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Investigating Location Attributes For Industrial Area Development: A Case Area of Balaju Industrial Area.

By

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DECLARATION

I hereby declare that the thesis entitled "**Investigating Location Attributes For Industrial Area Development: A case area of Balaju Industrial Area**" which is being submitted to the Department of Architecture, Pulchowk Campus, Institute of Engineering, Tribhuvan University. Under the direction of Associate Professor Dr. Sanjaya Uprety, 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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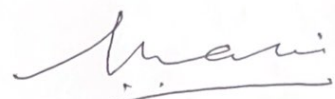
This is to certify they have read, and recommended to the Institute of Engineering for the acceptance, a thesis report titled "**Investigating Location Attributes For Industrial Area Development: A Case Area of Balaju Industrial Area**" submitted by **Mr. Ashish Simkhada (078-MSUrP-003)** in the partial fulfillment of the requirements for the degree of **Masters of Science in Urban Planning.**

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Abstract

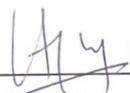Industrial areas play a significant role in the economic growth and sustainability of any region. The choice of an ideal location for industrial growth is an important choice with an impact on several stakeholders, including enterprises, communities, and governments. This study focuses on the investigation of location attributes for industrial area development, with a specific case study of the Balaju Industrial Area, situated in Kathmandu, Nepal. The study takes a different approach to examine the major variables affecting industrial growth in particular region. In-depth literature reviews, surveys, and interviews are conducted to collect data. Regression analysis was then used to investigate the relationship between the impact and industrial location satisfaction. Following the discovery of such relationship, location attributes are investigated and recommended. The study examines and assesses several geographical characteristics that have been necessary for the industrial development are studied and identified. One of the key findings of this study is that the site of an industrial development directly affects the community and can have both positive and negative effects. As a result, it is essential to allocate location attributes for industrial development carefully. According to this study, it is major to consider a variety of factors, including infrastructure, a skilled and semi-skilled labor force, availability of land, safety and security, new technology, research center, effective laws and policies, accessibility to markets, financial viability, and environmental sustainability, when choosing a location for industrial development. The study's conclusion emphasizes the necessity for a holistic approach for developing industrial areas that takes into account the interaction between location attributes and their effects on economic, social, and environmental issues. Finally, the ideal location attributes for an industrial sector in a newly urbanizing area in Nepal were proposed. These characteristics cover six areas: Land Use Regulation and Legal Compliance, Energy and Resources, Investment and Workforce Synergies, Proximity and Impact, Stakeholder Engagement and Security Protocols, Market Dynamics and Profitability. Hence, by using the Balaju Industrial Area as a case study to highlight important lessons and best practices, this research serves as a valuable guide for urban planners, policymakers, and other stakeholders interested in recognizing the fundamental elements that influence and required for the growth of industrial regions.

Keywords

Industrial Area, Location Attributes, Local Community, Balaju Industrial Area.

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1 CHAPTER ONE: INTRODUCTION

1.1 Background

An industrial area is a designated geographic zone that is specifically planned and developed for industrial activities and businesses. It is a concentrated area where various manufacturing, processing, and production activities take place (Worth, 2023). Industrial areas are typically located on the outskirts of cities or in designated zones away from residential areas. This separation helps to minimize the impact of industrial operations on the environment and nearby communities. Industrial areas provide a range of facilities and infrastructure to support industrial activities. This may include factories, warehouses, workshops, research and development centers, power plants, transportation, and logistics infrastructure, and utilities such as water supply, electricity, and waste management systems. The purpose of industrial areas is to create a suitable environment for industrial and manufacturing operations. By clustering similar businesses and industries together, industrial areas facilitate economies of scale, encourage collaboration and knowledge sharing, and streamline supply chains (Martin & Rogers, 1995). The industrial sector's progress has led to many achievements such as increasing regional economic growth, employment, and business opportunities. However, industrial activities also led to a variety of negative impacts associated with environmental and social problems that can degrade the quality of the environment and in turn, will reduce the carrying capacity of the environment (Sudanti Budihardjo, 2013). They also help to reduce pollution and noise by providing appropriate zoning regulations and infrastructure. They are often developed and managed by government bodies or private entities to create a conducive environment for industrial growth and productivity.

Industrial area development plays a vital role in economic growth and development of a region. The selection of an appropriate location for industrial development is crucial, as it can significantly impact various factors such as productivity, efficiency, transportation, and overall economic performance (Worth, 2023). In this context, this background provides an overview of the study conducted to investigate the location attributes for the development of the Industrial Area, and we consider Balaju Industrial Area as a case area for this study.

Due to the confined sociopolitical and economic conditions of the nation under the Rana Regime, industrial development in Nepal began relatively late. The founding of "The Industrial Council" in 1936 is thus the first event in the history of industrial development. In 1940, (i.e., information sharing regarding small, skill-based businesses) was founded. Cigarette and match factories were

among the first enterprises to emerge. Considered to be Nepal's first modern enterprise, Raghupati Jute Mills was founded in 1946 (Khatri M. , 2018). To achieve prosperity, create jobs, reduce poverty, encourage trade, and boost national income growth, the industrial sector must develop. However, Nepal's industrial progress during the previous few decades has not been very satisfactory. Just 6.6% of all workers were involved in manufacturing (NLFS, 2008). The contribution of manufacturing to total GDP was a minimal 6 percent in 2010. Most industries are located around various urban areas of the nation like Kathmandu Valley, Biratnagar, Simara, Birgunj, Hetauda, Pokhara, Butwal, Nepalgunj and other places of the Terai region (CBS, 2014).

According to Industrial District Management Limited (IDML, 2023), with the help of a joint effort by the American and Government of Nepal (GoN), the construction of the industrial zone was launched in 2016 B.S. with the laying of the foundation for the Balaju Industrial District in Balaju, Kathmandu. The Government of Nepal, along with the assistance of several friendly nations, established industrial zones in a number of locations across the nation to promote local investment, labor and raw material-based industries, and industrial development while also taking into account the geographical and regional economic balance of the nation. To coordinate and manage the management aspects of the industrial districts Nepal Government established Industrial District Management Ltd. under Company Act in 2045 B.S. According to the policy of the Nepal government, this company has been playing an important role as an agency for industrial promotion and serving the industry in a systematic, unified manner (IDML, 2023).

Industrial Development Management Limited (IDML) was constituted by the Nepal Government in July 1988 in order to boost the balanced regional development by making optimum utilization of local capital, natural resources (agriculture and forest based etc.) and human resources for industrial promotion (IDML, 2018). There are 11 industrial estates and 10 are in operation except Dhankuta, six are being developed and five are proposed for consideration (MoF, 2018).

Table 1 Basic Information of Industrial Estates by 2018

S. N.	Industrial Estates	Estd. Year	Financial Assistance	Location	Employment	Land Area (in ha.)	No. of Industries		
							Total	Running	Closed
1	Balaju	1960	USA	Kathmandu	4200	34.09	141	125	5
2	Patan	196	India	Lalitpur	2000	14.9	118	113	2

		3				1			
3	Hetauda	196 3	USA	Makwanp ur	4100	158. 73	134	102	4
4	Dharan	197 2	India	Sunsari	797	1 0	35	29	3
5	Nepalgunj	197 3	India	Banke	991	11.6 5	35	33	2
6	Pokhara	197 4	Nepal	Kaski	3000	25. 5	89	81	3
7	Butwal	197 6	Nepal	Rupand ehi	1859	22.0 9	72	65	3
8	Bhaktapur	197 9	German y	Bhakta pur	800	3.6 3	37	36	1
9	Dhankuta	198 0	Nepal	Dhanku ta	NA	3.2 6	NA	NA	**NA**
1 0	Birendrana gar	198 1	Netherlan ds	Surkhet	300	4.5 8	28	22	**2**
1 1	Gajendranar ayan	198 6	India	Saptari	40	14.9 6	11	5	**4**
	Total				**180 87**	**303. 40**	**700**	**611**	**29**

Source: IDML, 2018.

Table 1 demonstrates that 10 industrial parks have been offering multiple services to meet the needs of 700 enterprises. 611 of them are still in operation, while 29 have closed their doors. 18,087 people are employed in these sectors. Only two industrial estates were built by the government of Nepal, out of the eight that were built with support from other nations.

The Special Economic Zone (SEZ) Act of 2017 was created for the purpose of establishing Nepal's export promotion. In order to create industrial and commercial activity, the Nepali government convinced investors from home and outside to support the SEZ concept. The government then announced two SEZs, one at Bhairahawa in the Rupandehi District and the other in Simara in the Bara District. In a same way, the government intends to establish a minimum of seven SEZs around the nation, one in each of the country's seven provinces. The Ministry of Industry, Commerce and Supplies has completed a feasibility study of establishing SEZ in Biratnagar of Province-1, Panchkhal of Bagmati Province, Gorkha of Gandaki Province, Jumla of Karnali Province, and Dhangadhi of Sudur Paschim Province as well as eleven are proposed for consideration (MoF, 2018)

Due to the social, economic, and environmental effects on the surrounding area, the location of industrial districts is an important consideration in regional and urban planning. In order to coordinate socioeconomic benefits and environmental sustainability, an appropriate location must

take into account a wide range of criteria. According to (M.C. Ruiz, 2012) agreements on balanced development, the relationship between an urban environment with optimal social services, and the search for a quality physical environment to be conserved have taken on a key role in the combination of industrial activity and environment. Industrial areas play a crucial role in economic development, but their impacts on nearby communities are often a subject of concern. According to (Maantay, 2001), industrially zoned areas permit noxious land uses and typically carry higher environmental burdens than other areas. Zoning is the process of separating land into various zones or designated areas in accordance with predetermined rules and regulations. Within each zone, these regulations specify the permitted land uses, building heights, densities, and other factors. Zoning determines where various categories of land use may go, thereby influencing the location of resulting environmental and health impacts.

After searching for them, it was found that no records of the industrial establishment of the Balaju Industrial District have been recorded. Conversations with residents and business owners identified, however, that they were kept there because the surroundings were appropriate at the time. There were few houses and a lot of empty space there. This encourages the government to build industrial sectors there. Balaju discovered that the place was appropriate at the time because it was positioned outside of the inner city and within a 5-kilometer radius of it. Finally, Balaju's proximity to forests contributes to a reduction in the pollution that is caused by the area's industrial areas. These are taken from the records discovered while conducting study on the factors that led to the Balaju area's selection as an industrial location.

This research seeks to explore the location attributes for industrial development as well as the prospects and problems of local residents towards industrial areas. This study aims to offer useful insights for policymakers, industrial stakeholders, and urban planners to increase community participation and boost sustainable development practices by studying industrial regions and determining the elements influencing community perceptions.

1.2 Need of research

The study of location is important as it is directly related to the economy of the country and urban population. So considering the study of Balaju Industrial Area as a case study for examining location factors for the development of industrial areas is very important.

Exploring the Area's physical features, transportation networks and accessibility of Balaju Industrial Area will provide insights into the importance of infrastructure development and its

impact on industrial growth and understand the process to how an industrial zone was formed. The labor force dynamics, including the availability of skilled and unskilled workers, will enable a better understanding of the workforce requirements and potential gaps. This knowledge can guide initiatives aimed at skill development and ensure a sustainable supply of labor for the industrial sector (Uwe Deichmann, 2008). For a more livable place, the effects on the environment and the dynamics of urban settlement with the benefits and drawbacks of industrial areas should be researched. Investigating the availability and quality of land, along with the presence of necessary industrial infrastructure, will assist in identifying the requirements for establishing new industrial areas. Policymakers and stakeholders can create efficient strategies and policies to get through identical obstacles in other industrial sectors by thoroughly analyzing these problems.

In research on investigating location attributes for industrial area development, focusing on the case study of Balaju Industrial Area, is essential for informed decision-making, strategic planning, and sustainable industrial growth. Along with that this study helps us to give ideas about the location factors that are essential for the establishment of industrial area in a particular area. The findings of this research can contribute to the formulation of effective policies, optimized resource allocation, and the creation of thriving business environments in industrial areas. Hence this research is important because this type of research is not done before in Nepal and is needed to know the in-depth relationship between the industrial area and local community.

1.3 Importance of Research

Investing location attributes for industrial area development, with a case study of Balaju Industrial Area, is important for several reasons. It helps us understand why Balaju Industrial Area has become successful and what factors attract industries there. For an industrial area to be successful, it is important to understand how the public feels about it. This knowledge can be used to replicate success and attract industries to other locations.

By studying the challenges faced during the development of Balaju Industrial Area, we can find solutions to similar problems in other industrial areas. This research also explores transportation networks, accessibility, available land, and infrastructure, people's attitude towards industrial area, industrial area's problem and prospect. The research examines the labor force, including skilled and unskilled workers, in Balaju. The study also looks at the impact of government policies on Balaju's industrial area development considering local community.

Hence researching location attributes for industrial area development taking case area as a Balaju Industrial Area helps us make better decisions, plan strategically, and ensure sustainable industrial growth with good harmony with the surrounding community. By understanding different dynamics of industrial area and community relation that will be helpful to guides policymakers, attracts investments, and creates business environments in industrial sectors in urbanizing area in Nepal.

1.4 Problem Statement

There were no homes nearby when the industrial area when it was first built, but because it is in the capital city of Nepal, the urbanization took place rapidly. As the industrial area located in Balaju there are lots of prospects as well as problems to the local community. The absence of buffer zone around the Industrial Area is the main issue. As a result of numerous forms of pollution brought on by enterprises, there is a conflict between the public and industrialists on several agendas. These issues manifest as significant problems, including environmental pollution, mostly air pollution, poor water treatment and sewerage system, soil quality degradation, and noise pollution. Exposure to industrial pollution puts the surrounding population's health at danger, and constant noise and vibrations are negative for their wellbeing. According to locals few individuals left their houses as a result of this issue, and those with limited resources suffer greatly. Furthermore, the movement of vehicles associated with industrial activities contributes to traffic congestion and safety concerns, causing damage to infrastructure and road accidents. Lastly, the presence of the industrial area impacts land use and property values, with pollution, noise, and safety concerns affecting property sales and degrading the visual appeal of the local community.

1.5 Research Question
- What is the relation of Industrial Area to the local community?
- What should be the location attributes for Industrial Development in context of Nepal?

1.6 Research Hypothesis
- Null Hypothesis: The location of industrial area doesn't affect the local community.
- Alternative Hypothesis: The location affects the local community.

1.7 Limitation

While researching the location attributes for industrial area development, there are some limitations to consider. As the time period for the research is short there is limited time period for gathering and to analyze comprehensive data on various location attributes, because of certain information is not readily accessible and lack of records. This affect the depth and reliability of the research findings. The research focuses on a specific case study, Balaju Industrial Area, which means the findings may not be directly applicable to other industrial areas. Different locations have unique characteristics and challenges that may require separate investigations. The research faces limitations in data collection as data is collected from forty-one members from the local community and eleven members from the industrialist.

The findings of the research reflect the conditions and factors present during a specific period, potentially overlooking recent developments or future trends that could influence industrial area development. Considering these limitations is important to ensure a comprehensive understanding of the research findings and to encourage further studies that complement and expand upon the existing research in investigating location attributes for industrial area development.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Industrial Revolution

The Industrial Revolution was a period of significant technological advancements and socio-economic transformation that occurred during the 18th and 19th centuries. It marked a shift from an agrarian and handicraft-based society to one characterized by mechanization, mass production, and urbanization (Britannica, 2023). The introduction of new manufacturing processes, powered by steam engines and later electricity, led to the growth of factories and the rise of industrial capitalism. This revolution brought about substantial changes in industries such as textiles, mining, transportation, and agriculture, ultimately leading to increased productivity, improved living standards for some, and profound social changes. It laid the foundation for modern industrial societies and had a lasting impact on global economies, labor relations, and the overall trajectory of human history. Form (Britannica, 2023), the main characteristics of the Industrial Revolution were technological advancements, mass production in factories, urbanization, specialization of labor, rise of capitalism, social and economic changes, improved transportation and communication, and environmental consequences.

