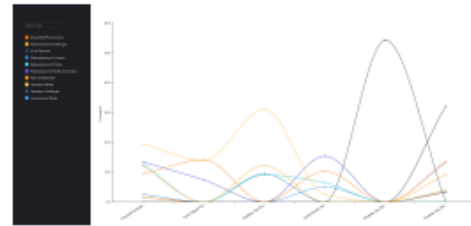


Figure 7: Code trend in documents

6.2.3 Visuals and Statistics

The Document Comparison Chart illustrates the distribution of codes across interview and article transcripts. For example: this visualization highlights that social remarks constitute the largest portion, suggesting that discussions were primarily centered on the social dimensions of Dry Port development and likewise with other codes.



Figure 5: Document Portrait

The code trend analysis in the reviewed documents provides a clear visualization of recurring themes across the dataset. Notably, 'Role of Authorities,' 'Redevelopment Model,' and 'Redevelopment Challenges' emerge as consistently discussed topics throughout the transcripts, indicating their central importance in brownfield redevelopment discourse. In contrast, while 'Social Remarks' is addressed in only one document, it is analyzed in substantial depth, highlighting its significance within that context. Additionally, the relatively uniform distribution of identified codes supports the inductive approach to thematic analysis, reinforcing the validity and reliability of the coding process.



Figure 6: Code relation browser

The Code Relation Browser is a specialized visualization tool designed to illustrate relationships among coded segments in thematic studies. It represents code relations through intersecting nodes, where size and color indicate the strength and significance of co-occurring codes. For example: analyzing this visualization reveals that Redevelopment Challenges share a strong connection with both Redevelopment Priority and the Role of Authorities. Therefore, addressing redevelopment challenges should go hand in hand with setting redevelopment priorities and defining the role of authorities to effectively facilitate the process.

6.2.4 Insights

Coded themes are covered in this section of QTT in order to provide insights for a thorough comprehension of themes.

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Table 3: QTT Insights

Coded Theme	Insights
Brownfield Phenomenon	The industry ceased operations following local protests over pollution and mismanagement of the cement plant. With no clear purpose for the land and its associated properties, the area transitioned into a brownfield.
Redevelopment Concepts	Initial redevelopment ideas included relocating Sukumbasi Basti and establishing a Waste Treatment Plant to utilize the brownfield site, indicating early attempts to repurpose the area.
Redevelopment Priority	Kathmandu's rapid growth and the resulting losses due to inadequate infrastructure necessitated a logistics hub. A study by the World Bank for the Nepal-India Regional Trade and Transport Project (NIRITP) identified Chobhar—thanks to its strategic location and connectivity—as the most feasible option among potential sites, with future improvements expected from the Tarai-Madhesh Expressway and the Fast Track connection.
Redevelopment Model and Actions	The World Bank conducted studies under NIRITP and allocated a budget of \$15.57 million for the Chobhar Dry Port, one of three sub-components. Managed by the state-owned Nepal Intermodal Transport Development Board, the project spans 11.77 hectares. Following a technical and financial evaluation process, TransNepal Freight Services was awarded a five-year lease to operate the facility.
Operation Model	The project, initially estimated at NPR 1.63 billion, was completed at NPR 1.44 billion with no cost overruns. Operating under a PPP model, TransNepal Freight Services secured a five-year lease with a minimum lease amount of NPR 28.8 million. Financed by a NPR 1.54 billion World Bank loan, the dry port offers storage, loading/unloading, container management, and banking services for customs clearance, and it employs local residents across various roles as part of a social management plan.
Challenges	The land acquisition process was unsystematic, marked by unresolved compensation claims and ownership disputes due to poor record-keeping. The project experienced protests, work stoppages between August 2018 and January 2019, and delays exacerbated by the COVID-19 pandemic and social hurdles. Additionally, logistical inefficiencies remain, as cargo is initially checked at border customs (e.g., Birgunj) before reaching the dry port.

7. Conclusion And Recommendation

The analysis of the Chobhar Dry Port case reveals several important lessons that can be extended to other brownfield redevelopment projects in Nepal. First, it is clear that unsystematic land acquisition, unresolved compensation claims, and ownership disputes can significantly delay projects and create lasting tensions between developers and local communities. This emphasizes the critical need for robust land management systems and transparent processes. Additionally, the case illustrates that successful redevelopment is not solely about financial investment and infrastructure; it also involves addressing environmental contamination and ensuring social inclusivity through job creation and community engagement.

Given these insights, a hybrid development model that combines elements of Rehabilitate-Operate-Transfer (ROT) and Joint Venture (JV) approaches appears most promising for similar projects. This model leverages private sector expertise in rehabilitating and managing existing underutilized sites while maintaining strong public oversight. Such an approach allows for the effective allocation of risks and benefits, ensuring that public interests and community needs are adequately protected. Moreover, by integrating flexible risk-sharing mechanisms and contingency planning for unforeseen challenges—such as public unrest or external economic shocks—the model can be tailored to the unique complexities of brownfield sites.

Equally important is the degree of citizen participation in these redevelopment initiatives. Drawing on the lessons from the Chobhar case and the framework provided by Arnstein's Ladder of Citizen Participation, projects should aim for the higher rungs—specifically, genuine partnership or delegated power. Engaging local communities not only enhances transparency but also builds trust and ensures that redevelopment plans address the socio-economic concerns of affected populations. By fostering a collaborative environment where citizens have real influence over decision-making, developers and government entities can mitigate resistance and create sustainable outcomes that benefit both investors and local stakeholders.


In conclusion, for other brownfield developments in Nepal, adopting a hybrid ROT-JV model with high levels of citizen engagement can provide a balanced, transparent, and socially inclusive approach. This strategy ensures that redevelopment projects are not only economically viable but also contribute to long-term community welfare and urban resilience.

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Annex E: Plagiarism Test Report

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