2.2 Industrialization

The process of industrialization involves fundamental modifications to the manufacturing process. It occurs when a nation or location switches from depending on farming and manual labor to producing commodities utilizing factories and machinery. Numerous changes result from this point in time (editors, 2023). For employment, people relocate from the countryside to cities, and manual labor is replaced by machines. Things can be produced more quickly and in greater quantities using machines. As a result, the economy expands, new jobs are created, and people's lives are improved. New inventions and improved methods of doing things are also brought about by industrialization. In general, industrialization is the process of producing more goods and enhancing our way of life through the use of machinery, factories, and new technology (TEAM, 2022).

"Industrialization refers to a process which has occurred in the history of all economically 'developed' nation states and which remains an aspiration for most of the governments of those many populations which remain today relatively undeveloped" (Szreter, 2004). Through industrialization the economy of a country is dramatically transformed so that the means whereby it produces material commodities is increasingly mechanized since human or animal labor is

increasingly replaced by other, predominantly mineral sources of energy in direct application to the production of useful commodities.

Similarly according to author (TEAM, 2022), industries that require a lot of energy, like steel production, would thrive in areas with access to affordable and reliable power sources. Transportation infrastructure is another vital attribute. Proximity to ports, highways, railways, and airports enables efficient movement of raw materials and finished products. This facilitates trade and reduces transportation costs. Additionally, the availability of a skilled workforce is critical. Areas with educational institutions, vocational training centers, and a pool of skilled workers can attract and sustain industrial development. Other factors, such as a supportive business environment, access to markets, and favorable government policies, also contribute to the location's attractiveness for industrialization. In summary, a location with abundant resources, robust transportation infrastructure, a skilled workforce, and favorable conditions for business can greatly support industrial development.

2.3 Industrial Area

A specified area created especially for industrial operations is known as an industrial area. Manufacturing facilities, factories, warehouses, and other industrial operations can be accommodated by providing the appropriate infrastructure, zoning laws, and support services. According to (F. Celata, 2009), industrial areas promote economic growth, attract investments, generate employment opportunities, and contribute to regional competitiveness. Industrial areas often foster the clustering of related industries, encouraging collaboration and resource optimization. They play a vital role in supporting industrial development, while also considering environmental sustainability and promoting sustainable practices.

2.4 Types of Industries

From the industrial theory (Britannica, 2023), industries are classified into four main types based on their characteristics:

2.4.1 Primary Industry:

Primary industries (Britannica, 2023) are involved in the extraction and production of raw materials from natural resources. This includes industries such as agriculture, forestry, fishing,

mining, and oil extraction. Primary industries are often located near the sources of raw materials and have a direct impact on the environment.

2.4.2 Secondary Industry:

Secondary industries (Britannica, 2023) are involved in the processing and manufacturing of raw materials obtained from primary industries. They convert unfinished or partially-finished materials into completed goods. Construction, assembly, and manufacturing are a few examples of secondary industries. Secondary sectors frequently need substantial infrastructure investments and expenditures in capital.

2.4.3 Tertiary Industry:

Tertiary industries (Britannica, 2023) are also known as the service sector and are focused on providing services to individuals and businesses. This sector includes industries such as healthcare, education, transportation, finance, retail, tourism, and professional services. Tertiary industries are typically characterized by a high degree of interaction with customers and a reliance on human capital.

2.4.4 Quaternary Industry:

Quaternary Industry (Britannica, 2023) refers to a sector of the economy that involves intellectual and knowledge-based activities. It includes sectors that are driven by innovation as well as research and development, information technology, data analysis, and consultancy. The generation, manipulation, and transmission of information are the emphasis of quaternary industries, which frequently rely heavily on technology and specialized knowledge. In knowledge-based economies, these industries are essential for promoting innovation, improving technology, and boosting the economy.

These four types of industries represent different stages in the value chain, with primary industries supplying raw materials, secondary industries transforming them into goods, tertiary industries offering various services, and quaternary industries with advanced services. The classification helps in understanding the interdependencies and dynamics of economic activities within an industrial system.

2.5 History of Industries in Nepal

In 1936, after the formulation of the Nepal Companies Act, the Biratnagar Jute Mills was established as the first joint-venture industry. A few more government-owned industries were

opened in the 1950s and 60s, often with support from China and the then Union of Soviet Socialist Republics (USSR). After the adaptation of globalization and liberalization in 1990 AD, the journey of industrial development has been started in Nepal. In 2049, foreign direct investment and technology transfer has been opened up in order to attract investment and technology in the Nepalese Industrial Sector. But the history of industry in Nepal has been begun in 1926 AD.

According to (Dhakal, 2023), the first trade union revolution started at Biratnagar Jut Mill in 2006/2007 BS. Former Prime Minister Girija Prasad Koirala and Man Mohan Adhikari started their political careers during that revolution. If the industry runs at full capacity, 50 metric tons of Jut can be produced daily and 2000 will get direct employment. Unfortunately this industry is permanently closed now. Raghupati Jut Mill and Morang Sugar Mill was established in 2003 B.S. These two industry has grate role on the development of industry sector in Nepal.

2.6 Industrial Policies and Acts in Nepal

Public policy is frequently used in daily operations to enhance population wellbeing. Policy might be defined as a set of guidelines for behavior that are meant to fulfill the needs of society as a whole through achieving goals and objectives. Local, provincial, and federal levels are the sources of an original public policy.

The two phases of Nepal's industrial policy are pre-1985 and post-1985. Oneside, before 1985 policies were guided by inward looking protectionist strategies (Dhakal, 2023). Domestic Industries are treated as infant industries and were protected from foreign competitors by high tariff and quota restrictions. The government was directly involved in the economy and provided essential products and services. A different approach, liberalization, which began in 1985 and picked up speed after the 1990s, aimed to modernize the economy and quicken structural changes by fostering a climate favorable to private sector involvement. Government involvement in the economy started to decline, and measures to encourage private and foreign investment were put in place. By limiting governmental interference in industrial goods price setting, a new "Industrial Liberal Policy" was developed with the goal of fostering an open and competitive economy (SAWTEE, 2007).

The government of Nepal has recently updated, improved, and revised a number of policies and acts as a result of the lessons discovered and difficulties encountered while attempting to promote industrial growth, exports, imports substitution, employment creation, and overall economic transformation and development. In order to strengthen the private sector's participation in

economic activity, these legislative actions and regulatory frameworks have helped to boost their trust. The key characteristics of the numerous policies, acts, and strategies are summarized in the following list.

Table 2 Features of various Industrial Policies of Nepal

S.N.	Policies	Main Features
1	Industrial Policy – 1960	➢ **Tax holiday and more facilities to the industries established in remote areas.** ➢ **Special consideration on customs duty.**
2	Industrial Policy – 1974	➢ **Focused was on protectionist strategies and development of small industries.** ➢ **Supported by high tariff barrier and quota restrictions.** ➢ **Developed the government enterprises.**
3	Industrial Policy 1981	➢ **Financial incentives for productivity oriented ventures.** ➢ **To attract foreign investments.** ➢ **Special attention for export promotion zone (EPZ).**
4	Industrial Policy 1987	➢ **Encouraging private sectors.** ➢ **Promoting industrial development.**
5	Industrial Policy 1992	➢ **Classification of industries in Nepal.** ➢ **Special attention for development of cottage & small scale industries.** ➢ **Privatization of the public enterprises.** ➢ **Promoting competitiveness among the private industries for reducing the production cost.** ➢ **Developing industrial zones.**
6	**Industrial Policy 2010**	➢ **Development of quality infrastructures and environment friendly new technology.** ➢ **Focused on joint efforts of public, private andcooperativesectors.** ➢ **Prioritized export potential products by using local resources.** ➢ **Enhancing enforcement capacity of the government.** ➢ **Promotion of good governance.** ➢ **Coherence between industrial, trade and transit policy.** ➢ **Development of agriculture and forest sector.** ➢ **Increase employment generation and boost per capitaincome.** ➢ **Promote Special Economic Zones (SEZs).** ➢ **'One-widow Policy for industries** ➢ **No work, no pay.**

Source: Various policies issued by Ministry of Industry, Commerce and Supplies (MoICS)

According to (Khatri M. B., 2018), Industrial policy environment plays a significant role in accelerating economic growth and achieving goals of development. In the globalized era, as a

Least Developed Country (LDC), Nepal faces numerous challenges in ensuring an enabling trade and industrial environment. Ever since 1960, various policies have been implemented to promote the industrial sector. However, the nation is far from making the expected improvement. Export performance has remained poor even after economic reform measures were put in place, primarily in the 1990s.

The administration has put a lot of effort into creating an environment that will motivate the private sector to increase investment in the country. Governments that came into power after 1990 in particular have worked to provide an environment that is favorable to economic growth by creating new industrial policies and replacing outdated ones in order to keep up with both domestic and international changes. In order to create an environment that would support the growth of the manufacturing sector, attract both domestic and foreign investment, generate income and jobs, and ultimately raise the standard of living in Nepali society, the government adopted a number of measures. The policy rules that were implemented after 1990 served as the main pillars that were crucial in attracting investment for industrial growth (Khatri M. B., 2018).

2.7 Periodic Plan and Industrial Development

From (National Planning Commission, 2023), Nepal adopted Periodic Plan system, industrial development moved on accordingly.

Table 3 Periodic Plan for Industrial Development

➢ **5 year Periodic Plan (B.S. 2013-2018):**
Industries like Rice Mill in Tarai, Oil Mill are established. Industrial Development Center was formed.
➢ **3 year Periodic Plan (B.S. 2019-2022):**
Company act and Corporation act issued. Balaju, Hetauda and Patan industrial are are established. Moreover Janakpur Churot Karkhana, Birgunj Sugar Karkhana are also established.
➢ **3-year Periodic Plan (B.S. 2022-2027):**
In this time period industries are established: Harisiddhi Tyle Factory, Baasbari Skin Factory, Dairy Development Corporation, andChiyaa Bikash Nigam
➢ **5 year Periodic Plan (B.S. 2027-2032):**
Industry Plan 2031 B.S. is issued.
➢ **5 year Periodic Plan (B.S. 2032-2037):**
Mainly Hetauda Cement Factory is established and industrial areas are expanded more.

➢ **5 year Periodic Plan (B.S. 2037-2042):**
Total industrial sector reached to 10. Various copy industries are established.
➢ **5 year Periodic Plan (B.S. 2042-2047):**
Policy to increasing export from industrial product
➢ **5 year Periodic Plan (B.S. 2049-2054):**
Industrial Policy, 2049 Industrial Business Act 2049 and Privatization Act 2050 are made which helped to promote this sector even more.
➢ **5 year Periodic Plan (B.S. 2054-2059):**
Promoted industries sector with many provisions.
➢ **5 year Periodic Plan (B.S. 2059-2064):**
Industrial sector faced challenges due to political instability and conflict.
➢ **3 year Periodic Plan (B.S. 2064-2067):**
New Industrial Policy, 2067 was made and issued.
➢ **3 year Periodic Plan (B.S. 2067-2070):**
Promoted industries sector with many provisions.
➢ **3 year Periodic Plan (B.S. 2070-2073):**
Foreign Investment Policy 2071 is made and implemented.
➢ **3 year Periodic Plan (B.S. 2073-2076):**
Planned to increase contribution of industry sector to GDP.
➢ **5 year Periodic Plan (B.S. 2076-2081):**
Many provisions to promote this sector with strategies to increase contribution to national economy.

Source: Various Periodic Plan Published by National Planning Commission.

2.8 Location Attributes for Industrial Development

Location attitudes are the decisions, opinions, and factors that influence how industries choose appropriate locations for their activities. Numerous elements, including the availability of infrastructure, transit systems, skilled labor, market accessibility, governmental regulations, environmental sustainability, and socio-cultural issues, have an impact on these characteristics. Decision-makers can successfully find ideal places for industrial expansion, maximizing economic gains while limiting negative environmental and social consequences, by thoroughly evaluating these aspects and how they interconnect.

According to author (Class, 2020), there are various factors that are essential for industrial development. The following are the major location attributes that are required for industrial development.

Geographical Factors

- Raw material: Availability of natural resource that can be used as raw material.
- Technology: To turn the resource into an asset with value.
- Power: To utilize the technology.
- Labor: Human resource in the area who can function as labor to run the processes.
- Transport: Road/rail connectivity.
- Storage and warehousing.
- Marketing feasibility.
- Characteristics of land and soil.
- Climate.
- Precipitation and water resources.
- Vulnerability to natural resources.

Non-geographical Factors

- Capital investment.
- Availability of loans.
- Investment climate.
- Government policies/regulations.
- Influence of pressure groups

Locational factors for industries
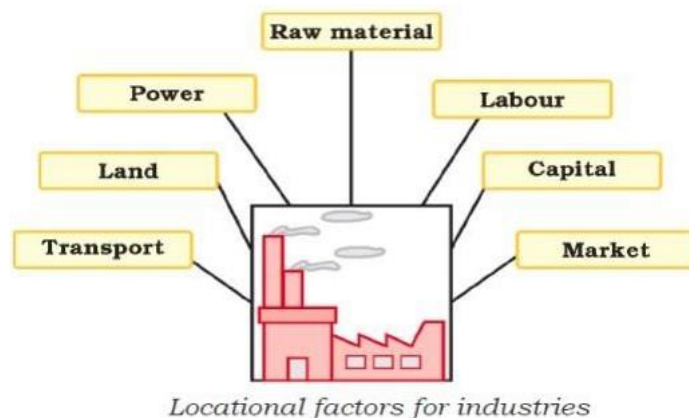
Figure 1 Location Attributes For Industrial Development.

According to (Chapman, 2009) Successful industrial development depends on the identification of locations that offer a favorable combination of these factors, aligning with the needs and objectives of industries. A strategic and informed approach to determining location attitudes can lead to increased competitiveness, job creation, technology transfer, and improved living standards in the chosen regions. On the other hand, inadequate location decisions can result in suboptimal

outcomes, including economic stagnation, resource misallocation, environmental degradation, and social disparities.

This study seeks to further knowledge in this area by performing an extensive evaluation of the literature by adding to the body of knowledge by offering insightful information about the factors influencing location attitudes for industrial development. The results of this study will aid in understanding and analyzing site attitudes for industrial development, which is crucial for informing decisions regarding holistic industrial ecosystems. This study aims to improve our comprehension of this essential aspect and offer useful advice for efficient industrial development planning by reviewing the available literature and filling in the research gaps.

2.9 Theory for Industrial Area

2.9.1 Agglomeration Theory

Agglomeration theory, developed by economist Alfred Marshall in the late 19th century, focuses on the spatial clustering of industries and its economic benefits. Marshall argued that industries tend to locate in specific regions to take advantage of agglomeration economies.

According to Marshall (Mulligan, 1984), agglomeration economies arise from three main sources: labor pooling, knowledge spillovers, and shared infrastructure. In regions with a concentration of industries, a larger pool of skilled labor is available, allowing firms to access a diverse and specialized workforce. This leads to efficiencies in recruitment, training, and labor mobility.

A further important element of agglomeration economies is knowledge spillovers. Businesses are more likely to share information, concepts, and inventions when they are nearby. Through collaboration and competition, this information exchange may result in greater productivity, technical improvements, and creativity. Transportation networks, utilities, and other supporting facilities that are accessible to numerous businesses in an agglomeration are referred to as shared infrastructure. Businesses can cut expenses and increase operational effectiveness by pooling these resources.

Marshall (Mulligan, 1984) also highlighted the role of external economies in agglomeration theory. External economies are the benefits that firms receive from the overall growth and development of an industry or region. As an industry grows in a particular area, it attracts more suppliers, specialized service providers, and skilled workers, creating a positive feedback loop of economic growth.

In general, the benefits of industrial clustering—such as labor sharing, knowledge reverberations, and shared infrastructure—are emphasized by Marshall's agglomeration theory. This hypothesis has impacted further studies on regional economics and the significance of spatial dynamics in fostering economic development and innovation.

2.9.2 Growth Pole Theory

The growth pole theory, proposed by economist François Perroux, suggests that concentrated growth in specific regions or "growth poles" can stimulate overall economic development. According to this theory, these growth poles act as catalysts for economic growth by attracting investment, generating employment, and stimulating economic activity. The positive effects of growth radiate outwards from these concentrated areas, benefiting surrounding regions and creating a ripple effect of development. The growth pole theory highlights the importance of identifying and nurturing these focal points of economic growth to achieve broader regional development and balanced economic expansion (Brand, 2018).

According to the Growth Pole Theory, we can generate a growth ripple effect by focusing our efforts and resources in particular regions. Like magnets, these growth poles draw opportunity and development. Governments and planners have embraced this concept to support faster and more prosperous regional growth. The Growth Pole Theory can be summarized as the idea of concentrating a lot of effort and resources on particular areas to make them extremely successful.
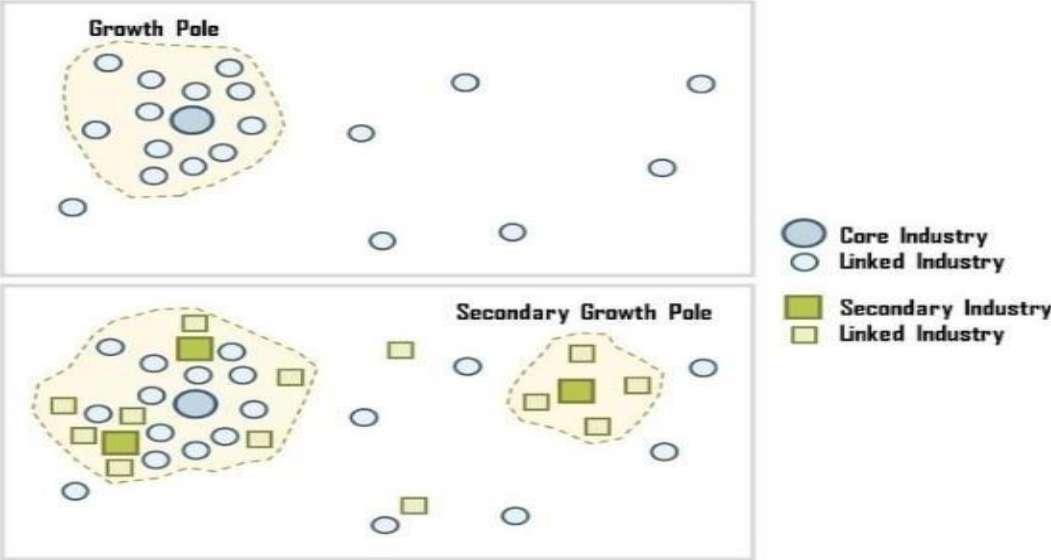
Figure 2 Perroux's growth pole theory

2.9.3 Gravity Model Theory

The gravity model for industrial development is an economic concept that draws an analogy between the force of gravity and the patterns of trade and industrial activities between regions. The model suggests that the flow of goods, services, and economic activities between two regions is directly proportional to their economic sizes (measured by GDP or population) and inversely proportional to the distance between them (Mahfuz Kabir, 2017).

The gravitation model suggests that industries tend to come together in areas with larger economic markets and closer proximity in terms of industrial development. Greater sales potential and client access are provided by larger markets, while lower transportation costs and easier supply chain management are provided by closer proximity. This model admits that the spatial distribution of industrial operations is significantly shaped by economic factors, which act similarly to gravity's pull. Regions with large consumer markets, good infrastructure, skilled labor pools, and favorable business conditions tend to be where industries concentrate.

The gravity model is useful for industrial strategy and regional development. It helps in the understanding of the dynamics of industrial development and can direct choices about where to locate businesses, where to invest in infrastructure, and how to conduct trade. Policymakers can promote balanced industrial development and improve resource allocation to support economic growth by taking into account the economic sizes and distances between regions.

To draw the breaking point of the market's gravitational force, the size of the markets and the distance to the market from the customer base to calculate the limit of the market's gravitational pull (Fig. 2). In Fig. 2, L is the large market, S is the small market and C is the customer base. When we apply the gravity formulae between C and L or C and S, we come to see that the gravitational force between C and L is greater than C and S. It is so because the size of L is greater than S whereas their distance from L is equal. Hence, customers will prefer L for their needs and L's breaking point or area of influence extends up to C.
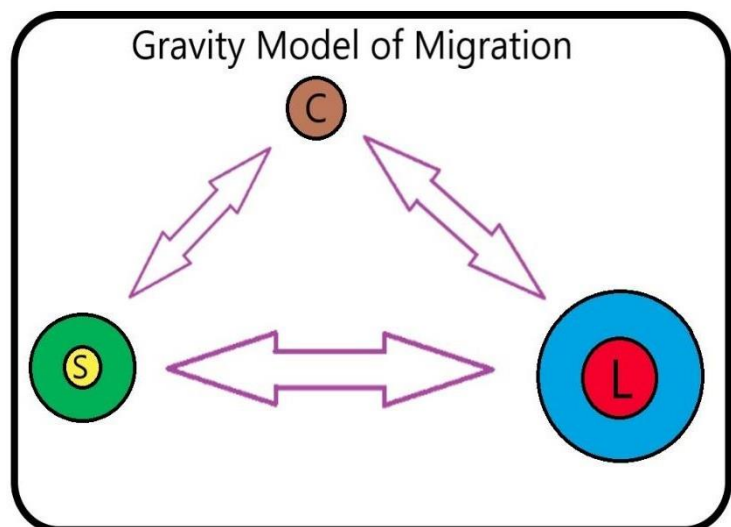
Figure 3 Gravity Model for Migration

2.9.4 Weber's theory of industrial location

Weber's theory of industrial location (Britannica, 2023), also known as the location theory, was developed by German economist Alfred Weber in the early 20th century. The theory focuses on explaining why industries tend to locate in specific areas. Weber argued that the location of an industry is influenced by three main factors: transportation costs, labor costs, and agglomeration economies.

Weber (Helfer, 2022), claims that by taking into account the geographical distribution of supplies and markets, industries seek to reduce their production costs. In making this choice, transportation expenses are a key factor. To save money on transportation, industries frequently position themselves close to the sources of their raw materials. To reduce the cost of delivering finished goods to customers, industries similarly strive to be close to their markets. Industrial location selections also consider labor costs. The "labor cost gradient," which Weber first suggested, contends that businesses are more likely to locate where labor costs are the lowest. Factors like pay scales, productivity, and the availability of workers can all have an impact on this.

Agglomeration economies were understood by Weber and Agglomeration is the term used to describe the concentration of related industries in a certain area. Due to shared infrastructure, specialized suppliers, skilled labor pools, and knowledge spillovers, according to Weber, industries are better off being close to one another. These agglomeration economies can help industries save money and operate more effectively.

Overall, the interplay between labor costs, transportation costs, and agglomeration economies in determining the spatial distribution of industries is emphasized by Weber's theory of industrial location. Although it offers insights into the variables affecting industrial location choices, it does not take into account other significant variables like market demand, governmental regulations, and technical improvements, which have grown in importance since Weber's time.

2.9.4.1 Assumptions of Weber's industrial location theory

➢ The Geographical area of industry is physically, technologically, culturally, and politically uniform.

➢ Both the sources of raw materials and consumption centers are known.

➢ The transportation cost of goods is dependent on weight and distance.

➢ The workforce or labor is geographically fixed.

➢ Due to high competition, there is perfect competitive pricing among the industries.

2.9.4.2 Location in theory

Location is important in the context of industrial growth. It additionally includes the process of selecting the ideal location for industrial activities. Location plays an important role in the idea of industrial growth for a variety of reasons. An essential component is having easy access to resources and raw materials. Industries that benefit from being close to their sources of raw materials include mining and forestry. This proximity reduces the cost of shipping and ensures a consistent supply chain (Studio, n.d.).

It is very important to have access to a skilled labor force. Industries that require specialized knowledge or expertise typically prosper when located in areas with a ready supply of competent personnel. This accessibility to skilled workers can boost industry innovation and production. The primary factors are connectivity and transportation. Industries must have strong connections to markets, suppliers, and delivery routes. Access to effective transportation networks, such as highways, railroads, ports, and airports, can have a big impact on how competitive and popular an industry becomes.

Being near a market is important. Reduced distribution costs and improved market responsiveness can result from being close to the intended consumer base. This is especially important for businesses that produce goods for which there is a significant demand for modification or rapid delivery. The role of regulations and policies is important. Industries can be drawn to a location with the help of benevolent business laws, tax breaks, and a helpful regulatory atmosphere. Unfavorable policies, on the other hand, could hamper the expansion of industry.

Finally, the availability and cost of utilities, such as energy and water, can significantly influence location decisions. Industries with high energy consumption, like manufacturing, benefit from affordable and reliable energy sources. The theory of industrial development underscores the critical role of location. A well-chosen location can provide access to resources, skilled labor, markets, transportation, and supportive policies, all of which contribute to the growth and success of industries (Uwe Deichmann, 2008).

2.9.4.3 Least Cost Theory: Transport Cost

The Least Cost theory (Israel), an idea that is used to determine the best location for enterprises, emphasizes the significance of reducing transportation costs. This idea, put forth by economist Alfred Weber in the early 20th century, focuses on the interaction between transportation costs, the accessibility of raw materials, and market access. The Least Cost Theory states that enterprises

should situate themselves so as to reduce the total cost of production, which includes both production expenses and transportation costs. Industries take into account two main factors to accomplish this goal: the location of the market for the finished product and the location of the raw material supply.

Weber (Helfer, 2022) introduced the concept of the "least cost location," which suggests that an industry should ideally position itself at the point where the costs of transporting raw materials to the factory and finished products to the market are minimized. This point is where the combined costs of transportation reach their lowest point, ensuring maximum efficiency and profitability. Distance, mode of transportation (such as road, rail, or airways), and the type of product being transported (such as bulk materials versus completed items) are all factors that affect transportation costs. For instance, to save down on transportation costs, businesses in the mining and heavy industrial sectors often locate close to their suppliers of raw materials.

On the other hand, industries producing goods with a higher value-to-weight ratio, such as electronics or pharmaceuticals, often prioritize proximity to the market due to the relatively lower transportation costs for lighter, high-value goods.

The importance of lowering transportation costs in industrial location selections is highlighted by the least cost theory. Industries can optimize their production processes and improve economic efficiency by carefully situating themselves in relation to the sources of their raw materials and the markets they are aiming to reach. Although the theory might not account for all contemporary complications, it is nonetheless a key idea in comprehending what influences industrial geography.

Weber used the location triangle models for the manufacturing industries as shown in figure 4. According to Weber's triangle model, the manufacturing industries are divided into two groups namely, weight-
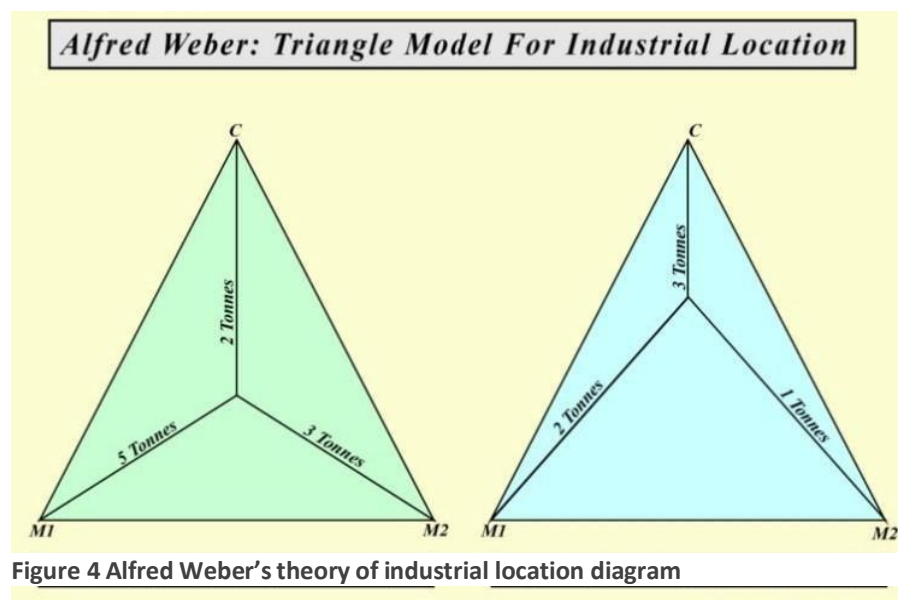
Figure 4 Alfred Weber's theory of industrial location diagram

gaining industry and weight-losing industry. Therefore, the Iron and Steel industry, Cement industry etc. are come under the weight-losing industry so the raw materials are impure then the industries should be shifted towards the region of raw material. If the raw material is weight gaining or pure then the location of an industry should be between the region of raw materials and the market. Apart from these, if the raw material is universally available then the industry should be shifted near the market. (refer figure 4).

2.9.4.4 Least Cost Theory: Production Cost and Agglomeration

The Shortest Transportation Cost (ST) Theory is a concept in industrial location theory that focuses on production costs and the idea of agglomeration. Proposed as an alternative to the Least Cost Theory by economist August Lösch, the ST Theory considers not only transportation costs but also production costs and the benefits of clustering industries together.

In the ST Theory, the location decision for industries is influenced by both the cost of transporting raw materials to the factory and the cost of transporting finished products to the market. However, unlike the pure emphasis on minimizing transportation costs in the Least Cost Theory, the ST Theory introduces the concept of agglomeration economies.

Agglomeration economies (Fearon, 2002) refer to the advantages that industries gain from being located in close proximity to each other. These advantages include shared infrastructure, access to
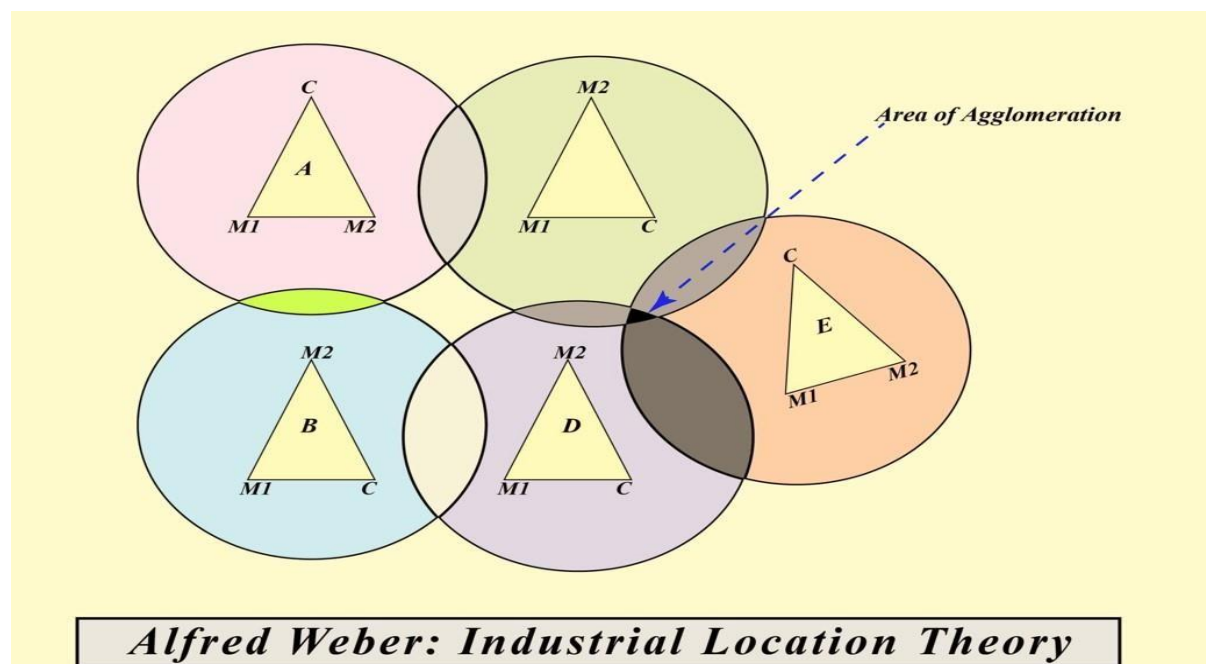
Figure 5 Weber's industrial location theory

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a specialized labor force, and the availability of suppliers and related industries. When industries cluster together, they can benefit from economies of scale, reduced production costs, and increased innovation due to the exchange of ideas and expertise.

According to this idea, production costs and the advantages of agglomeration are just as relevant in influencing industrial location choices as transportation costs. Skilled workers and knowledge-sharing may be prioritized by some industries, such as those that are technologically or research-intensive, driving them to locate near industry clusters or research institutes. Major manufacturing sectors, on the other hand, can still place a high value on access to raw materials while also taking into account the possible savings and efficiencies associated with being a part of an industrial cluster.

In summary, the Shortest Transportation Cost Theory highlights the role of both transportation costs and production costs in industrial location decisions. It emphasizes the benefits of agglomeration, suggesting that industries can gain advantages from locating near each other, leading to increased efficiency, innovation, and reduced costs. This theory offers a more nuanced perspective on industrial geography, accounting for the diverse factors that influence location choices

2.9.4.5 Impact of labor cost on location of an industry

According to Weber's least labor cost theory (Helfer, 2022), if the labor cost is very cheap at a specific region then the industry would be shifted from the least transportation cost to least labor cost provided the saving in labor cost would be greater than any additional transport cost.

In figure no.-2, P represents the least transportation cost and the circles at the periphery of P represents the Isodopanes (the lines of equal transportation cost per unit of production). According to fig-2, the
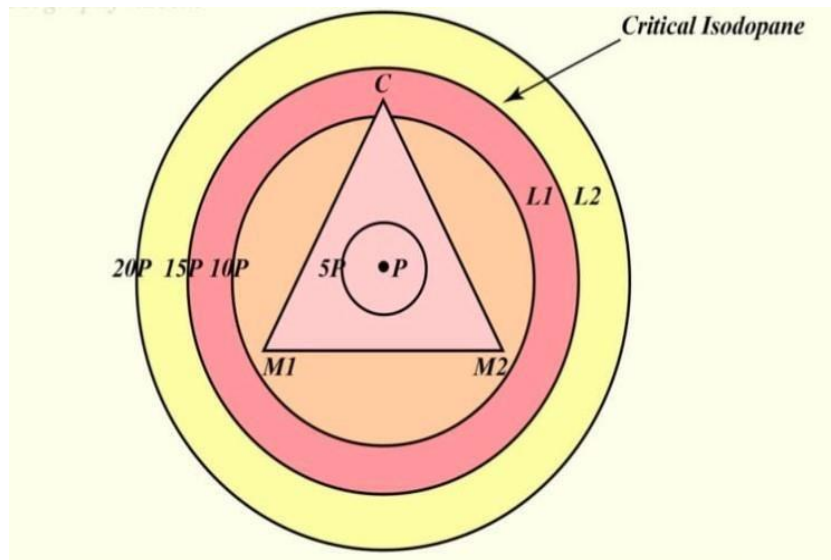
Figure 7 Weber's theory of industrial location

L1 and L2 are two locations which would save 15 paise per unit of production. C represents the

consumption point for manufacturing goods. Any location within the 15 P Isodopane would save more on labor cost than transportation cost as it is near the consumption point. Therefore, L1 is a more profitable location than P.

2.9.4.6 Industrial Location in Practice

In reality industrial location refers to the strategic decisions taken by companies regarding the location of their operations. These decisions are motivated by practical factors, even though theories like Alfred Weber's Least Cost Theory give a theoretical framework. Access to raw resources, closeness to markets, the availability of skilled labor, and the state of the transportation system, governmental regulations, and environmental concerns are all important factors. Industries frequently try to reduce transportation costs by situating themselves close to resources if the materials are heavy or near markets if the products are large. Additionally, industries may group together to take advantage of economies of scale, specialized labor, and shared resources (Webber, 2020). These selections are influenced by the particular requirements of each industry and the local environment, and industrial location will continue to be dynamic as global markets change, technology develops, and sustainability becomes increasingly essential.

2.9.4.7 Criticism of Weber's theory of industrial location

- ➤ Weber didn't consider the role of demand for goods for the location of Industries. However, he overemphasized the role of supply.
- ➤ There is no region which is physically, politically, culturally and technologically uniform but, he has taken this assumption to reduce the real-world complexities.
- ➤ Due to better opportunities for employment, labors often migrate but, weber has taken labor as static.
- ➤ Weber also neglected the political factors of a location but, it has been experienced that the migration of labors also caused due to political and governmental factors.
- ➤ He overemphasized the role of transportation cost in the establishment of an Industry.
- ➤ It is not possible to find the perfect competitive pricing of goods as man seldom behaves rationally but, weber has also taken this assumption.

2.9.4.8 Industrial Location

Location refers to a term that describes a thing's position in respect to other objects. As a result, the term "industrial location" refers to a statement about both the spatial distribution of industry as well as the relationships that exist between that distribution and other phenomena. Industrial

location theory makes references to to explain the spatial dispersion of industry many facets of society (Webber, 2020).

According to (Webber, 2020),"Industrial location theory was first simple and examined the location decision of firms in an abstract world. Such isolation of location from other facets of economic organization is inadequate, and now industrial location theorists try to make their theories more general, by showing how industrial structure and location reflect the broader changes that are taking place in society."

2.9.4.9 Significance of Industrial Location

The significance of industrial location in Nepal is very important for its economic growth and development. Choosing strategic locations for industries can boost job creation, increase revenue, and contribute to technological advancement. Nepal's topographical diversity, selecting suitable locations takes on added importance to optimize resource utilization, mitigate transportation challenges, and promote regional balance. Industries strategically placed can stimulate local economies, enhance skill development, and address unemployment. Moreover, well-planned industrial locations can attract investment, encourage trade, and drive innovation, ultimately aiding Nepal's journey toward sustainable development and improved living standards for its citizens.

2.9.4.10   Evolution of Industries

Industries have changed a lot over time. Back in the old days, people used to make things using their hands and simple tools. This was called the "handicraft" or "craftsmanship" period. Then, with the Industrial Revolution, machines came into play. This made production faster and cheaper, leading to big factories and the rise of industries like textiles and manufacturing. As time went on, technology kept advancing. We entered the Digital Age, where computers and electronics became crucial. This gave birth to new industries like technology, software, and telecommunications. Nowadays, we're in the midst of the Technological Revolution. Industries are becoming even more high-tech, with a focus on things like artificial intelligence, renewable energy, and biotechnology. So, industries have evolved from manual work to machines to super-smart technology.

2.9.4.11   Evolution of Manufacturing

According to (ElMaraghy, 2021), Manufacturing has changed a lot over the years. In the past, people used to make things by hand, like crafting pottery or weaving clothes. Then, during the Industrial Revolution, machines started to help with making things. This made production faster and goods more affordable. Factories popped up, and industries like textiles and machinery grew. As time passed, technology continued to improve. Computers and robots became part of

manufacturing, making processes even more efficient and precise. This is called "automation." Nowadays, advanced technologies like 3D printing and smart factories are transforming manufacturing once again. These new methods allow us to create things in innovative ways and customize products easily. So, manufacturing has evolved from manual work to machines to highly advanced technology, changing the way things are made.

2.9.4.12 Profits and Location

Making a profit and choosing the right location are important for industrial development. To make money, industries need to sell the things they produce for more than they spend to make them. Picking a good location is also crucial (Webber, 2020). Being close to resources, like raw materials and skilled workers, can save money and time. Additionally, being near customers is smart because it's easier to deliver products to them. Some industries need specific conditions, like being near highway for transportation or in a place with good energy sources. So, finding the right place and managing money well are key for industries to grow and succeed.

2.10 Case Study Literature

2.10.1 Plant location selection of a manufacturing industry using analytic hierarchy process approach

For a manufacturing industry, choosing an ideal plant location is an essential choice that has a big impact on operational effectiveness, production costs, and overall competitiveness. The use of the Analytic Hierarchy Process (AHP) approach, a well-known decision-making methodology, to direct the plant location selection process is the main topic of this article.

The AHP method involves dividing the decision problem into a sequence of factors that affect the choice of where to locate the facility. The hierarchy frequently involves elements like market proximity, regulatory environment, workforce availability, quality of infrastructure, accessibility to transportation, and labor concerns. Sub-criteria could include things like the price of transportation, the size of the trained labor pool, the accessibility of utilities, tax incentives, market demand, and sustainability standards.

The AHP process assigns relative importance or weights to each criterion and sub-criterion through pairwise comparisons, which are often based on expert opinions or historical data. A consistent set of priorities is derived, enabling a systematic evaluation of different potential plant locations.

Using AHP, decision-makers can compare the various locations based on their alignment with the established criteria and sub-criteria. The methodology facilitates the calculation of a composite score for each location, providing a quantitative basis for comparison. AHP allows for sensitivity analysis, which assesses the impact of changes in criteria weights on the final selection. This aids in understanding how altering priorities might affect the preferred location choice (Gothwal, 2015).

The application of AHP to plant location selection offers several benefits. It provides a structured and transparent approach, incorporating both quantitative and qualitative factors. It aids in making informed decisions by considering multiple criteria simultaneously and incorporating the insights of various stakeholders (Gothwal, 2015). However, it's important to acknowledge that AHP requires accurate data and informed judgments, which might pose challenges in certain cases. Moreover, the methodology assumes that the criteria and sub-criteria are independent and do not interact, which might not always reflect real-world complexities.

In conclusion, this article examines how to choose the best plant location for a manufacturing company by using the Analytic Hierarchy Process method. The analytical hierarchy process (AHP) approach is used in this research to reach a consensus opinion. The AHP model is created and applied to a real-world case study to see if it is useful for selecting the plant location for a manufacturing company. The AHP method was used to select the best location among the five cities—Delhi, Manesar, Chandigarh, Mumbai, and Baddi—recommended by a particular manufacturing business. The locations were investigated for various factors affecting the plant placement. Analysis shows that Baddi is the best location for their new plant to be built. AHP is an effective and adaptable approach for breaking down a complex decision problem into a straightforward hierarchy that takes both financial and non-financial aspects into account.

3 CHAPTER THREE: STUDY AREA

3.1 Location and Layout

Figure 8 Balaju Industrial Area in Aerial View inside the red dots

Balaju Industrial Area is an industrial zone located in Balaju Area along the rig road in kathamndu. It is one of the main industrial zone of Nepal which is located in the northwest of the Kathmandu Valley. This region is home to a large number of manufacturing and processing businesses that have a significant impact on the industrial development of the nation. The main heart of Kathmandu is easily accessible from the Balaju Industrial Area. It lies approximately 6 kilometers northwest of Kathmandu Durbar Square, one of the city's major landmarks. The industrial area is well-connected to the rest of the city through multiple transportation routes, making it easily accessible for both commuters and logistics purposes.

The industrial area covers a 670 Ropanies of land area, featuring a well-organized layout to accommodate a diverse range of industries. Balaju Industrial District has a total area of 670 ropanies out of which 540 ropanies are well developed. The land occupied by service sector are 130 ropanies. Currently there are 131 industries established inside the district out of which 97 industries are in operation (IDML, 2023). Balaju Industrial Area's concept was designed to

maximize area use while offering a favorable environment for industrial activities. The layout's main features are listed below.

3.1.1 Industrial Plots:

From the data from IDM (IDML, 2023), Balaju Industrial Area consists of numerous industrial plots designated for different types of industries. The plots vary in size and are usually rectangular or square in shape, with clearly defined boundaries. The area houses a wide range of industrial units, including factories, warehouses, and manufacturing plants. Various sectors such as textiles, plastics, metal fabrication, food processing, and printing are represented in the industrial area. Most of the plots are occupied by the factories that are outdated in infrastructure and few plots with new infrastructure. The investment of the private sector has invested in the industries grosses more than 312 crores, while the government sector investment is 6.22 crores (IDML, 2023).

3.1.2 Road Network:

The industrial area incorporates a well-planned road network to facilitate smooth movement of goods, raw materials, and employees within the premises. The roads are wide and properly paved, allowing easy access to different sections of the industrial area. They are designed to accommodate heavy vehicles and are connected to the main city roads for connectivity. This industrial area has a total road network of 5.2 km. However, certain portions of an industrial area's roads are in the worst condition and require maintenance as needed. Although the footpaths are in bad condition, there is nice greenery along the roadside in the industrial sector. One of the noticeable point is that the main roads that are in front line and that are connected to the major offices of industrial district are good condition but other than main roads and branch roads are in poor condition.

3.1.3 Infrastructure:

Balaju Industrial Area is equipped with essential infrastructure to support industrial operations. The area is supplied with reliable electricity, water, and communication facilities to meet the requirements of the industries located there. Adequate power supply and backup systems ensure uninterrupted production processes. Balaju Industrial District has its own electricity distribution network. The total power consumption by this I.D. is 7000 KVA. The district has its own water boring system, water supply systems as well as water filtration plant. The total water

Figure 9 Gate of Balaju Industrial District (BID Gate)

consumption here per day is 412 k.l. per day (IDML, 2023).

3.1.4 Industrial Services:

Different services that are necessary for industrial operations are offered in the Balaju industrial area. These include of places to conduct banking transactions, transportation services, repair and maintenance facilities, garbage disposal sites, and security services. Important service for education to children of labor and normal health checkup facilities for labor is good service that can be seen inside Balaju industrial area. The accessibility of these services close to the industrial sector improves the industries' convenience and fosters their expansion. However the service are available in case of garbage poor management in the site are observed.

3.1.5 Amenities:

Balaju Industrial Area includes services to meet the demands of the workforce in the industry. To make the working environment comfortable for workers, there are canteens, restaurants, and open spaces. In order to provide proximity between the workplace and living spaces, some factories within the industrial zone has accommodations for the labor.

3.1.6 Zoning and Regulations:

To maintain order and control industrial activity, the industrial area follows the rules and regulations. A particular percentage of land is set designated for different industries in order

to promote efficient land usage. To ensure a safe and healthy workplace, compliance with safety, environmental, and labor rules is enforced. Due to its ideal location and comprehensive layout, Balaju Industrial Area is a popular choice for industrialist in Kathmandu. Its significance as an increasing industrial zone is enhanced by its close proximity to the city core, effective infrastructure, and accessibility to services. The region is one of the Nepal's economic hub and offers many people work opportunities.

3.2 Challenges and opportunities

Balaju Industrial Area, like any other industrial zone, faces a set of challenges and opportunities. Here are some of the key ones.

3.2.1 Challenges:

3.2.1.1 Infrastructure:

One of the primary challenges is the need for continuous improvement and maintenance of infrastructure. The industrial area faces issues related to roads, drainage systems, power supply, and waste management. Upgrading infrastructure to meet the needs of industries is in need for the smooth functioning of businesses. The infrastructure of local community is unmanaged and locally developed.

Figure 10 Traffic congestion along ring road because of Industrial Area

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3.2.1.2 Environmental Impact:

Pollution of the air and water is one effect that industrial activity that has impact on the environment. In Balaju Industrial area operation effectiveness in waste management systems, lack of advocacy about environmentally conscious actions, and low environmental standards practice are the major issues in this area. It's necessary to find a balance between industrial development and environmental sustainability.

Figure 11 Fire Breakout inside Industrial District

3.2.1.3 Skilled Labor:

The development and competitiveness of the industries in Balaju Industrial Area depend mainly on the availability of skilled workers. However, finding and keeping skilled staff may be difficult. Boosting educational institutions and vocational training programs for the skills gap and fill the demand for competent workers in the sector are major needs.

3.2.1.4 Regulatory Compliance:

Businesses in the industrial sector may encounter difficulties following to legal requirements such as labor regulations, safety standards, and taxation rules which are observed in this industrial area. The main issue is that there are numerous challenges and inadequate policies, yet they are addressing the issues in that context.

3.2.2 Opportunities:

3.2.2.1 Industrial Growth:

Balaju Industrial Area offers significant opportunities for industrial growth and expansion. The area's strategic location, well-connected transportation network, and availability of infrastructure make it an attractive destination for new businesses and investors. The industrial area can attract both domestic and foreign investments, leading to job creation and economic development (IDML, 2023).

3.2.2.2 Cluster Effect:

The concentration of diverse industries in Balaju Industrial Area can create an agglomeration effect, good collaboration, knowledge-sharing, and economies of scale inside industrial zone as well as can be observed outside an industrial area. The proximity of different industries allows for the efficient exchange of resources, services, and ideas. Hence the clustering result in increased productivity, innovation, and competitiveness for businesses in this area.

3.2.2.3 Employment Opportunities:

Balaju Industrial Area serves as a major place of employment for Nepalese. Because of presence of industries in the area that directly and indirectly generate job opportunities at various skill levels. This contribute to poverty reduction, skill development, and overall socio-economic progress in the region.

3.2.2.4 Additional Services:

Peripheral service development has prospects when a successful industrial location like Balaju is present that includes facility like water and sanitary facility for local public. By meeting the demands of the industries and the people who work in them, supporting businesses like banking, catering, logistics, maintenance and repair, transportation, small business like restaurants, shops and stationary shops.

3.2.2.5 Urban Development:

The area as a whole benefit from the presence of the Balaju Industrial Area. It attracts investments in social services, commercial establishments, residential construction, and infrastructure. As a result, the surrounding community enjoyed higher living standards, rising property values, and improved quality of life for those who are about 500 meter away from industrial area but those who are attached with the industrial are suffers a problem. Balaju Industrial Area continue to develop as a dynamic industrial hub and contribute to the economic development of the area and the nation and can be improved by addressing the issues and grasping the opportunities.

3.3 Market

Balaju Industrial Area, a choice for investor for industrial setup in the nation because it is situated in the ideal location as it is close to the ring road and along the highway with in the city. As it is located in the highly dense city it is has higher demand as the industrial area locates inside the place with maximum demand.The area also houses several wholesale and retail outlets, allowing

businesses and individuals to procure goods at competitive prices just outside the industrial area located in Balaju Chowk area. The market is a hub of commercial activities, with traders, manufacturers, and suppliers interacting and conducting business. This has contributed to the growth of the market, bringing in advanced technology, expertise, and new business opportunities. Overall, the market in Balaju Industrial Area is a dynamic and it serves as a crucial contributor to Nepal's economy, generating employment opportunities and driving industrial growth.

3.4 Workforce

Balaju Industrial Area's workforce are the main source for the success, productivity, and innovation in this industrial sector. They raise the standard for these industries through their commitment, expertise, and hard work. The workforce here are trained with new technologies and techniques by the industrialist. Mostly with big industries labor are trained in their respective fields, staying up-to-date with the latest trends. The workforce of Balaju Industrial Area is also characterized by its diversity. People from various backgrounds and communities come together, fostering a richness in ideas, perspectives, and skills. This diversity hepls innovation and collaboration, fueling the growth of industries.

The workforce in Balaju Industrial Area is supported by vocational training programs, educational institutions, and skill development initiatives from Balaju School of Engineering and Technology that is located inside the industrial area and that helps to operate different type of program supporting industrialist. This ensures that they are equipped with the necessary knowledge and capabilities to excel in their roles.

3.5 Local community and Residents

The number of homes in the area around Balaju Industrial Area is composed with a variety of residences that serve both the local population and the industrial workforce. Private house with rent facilities, apartments, housing colonies, and rented homes the housing options available in the area. There are a few residential structures nearby the industrial sector that are built with industrial employees in mind, offering both affordable and suitable living options. In addition, there are residential communities that have grown over time that are comfortable to cope up with industrial area. The housing layout reflects the demand for accessible housing among locals and industrial workers. Because of industrial location most people are happy with the agglomeration of small business which directly and indirectly gets opportunities for income and few of them are unhappy

because of negative impact of the industrial area. There is park near by industrial area that has positive impact to community.

Neighborhood residents have a strong sense of support and community, which promotes a welcoming environment with few in negative side of it. They value cooperation and regularly participate in initiatives to promote social harmony. The community actively participates in local events, festivals, and cultural celebrations, showcasing its rich heritage and traditions. Additionally, they take pride in their neighborhood and actively contribute to its development, ensuring a clean and well-maintained environment. Through

Figure 12 Local Community and Industrial District

their collective efforts, the local community of Balaju Industrial Area creates a welcoming place to live and work. People do, however, support industrial areas; they strongly believe that these areas should be protected while also encouraging community development.

3.6 Environment

Both the businesses in the area and the locals are very concerned about the environment in Balaju Industrial Area. To ensure sustainable operations and decrease the influence on the local ecosystem, various efforts are done. Environmental friendly practices have been adopted by many companies, including waste management systems, energy-saving devices, and water conservation techniques. Additionally, training sessions and awareness campaigns are held to encourage stakeholders and employees to practice environmental responsibility. To address challenges including air pollution, water contamination, and noise management, the industrial sector also works with local development committees, environmental organizations and governmental organizations. Balaju Industrial Area with Balaju Biaisdhara Park and other green spaces give the

locals fresh air to breathe and recreational activities. This park act as multifaceted buffer zones in dense urban areas, providing environmental, visual, and social relief while contributing to the overall well-being of the community. Ultimately, it is clear that both the public and industrial sectors are committed to preserving the environment and advancing a more environmentally friendly place.

Figure 13 Balaju Baisdhara Park adjacent to the industrial area.

4 CHAPTER FOUR: CONCEPTUAL FRAMEWORK AND RESEARCH METHODOLOGY

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.

4.1 Research Methodology

The research utilized a mixed-method approach to collect and analyze data. Both quantitative and qualitative along with primary and secondary data sources were utilized to gather comprehensive information about the location attributes of Balaju Industrial Area. Primary data collection involved surveys, interviews, and field visits to industries and relevant government authorities. Secondary data sources included literature reviews, reports, and statistical data from government agencies and industrial associations.

4.2 Research Paradigm

Research paradigm, as defined by (Brad Wray, 2011) is a collection of shared assumptions and understandings among scientists regarding how issues should be understood and solved. The pragmatic paradigm, which the current investigation belongs, is characterized as one in which the researchers believe that reality must be actively resolved, challenged, and interpreted. Pragmatic paradigms are free to use a range of approaches since they are informed of their limitations and complementary nature. In mix techniques, quantitative and qualitative data are mixed to better comprehend reality. Rather than emphasizing its representation or conception, pragmatism highlights interaction with reality.

This study is primarily qualitative in nature and involves interviews with key informants. However, it also incorporates quantitative data derived from gathering, analyzing, and integrating the results of on-site household surveys that were conducted as part of the investigation of the Balaju Industrial Area and Local Community. The purpose of the study is to gain knowledge and understanding of how the local community and industrial districts interact. With regard to the

Balaju Industrial Area and local community, this research aims to explore, characterize, and explain the social reality.

4.3 Ontology

Ontology and epistemology are to research what 'footings' are to a house: they form the foundations of the whole structure (Grix, 2004). It is the ontological question that leads a researcher to inquire what kind of reality exists: "A singular, verifiable reality and truth or socially constructed multiple realities" (Rehman, 2016). The study's ontological position for the study is that the current location of the Balaju Industrial Area affects the local community in both positive and negative ways, making it important to look into location-related factors.

The analysis of Location attributes for industrial areas has several perspectives and realities. Multiple stakeholders (People, government, policymakers) are involved in the data collection and each one interprets the same context differently resulting in multiple realities. The ontological position for the research is that the analysis of location attributes and people's perception towards industrial areas is socially constructed multiple realities.

4.4 Epistemology

Epistemology refers to "the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated" (Gall, 2003). Epistemology deals with what can be considered valid knowledge to claim the ontological assumption. The epistemological position for the study is that the location attributes of industrial location can be obtained from qualitative and qualitative analysis. Valid knowledge can be obtained through observation, interviews, and interpretation of secondary data. The plans and policies regarding the industrial area and its surrounding can be obtained from documents. The socioeconomic impacts and environmental problems between the public and industrial area, its changing pattern, and how people interpret this situation can be obtained by focus group discussion.

4.5 Basis for Pragmatic Paradigm

Research paradigm helps to examine the social and natural realities of the world. "Research paradigms can be characterized by the way Scientists respond to three basic questions: ontological, epistemological, and methodological questions." (Rehman, 2016). (Lub, 2015) put forward "the

beliefs the researcher holds, will reflect the way the research is designed, how data is both collected and analyzed and how the research results are presented." Thus, recognizing a paradigm is critical to aiding the research process, finalizing the course of action, and determining opinions.

The positivist paradigm operates under the premise that everything can be reduced to a single reality that can be recognized, quantified, and comprehended. Positivists contend that knowledge ought to be created objectively, free from the biases of the researchers and participants. In order to minimize bias in the study, positivists operate in a dualism and objectivity model where the researcher and participants are kept apart (Rehman, 2016). Since the research is based on social science and cannot be done in a controlled setting, this paradigm is not applicable.

In contrast to the logical positivist movement, where the scientist is independent and detached from the research, post-positivists believe there is a mutual influence (Krauss, 2005). Here, scientific methods are adopted but the idea of truth gets modified and the reality is extracted not as a singular reality. As with positivist research, quantitative post-positivist research also concerns observations that are rooted in theory (Krauss, 2005). Since the research is not based on any theory and does not adopt scientific methods, this paradigm is not suitable.

The way that each person interprets their own worldview is based on their perceptions, according to interpretivists. This theoretical paradigm's basic principle is that reality is socially produced. Because the research topic deals with multiple realities and the knowledge is socially constructed by those who are involved in and have opinions about the research process, the interpretive paradigm is used to analyze qualitative data from interactions between the researcher and the relevant institutions. Neither an experiment nor a controlled environment are necessary for this study.

Transformative researchers felt that the interpretive/constructivist approach to research did not adequately address issues of social justice and marginalized peoples (Knipe, 2006). The research does not deal with such issue, hence this paradigm is not applicable.

Pragmatist researchers focus on the 'what' and 'how' of the research problem (Grix, 2004). Pragmatism is not committed to any one system of philosophy or reality. When two or more paradigms are applied in research, it is known as a pragmatic paradigm. Since the research is going to be done by mixed-method approach means that both quantitative and qualitative data were collected and analyzed. Quantitative data involved numerical information, such as statistics, regression analysis from survey responses, which helped provide a broader understanding of the relationship of location attributes. Qualitative data, on the other hand, involved interviews,

observations, and discussions that allowed for in-depth exploration and insights from stakeholders involved in Balaju Industrial Area, hence this paradigm is adopted.

4.6 Methodology

How and what methods can be used to acquire knowledge are the subject of methodology (McCombes, 2023). The methodology refers to the methods used to collect, examine, and assess data. Qualitative as well as quantitative studies are used in this investigation. Even though this study will mostly employ qualitative approach, data from regression analysis methods will be used to track public opinion to lookup the relation between the people's satisfaction with the current location of industrial area and impact of industrial area. By adopting an outside perspective, the researcher interprets the data using this method.

In pragmatism, a flexible approach to resolving research-related issues is appropriate. According to pragmatism, there are numerous techniques that can be used to address problems more effectively and get to the bottom of issues rather than focusing on one optimal way to solve them. Pragmatics holds that there are multiple realities, not just one.

The pragmatism paradigm uses both the post-positivist and interpretivist perspectives to address problems. In view of this, this research paradigm suggests a mixed-method approach to study. According to a mixed-method approach, such research will use both qualitative and quantitative research approaches.

4.7 Data Collection Techniques

Direct on-site observations, checklists, and photographs will be used as the data-collecting methods, and everything that is seen, heard, or encountered will be recorded in in-depth field notes. By directly posing questions to individuals and the appropriate authorities in one-on-one dialogues and focus groups, semi-structured and open-ended interviews will be undertaken. Open-ended survey questions should be used to better understand respondents' views on the nature of industrial areas and how it relates to their daily lives. All of the methods outlined above serve as the main data sources.

Collecting information that is already out there, such as texts, images, audio or video recordings, etc., is an important secondary data. It is also necessary to examine policy documents relating to industrial regions. The proper government agency must be contacted for maps and blueprints, and

Google Satellite Images must be consulted. Another important source of information for the research could be a case study. A review of relevant foreign cases that could provide guidance on how to address the research issue will be done.

4.8 Methods

4.8.1 Literature Review
Through literary evaluations, we will learn about the formation and evolution of these industrial districts, as well as their history, review the policy documents and management standards.

4.8.2 Observation
When conducting participant observation, the researcher immerses themselves completely in the activity that the respondents are involved in while taking notes and/or capturing audio. It is necessary to make a list of the site's geography, physical infrastructures, surrounding environment, economic activity, the growth of public facilities, and other components with photos in the study areas. Observation also helps with the analysis of the state and problems in the investigated regions.

4.8.3 Sample survey
In the survey, random sampling technique are used for the survey. And the respondents chosen represent a diverse range of public near industrial area. Their viewpoint regarding the economic and environmental issues are derived. The questionnaire helps to understand the location attributes of industrial area development and its surrounding.

4.8.4 Focus Group Discussion
A focus group discussion (FGD) is a qualitative research strategy for gathering data in which a pre-selected group of participants engages in in-depth discussion about a particular topic or issue under the guidance of a trained, external moderator. A focus group discussion typically has six to twelve individuals, but smaller groups are equally acceptable and instructive because they provide each participant with enough time and space to speak. The focus group discussion are conducted in the case area.

4.8.5 Key Informant Interviews
Key informant interviews are qualitative in-depth discussions with individuals who are knowledgeable about the local community. Key local informants are surveyed using a semi-structured format. Users, relevant stakeholders, and accountable authorities and organizations are

interviewed regarding their management of and difficulties with implementation and execution in the research areas.

4.8.6 Case Study

The Balaju Industrial Area is the case study area chosen for case study methodology. As a result, relevant cases are examined as secondary data. It will facilitate the gathering of more detailed information regarding current concerns and challenges.

4.8.7 Data Analysis

The data from the survey are analyzed using a computer program called IBM SPSS (Statistical Package for the Social Sciences). This method is employed to compare occurrences and groupings and to comprehend the link between dependent and interdependent variables that are represented in a data file. Numerous techniques will be employed to analyze the data, including ethnography, which is the systematic study of people and culture and without which it would be impossible to conduct daily activities or appreciate the worth of the public realm. Triangulation would be utilized to verify and validate the research results, and it would then be described in the findings of this study. These steps would lead to the creation of the research report.

4.8.8 Limitations

The limitations of the research can be listed as follows:

➢ Some respondents may not have been truthful while answering survey questions or may have provided socially desirable responses.
➢ In survey and in interview, a low response rate raise concerns about the representativeness of the collected data.
➢ Limited sample size impact the generalizability of findings and the ability to draw broader conclusions.
➢ Limited time for data collection and analysis restrict the comprehensiveness of the study.

4.8.9 Research Logic

If a researcher is familiar with logic, their thinking becomes more critical and useful when performing research. The objective of logic is to distinguish between sound and incorrect reasoning, or between better and worse thinking. Both a science and an art form, logic. The science of logic investigates, develops, and arranges the concepts and methods that can be applied to discern between sound and flawed reasoning. It is logic to proceed from a premise to a conclusion. When studying logic, it is essential to make clear what it is and why it is significant. Deductive, inductive, retroductive, and abductive are the four types of research logic (Uprety, 2022). While

deductive research starts with a theory and tests the hypothesis. It is used to check the existing theory specially used in quantitative research. Inductive research starts with specific observations of patterns and regularities and tentative hypotheses that lead to broad conclusions or theories. Inductive logic gives the probable truth so that may lead to false conclusion. Retroductive logic is used when we are not able to go on site. It is a mix of deductive and inductive logic. For instance: formation of planets. Contrary to deductive and retroductive reasoning, abductive research uses the terms and meanings that social actors employ as well as the actions they engage in to generate scientific descriptions of social life. We have to be self-measuring tool in this method.

Given the nature of the research's objectives, a combination of inductive and abductive logics are employed. A strategy of drawing inferences or conclusions is known as inductive reasoning. The use of meanings and interpretations, intentions, and reasons that people use in their daily lives is a rigorous approach for developing the social sciences. Because we are the case area's measurement tool, we mix inductive and abductive reasoning in our case area. From the questionnaire survey, there are a number of observations and facts that need to be examined and made sense of before moving on to the most likely explanation for the observations.

4.8.10   Research Ethics

The term "ethical considerations in research" refers to a set of guidelines that govern study designs and practices. Human research typically aims to comprehend real-world events, investigate effective remedies, examine habits, and improve lives in other ways. Both the topic of our research and the methods we use include crucial ethical considerations. Teleological and deontological ethics are the two basic broad categories of ethics. The deontological view is a rule-based view, while the teleological view is a consequent-based approach.

Deontological ethics is something we take into consideration on research because we prioritize our method over our final product in an ethical manner. By being kind and respecting everyone's opinions, we performed our poll without interfering with people's workdays. No intimidation or discrimination based on race, ethnicity, sexual orientation, gender, religion, handicap, age, or any other basis was used during the survey's conduct. Due to the fact that this was a social survey, we took participant protection rights, increased research validity, and preservation of scientific integrity into account.

4.8.11   Research Validation

Regression analysis was used to evaluate hypotheses about the relationship between local community satisfaction and the overall impact of industrial areas on local communities using quantitative data. After the establishment of relation, the narrative analysis was carried out for the qualitative data because both methods were used for resolving problems.

Based on the narrative analysis, which also incorporates self-observation, key informant interviews, and secondary data analysis. Triangulation was used in this method to analyze the data and validate the data that had been collected. After the data were successfully validated, the analysis and integration of the results took place and eventually a conclusion and suggestions were drawn.

5 CHAPTER FIVE: Time Series Analysis Mapping

5.1 Introduction:

Time series mapping of geographic locations involves the visualization and analysis of geographic data over a series of time intervals. It allows researchers to track and observe how specific locations or geographic features change and evolve over time (Greiner, 2022). This method is frequently used to examine trends, patterns, and variations in spatial data across a variety of disciplines, including epidemiology, urban planning, and environmental monitoring. To illustrate changes in geographic features on time series maps, color-coding, animation, or other visual approaches are frequently used. This makes it simpler to spot temporal trends and draw conclusions from the data.

Figure 14 Balaju Industrial District

The purpose of time series mapping of geographic locations in investigating location attributes for industrial development is to identify temporal trends. Time series mapping helps in identifying how specific geographic locations change over time. For industrial development, this can reveal trends in factors like population growth, infrastructure development, land use, and environmental conditions. It helps to analyze historical patterns by examining historical data through time series mapping, researchers can understand the historical patterns of industrial development in a particular area. This knowledge can inform future decisions regarding industrial expansion or investment.

5.2 Data and Tools

Time series mapping requires data with timestamps to track changes over time. In this chapter data with google earth is used to generate five year time interval changes of Kathmandu valley focusing in Balaju Industrial area. It include the visual appearance of development of this region.

GIS software is used for time series mapping. It allows users to visualize, analyze, and manipulate.

The Balaju Industrial District (BID) time series maps and urban growth are displayed in the map, which was created using Google Map Pro. The map was created using a 5-year time frame between 2003 and 2023. Prior to 2003, satellite images are unclear and are were not used for context analysis.

5.3 Time series Maps.
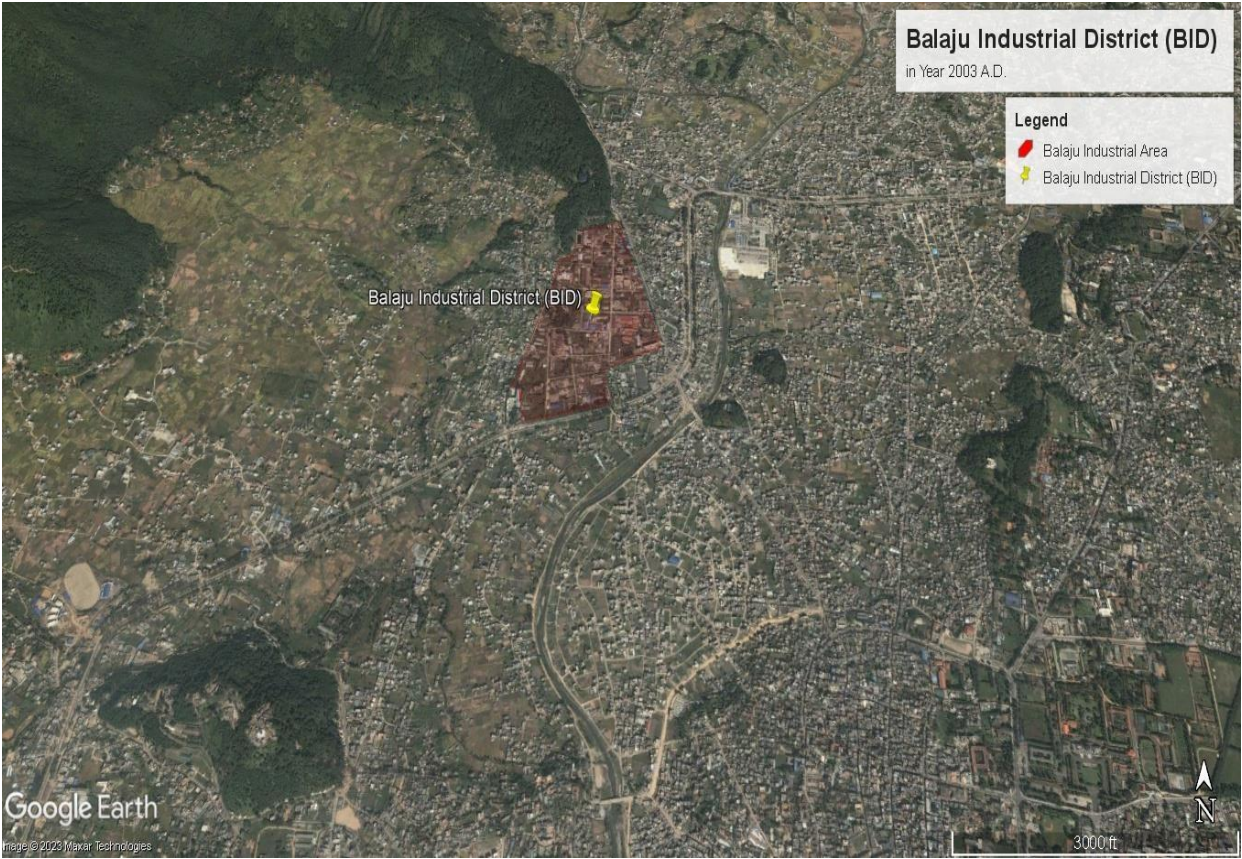
Figure 15 Year 2003 A.D.
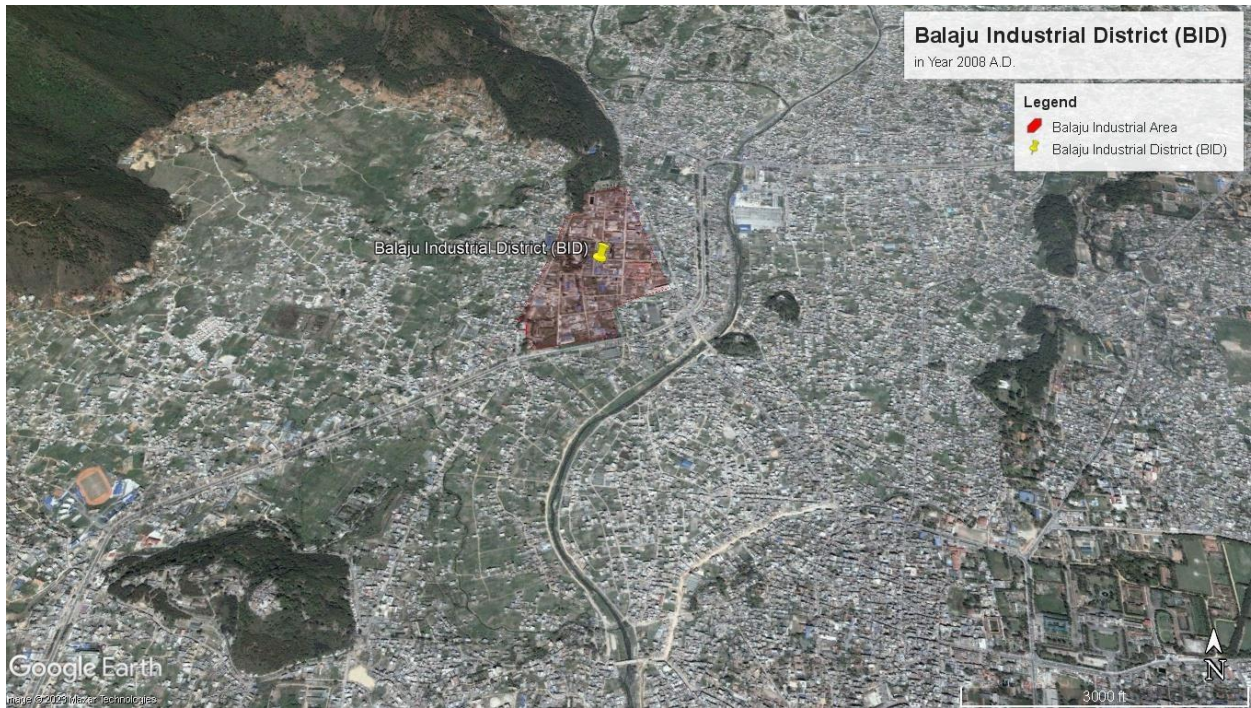
Figure 16 Year 2008 A.D.
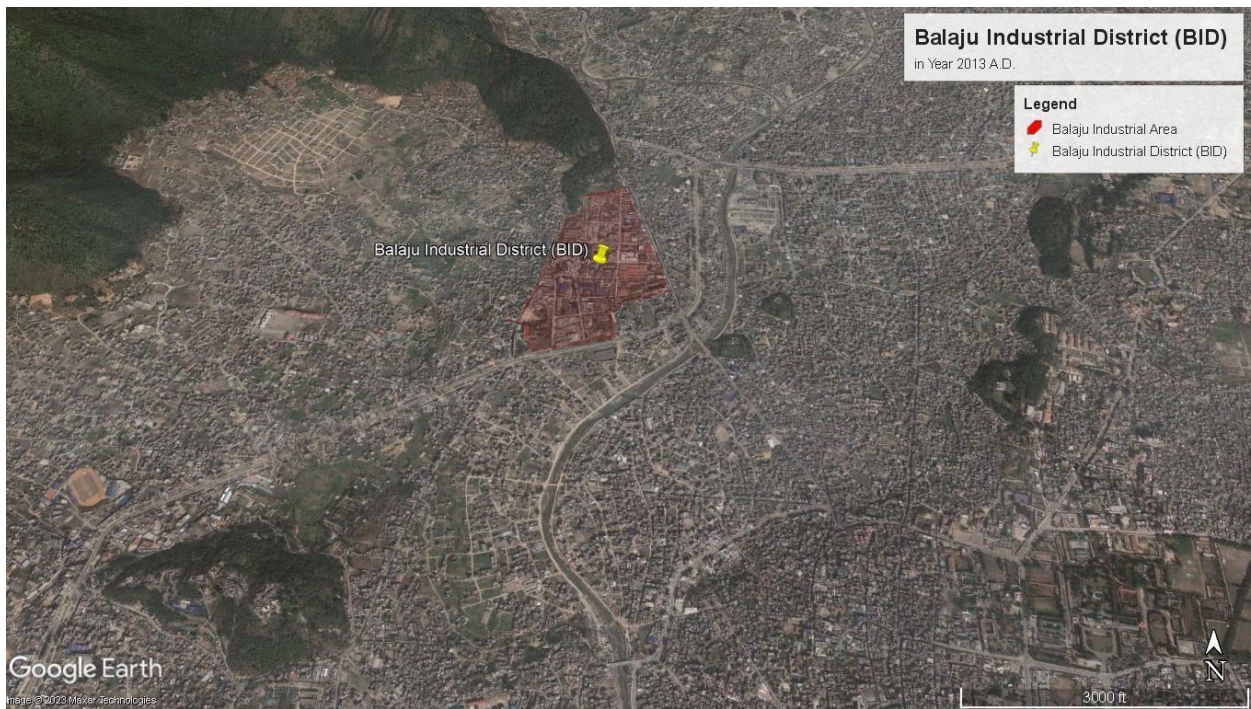
Figure 17 Year 2013 A.D.

47
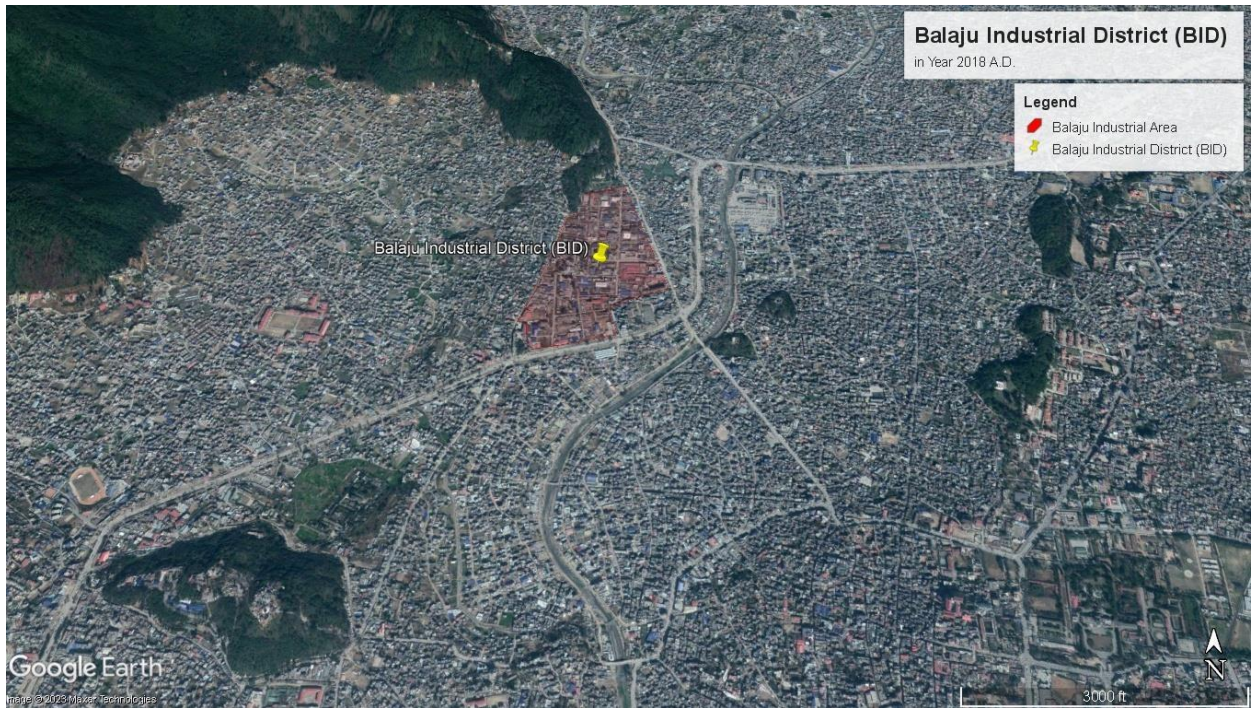
Figure 18 Year 2018 A.D.

Figure 19 Year 2023 A.D

5.4 Notable changes in valley over time.

Urbanization is taking place rapidly, with a share of 62.6% of Nepal's total population living in urban areas (MoFAGA, 2017), up from 4.88% in 1991 to 62.6% in 2015. The Kathmandu Valley is the most populated metropolitan area and one of South Asia's fastest-growing urban agglomerations, which has a significant impact on the social and economic structure of the valley (Muzzini & Aparicio, 2013). During this time, the Kathmandu Valley has seen a substantial increase in both development and population. To accommodate the growing population, the cities in the valley, especially Kathmandu have grown both horizontally and vertically. Construction of new buildings, town planning, new roads, bridges, and public transit infrastructure are the major changes. Increased population and building density in valley areas result in more compact development with Pollution and degradation of the environment. Traffic congestion has become a major issue in the Kathmandu Valley due to the rapid increase in the number of vehicles.

5.5 Key findings and Trends observed in the time series maps.

Several important discoveries and trends can be seen when time series maps of a Kathmandu valley focusing in Balaju Area and its surrounding rapidly urbanizing are examined. These results can provide insights on how the town has changed and developed over time. We notice the following important findings and trends:

5.5.1 Population Growth:

From the google maps we found that there is increase in number of houses hence result in an increase in the population of that area. Urban areas' poor capacity for development causes a more dense and saturated pace of population growth. Organic development can be observed around Balaju area.

5.5.2 Urban Expansion:

Time series maps show the physical expansion with how the built-up area has expanded over the years, often encroaching into previously undeveloped and agricultural land.

5.5.3 Infrastructure Development:

Construction of new buildings, town planning, new roads, bridges, and public transit infrastructure are the major changes that can be observed from the maps.

5.5.4 Land Use Modifications:

The way that land is used are changed now noticeably. As urbanization occurs, agricultural land are replaced by residential houses and commercial buildings.

5.5.5 Density Changes:

Increased population and building density in valley areas result in more compact development.
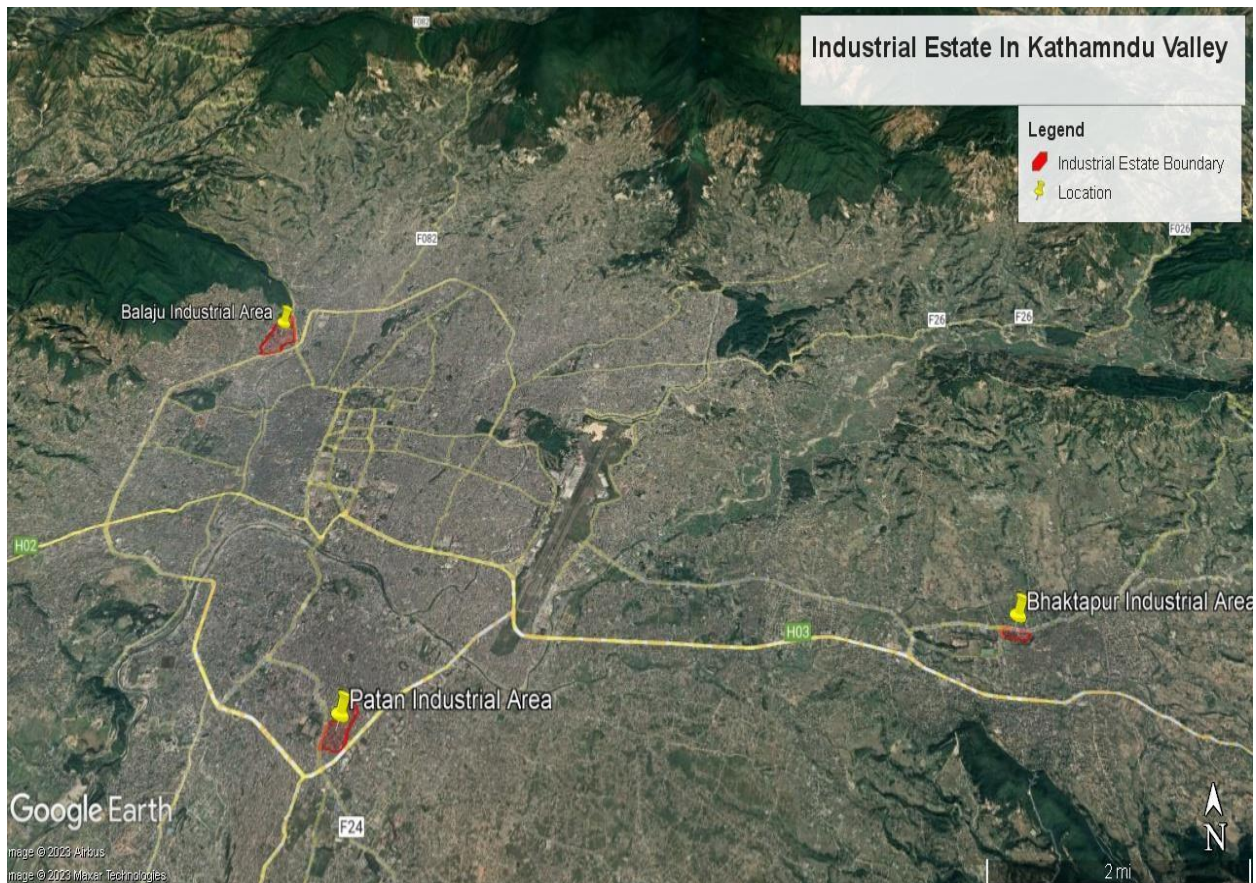
Figure 20 Kathmandu Valley locating Industrial Area.

5.6 Condition of Balaju Industrial Area and community

Figure 21 Balaju Industrial Area with major Industries

From the analysis and observation we find that the Balaju industrial area is surrounded by community over the time period and there is psychologically both positive and negative impact in their ways of life. Positively, it promotes a sense of financial stability by creating job opportunities and economic progress. On the other hand, there are drawbacks, like environmental issues like noise, pollution, and disturbance that can cause stress and lower people's general well-being. From the above figure in the red circle there is Nepal Gas Udhyog which creates highly negative impact as it is only about 100m, 250m and 300m away from the residential area as shown by the red line in three side respectively.

6 CHAPTER FIVE: FIELD WORK

In this chapter we discuss about the research work that is carried out in the field to collect data. This chapter mainly focused about the Key Informant survey, Sample Survey observation and secondary data collection.

Method used in this survey is shown in the table below.

Data collection methods		
Method	**Process**	**How it was conduct**
Survey	To understand the general characteristics or opinions of a group of people.	A list of questions was prepared in google from and survey was conducted online, in person over-the-phone.
Interview/focus group	To gain an in-depth understanding of perceptions or opinions on a topic.	Verbally ask participants open-ended questions in individual interviews or focus group discussions.
Observation	To understand Balaju Industrial area and it's surrounding in its natural setting.	Survey done with visual and field observation without trying to affect them.
Secondary data collection	To analyze data from populations that you can't access first-hand.	Searching and collecting existing datasets that have already been collected, from sources such as industrial area, government agencies or research organizations.

6.1 Questioner Survey

For this fieldwork, table work and study are done for many days including the collecting of information about the site and relevant studies and two sets of questioner was prepared. Two sets of questions were prepared that was for the local public and another for the industrialist. Questioner was prepared with the help of google form and required data collection process started. After all questioner as prepared then random sampling survey was done for both public and industrialist.

After the formulation of research questions then started to collect quantitative or qualitative data:

•   Quantitative data is expressed in numbers and graphs and is analyzed through statistical methods (used regression analysis).

•   Qualitative data is expressed in words and analyzed through interpretations and categorizations (Narrative analysis).

As researcher aim was to test a hypothesis to explore ideas, understand experiences, or gain detailed insights into a specific context, collect both quantitative and qualitative data. The research topic belongs to the case area of the Balaju Industrial Area and its impact on local community; researcher aim was to assess whether the impact of industrial area in local community in different locations. And as well to gather meaningful feedback from public and different stakeholders to explore new ideas for detail information. Since both quantitative and qualitative methods are used in this research, a mixed methods approach for data collection was used.

6.1.1 From Local Community
From the local community 41 person are chosen randomly and then data is generated accordingly.

6.1.1.1 Demographic Information
In this demographic portion general information regarding the age, gender, education and employment status is carried out.

6.1.1.1.1 Age
Most of the respondent are from age group 20 to 40 years old. But on conducting survey respondent of all age 16 to 85 are included. While choosing person for survey age was considered as an important factor because it shows us which age group was answering the question and the reason that a person's knowledge and experience about a topic or subject will often be determined by his or her age.

Age

41 responses
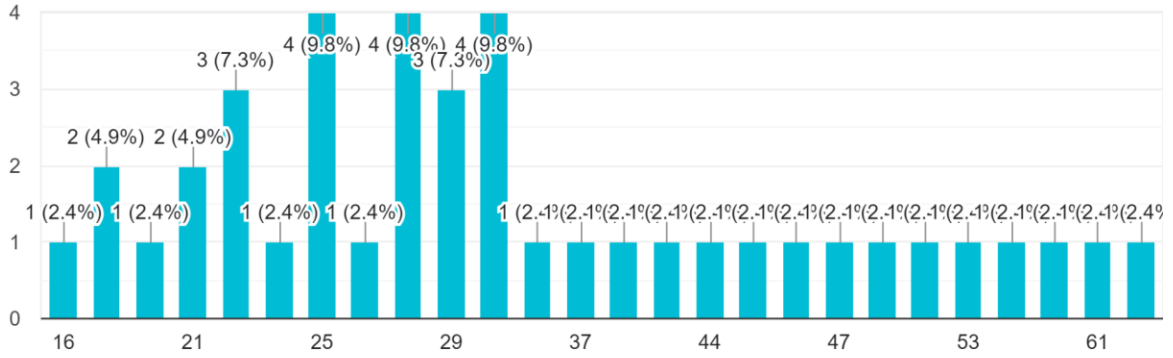
Figure 22 Age of respondent

6.1.1.1.2 Gender

In this study, 58.5% of men and 41.5% of women participate. These inquiries aid in identifying how a person's gender affects their decision-making. Knowing which gender was responding to a certain topic was very important.

Gender

41 responses
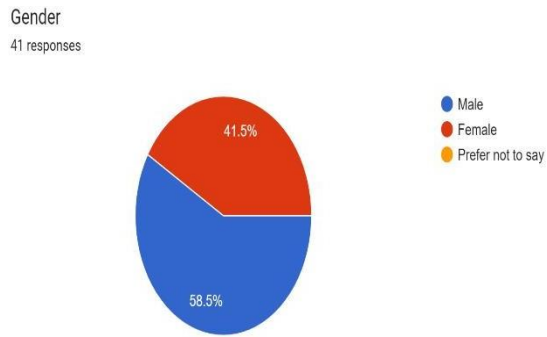
Figure 23 Gender of respondent

54

6.1.1.1.3 Education Qualification

There are no respondents who lack education; the majority of respondents have a college degree, followed by a bachelor's degree and a school level. Knowing the respondent's qualifications is crucial for the survey.

Education Qualification
41 responses

- No Schooling
- School
- College
- Bachelors Degree
- Masters Degree

29.3%
9.8%
36.6%
24.4%
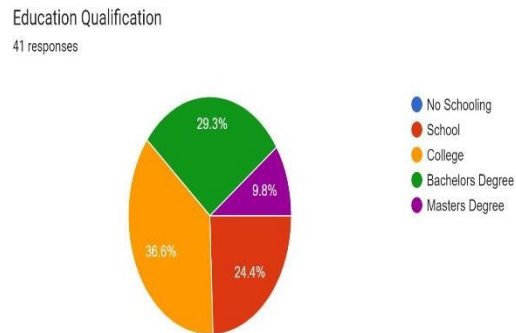
Figure 24 Education Qualification of Respondent

6.1.1.1.4 Employment Status

Knowing the respondent in-depth requires understanding their employment position. According to the poll, the majority of respondents have their own businesses, followed by those who are working and those who are unemployed, with student respondents as the least amount of information from the data set.

Employment Status
41 responses

- Employed
- Unemployed
- Self-employed
- Own Business
- Student

31.7%
9.8%
14.6%
19.5%
24.4%
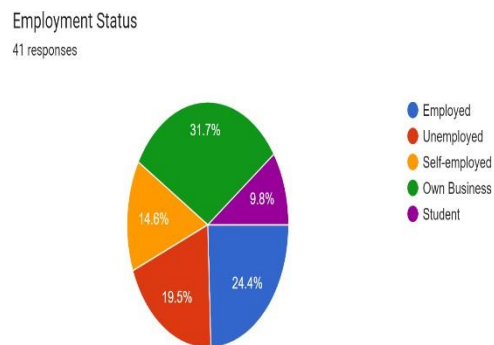
Figure 25 Employment Status Chart

6.1.1.2 Urban Geography Study

It is important to understand the location of the local community and the characteristics of its residents. Therefore, the following questions and answers address that particular issue. Other question that are asked to local community and got response as follows.

According to the data collected, more than 50% of the respondents had resided in the neighborhood near Balaju Industrial Area for longer than ten years, followed by five to ten years and one to five years respectively, and only 7.3% having lived there for less than a year.

According to the data colleted, more than 50% of the respondents had resided in the neighborhood near Balaju Industrial Arae for longer than ten years, followed by five to ten years and one to five years respectively, and only 7.3% having lived there for less than a year.

How long have you lived here?
41 responses

- less than 1 year
- more than 1 year and less than 5 years
- more than 5 years and less than 10 years
- more than 10 years

53.7%
7.3%
17.1%
22%

Figure 26 Chart that Shows Characteristics of Local Residence

In this study, it is crucial to determine how respondents are distributed in relation to the industrial area. According to the data, 29.3% of respondents live between 50 meters and 500 meters from the industrial area. While 12.2% of respondents live within 100 meters of or less than one kilometer from the center. Additionally, 17.1% of the respondents reside within one kilometer.

How far you lived from Balaju Industrial area ?
41 responses

- with in 50 meter
- with in 100 meter
- with in 500 meter
- with in 1 Km
- more than 1 km

17.1%
12.2%
29.3%
12.2%
29.3%

Figure 27 Char Showing Distance from industrial area to living place.

Do you think that the industrial area's location is ideal or not? When respondents are asked this question, the majority of them indicate that the industrial area is not in the proper location, that is about 53.7%, say that is not in right place where as about 24.4% who say it is in right place. The remaining response is unknowledgeable regarding the subject.

What do you think about the present location of Balaju Industrial Area? Is it in right place in your opinion ?
41 responses

- Yes
- No
- I don't no.

22%
53.7%
24.4%

Figure 28 Chart Showing perception about location of industrial area.

56

The majority of respondents, when asked about the location of industrial location, agree that these industrial area should be removed from the neighborhood. In response to the interviewer's question, "Why do you say that?" the respondent stated that it is always preferable to stay outside of the neighborhood due to various forms of pollution, including air, water, and environmental contamination as well as odor issues.

In your opinion how far should be the industrial area from the residential area?
41 responses

- with in 5 km
- with in 10 km
- with in 30 km
- more than 30 km

22% 22% 19.5% 36.6%
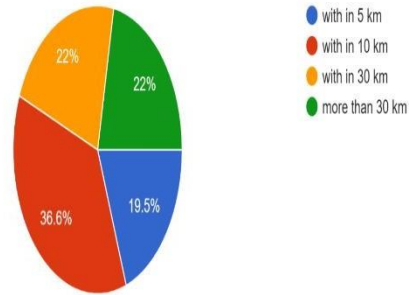
Figure 29 Chart showing respondent opinion about appropriate location for industrial area

When local residents were asked if they thought it was possible to have an industrial sector and a residential area together as part of a mixed land use idea, the majority of respondents (73.2%) said no, while 9.8% said yes, and 17.1% didn't know what was best.

In your opinion is it possible to have industrial area and the residential area together with mixed land use concept ?
41 responses

- Yes
- No
- Maybe

17.1% 73.2% 9.8%
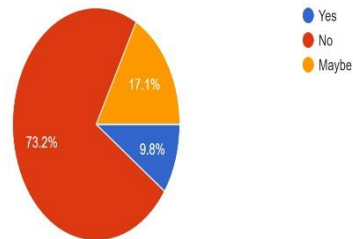
Figure 30 chart Showing respondent about mixed land use concept

When asked their opinion on the ideal distance between an industrial area and a residential area, respondents gave the following responses: 36.6% said the industrial location should be within 30 km, 22% said it should be both within and outside of 30 km, and only 19.5% said it should be within 5 km.

In your opinion, Where is the good place for industrial areas ?
41 responses

- With in the local community
- Far from the Local Community (residential area)

92.7% 7.3%
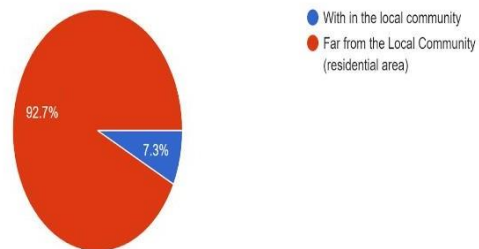
Figure 31 chart Showing respondent about distance for industrial location

57

When the issue of the significance of the buffer zone between the industrial area and the neighborhood was posed, respondents were asked to rate it on a scale of 1 to 5, with 1 denoting less relevance and 5 denoting extremely high importance. In response, it was discovered that 61% of respondents believe it to be extremely important, 29.3% believe it to be important, 4.9% were neutral, and the remaining 4.9% believe it to be unimportant.

How would you rate the importance of buffer zone between the industrial area and local community ? (Rate on a scale of 1-5, with 1 being less important and 5 being very highly important)
41 responses
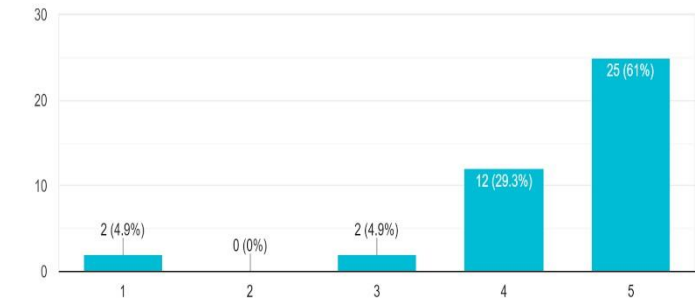
Figure 32 Bar Graph showing importance of buffer zone

6.1.2 From Industrialist

From the Balaju Industrial area 11 industrialist are chosen randomly and then data is generated accordingly.

6.1.2.1 Demographic Information

In this demographic portion general information regarding the age, gender, company name and position in company and employment status is carried out.

6.1.2.1.1 Age

Age
11 responses
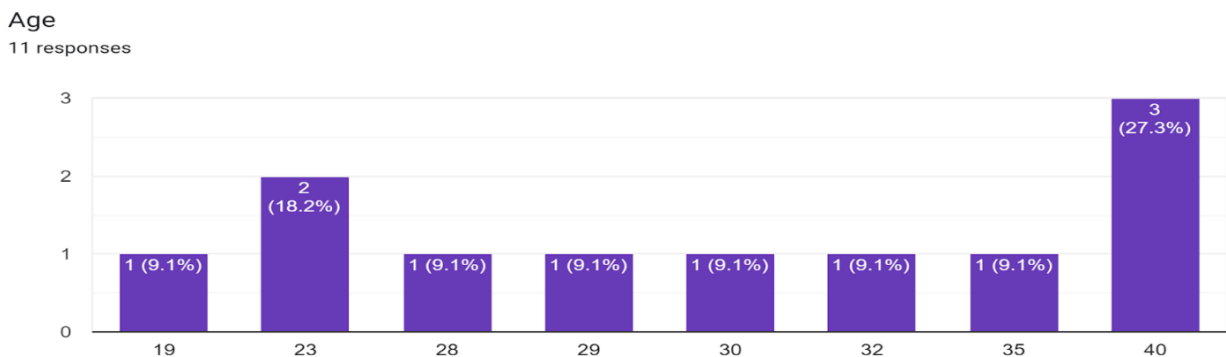
Figure 33 Age of Industrialist

58

6.1.2.1.2 Gender

Gender
11 responses

● male
● Female
● Prefer not to say

81.8% 18.2%
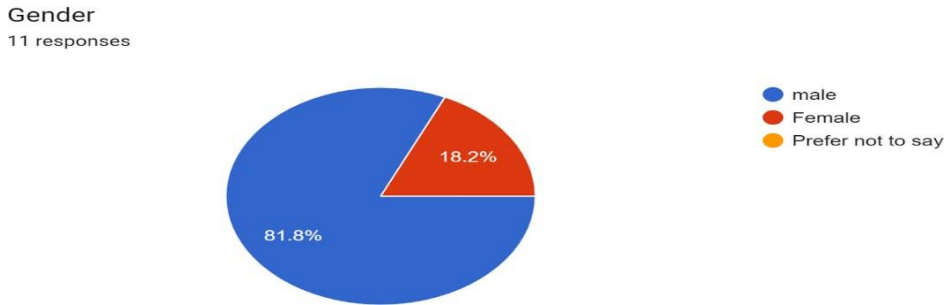
Figure 34 Gender of industrialist

6.1.2.1.3 Name of company of Industrialist for survey

- Hiltake plastic pvt ltd
- Mahendra pvt ltd
- Balaju Hiloft Non-Oven Industries pvt ltd
- Kohinoor cold storage pvt ltd
- Plastic industry Pvt Ltd
- Shree Polythene and plastic udhyog
- National plastic industry Pvt Ltd
- Disposable Plastic Material Pvt ltd
- Bajra footwear industries pvt ltd
- Furniture hub and Himi Bekary Pvt Ltd.

6.1.2.1.4 Position in Company

Your position in that company ?
10 responses

Figure 35 Position in company

6.2 Key Informant Interviews

6.2.1 Mr. Himal Bhandari (Senior Officer)

He is the senior Officer at the Balaju Industrial District Management Limited.

Question: Why balaju Area is selected for site for Industrial development?

Answer: The construction of the industrial sector began in 2016 B.S. It was located distant from the center of the city due to the pollution and its effects. The location is convenient for industrial expansion, and there is land available nearby a forest region. We learned from the paper that the government of Nepal is doing a good thing by acquiring land in the Balaju

Figure 36 Mr. Himal Bhandari (Senior Officer)

region because there is land available. Therefore, we can only conclude that government's decision to operate industries in this region is motivated by all of these factors.

Question: What are the condition of infrastructure availability and its problems?

Answer: As I mentioned in the previous question, the Balaju Industrial District was established in 2016 B.S. As a result, the infrastructure put in place at that time by the government to make it easier for industries to operate is outdated and does not adequately support current operations. Nevertheless, the industrialists still rent space in the ancient building. They are using it with minimal upkeep because it is government property that cannot be destroyed, he claimed. There isn't a budget from the government for maintenance work, but it is managed from the profits that the business makes and is utilized for maintenance. As well as from that profit money is used to fund a variety of additional projects for the industrial area's development. However, Nepal's government occasionally allots funds for new industrial sector construction in other locations. Additionally, all work is done internally, and there is no regular funding from the government.

Question: How is the availability of workforce including skilled, semi-skilled, and unskilled workforce?

Answer: As the capital and the country's cultural and economic center, Kathmandu is likely to be where individuals look for employment chances. And this serves as a hub for labor moving to various locations. Additionally, the fact that this neighborhood has good road access and is

connected to Katmandu makes it easier to get workers. In terms of labor and skills, highly educated and competent workers are difficult to because we cannot produce them across all industries and institutions here. Even if we were able to hire skilled workers, they left the country in search of better possibilities. However, the Balaju School of Engineering plays a key role in Balaju Industrial Area as it creates technical personnel that is helpful for our industry. As a result, many products from that engineering school are involved in these sectors.

Question: How is the condition of governmental policies and is it supportive for industrial growth?

Answer: The process of changing policies frequently as a result of advancements is normal and mandatory process by government. Furthermore, our constitution states that it is more important to consider how to make the industrial sector more hospitable to investors and business. Additionally, we also establish our own institutional policies and we do have the industrial policy from the government, we operate our institution in accordance with those policies. Also operating under same norms and regulations are our factories. As a result, I'll state that's effective and that so far, there have been no issues.

Question: What is the current state of the market in terms of supply and demand, proximity to the market, production, and distribution?

Answer: Due to the fact that we are governed by the WTO, there are frequently complaints. Because of WTO membership, which has a direct impact on us greatly in the production and manufacturing sectors, the globe has effectively become a little global village where all items are easily transferred. Since we must import raw materials from other nations in order to produce things and occasionally to export those commodities as well, we are constantly at a disadvantage in the market competition. We cannot compete with them since there are two large, powerful nations nearby, and the cost of imported raw materials from other nations is higher. Consequently, businesses close to the border generally don't experience many challenges, although businesses in the valley frequently do due to the high cost of transportation. Regarding the current situation, the market has been experiencing inflation since COVID and an economic crisis that is affecting the market cycle both directly and indirectly. And finally, because we lack a cash payment mechanism and goods are frequently supplied on credit, our market has issues with the cash flow system. Consequently, due to all of these factors, many businesses that once operated for 24 hours now only do so for 12 or 8 hours.

Question: What issues do you have with the industrial area's impact on the environment and its sustainable growth, and what challenges do you face in this situation?

Answer: There were no homes in the region when it was established in 2016 B.S., but as the industrial area grew, residents began to move in close by. Now that it has become widely recognized, human health is a major concern. There will undoubtedly be tension if there is a residential neighborhood next to an industrial area with a shared boundary, and we do deal with that. And the pollution coming from the factory area is not just one kind; it is a variety of kinds, including sound, air, and smell pollution. We cannot claim not to have that issue because it is unquestionably a problem. In this scenario, we claim that we work to enhance industrial quality in order to reduce pollution, and that secondly, the surrounding community should work with us to find a practical solution to the issue. Local community and industry should cooperate with one another unless there is no other option, and that is the only choice we have. Industries should bring advanced pollution-reduction technologies in order to reduce pollution. The Neal government's environment section has created laws and policies that industries must follow in order to reduce pollution. Yes, there are minor disagreements, which we resolve.

Question: what is the condition of financing facilities for establishment for new factories in this industrial District?

Answer: We lease the property to the industrialist because it is government-owned land, and the bank will not finance the governmental land and the structures on that site. Only the structure they make and equipment they have is accepted by the bank. To obtain financial assistance, they must submit a collateral deposit of property located outside of the industrial area. As a result, we do have a problem with finance.

Question: what is the scenario of people who is willing to come to this particular place for industrial operation?

Answer: Small investors are not attracted to this location because it is not feasible for them to arrive with low investment. The cost of establishing an industry is significant, thus investors with big budgets are naturally drawn to this field. Furthermore, it is a location for industry with long-term goals rather than a hub for trade so this site is right in the middle of Kathmandu, making it a popular choice for investors to set up factories. We don't have enough space for this, though, because we are already saturated.

Question: As mentioned in the above question's answer we are already saturated do we have any solution to this specific problem?

Answer: Yes, we do have a solution to this issue. Nepal's government performed a good job by allocating a budget in 2072/2073 B.S. for the investigation and development of a new industrial

area with an aim to establish industries with enough space and larger in size. Additionally, the government has previously conducted a feasibility study and DPR in five open industrial areas with established locations. However, it is challenging to proceed smoothly due to political unrest and other issues.

Question: Is there any social work and cleanness maintenance program done by industrial areas to the community?

Answer: Yes, we do, and our policies also include CSR (Corporate Social Responsibility), which states that a firm must set aside a certain amount of its profits for CSR, with the proceeds going toward various forms of social activities. And this central office of Balaju Industrial District Management Limited collaborates with other local social organizations to promote cleanliness, plantation, and other socially beneficial activities. Overall, we strive for this industry's improvement and are continually interested in this subject.

Question: Do you see or experience any significant issues as a result of this industrial area?

Answer: No, we don't have any major problems. In addition to being the country's economic backbone and a place for opportunities, investment, job opportunities, and profit-making, this region also offers a wealth of other benefits that are too numerous to list here. The only drawback is that it was established so long ago that it was poorly planned, and there are no opportunities for future growth. There are significant problems with sewerage treatment throughout the Kathmandu Valley and as well in industrial areas, including air pollution brought on by factory emissions and smell issues are a major concern. Only those are the problems other else is fine.

Question: Is there any problem in the management sector?

Answer: When it comes to management, it is directed by the government, and we proceed in accordance with its directives. To operate this institution, a committee created by the Nepalese government include the self and representatives from the finance ministry, industrial ministry, and office of the audit general. These members operate under their own set of policies and management systems, so we don't need to create a new management system. As a result, there are no issues with this subject.

Question: Suggestion about the location attributes for the new industrial area development?

Answer: The first recommendation is that it shouldn't be too close to homes and have a buffer zone with vegetation so that it can reduce pollution and enhance the beauty of the area. And the most

important part is that it should have an appropriate water drainage system, a mandatory treatment facility for sewerage discharge, and a facility to test and discharge it.

6.2.2 Mr. Bhusan Kumar Upadhaya (Assistant Director, Information Officer)

Mr Upadhaya is the assistant director, and information officer in Balaju Industrial District.

Question: Why this industrial area is kept in in this Balaju Area?

Answer: Industrial area are established with the aim for equal regional development. The Balaju Industrial District was established here, and for other regional developments such as for Purbanchal, the industrial district is located in Dharan, and for Madhaya Paschimanchal, the industrial district is
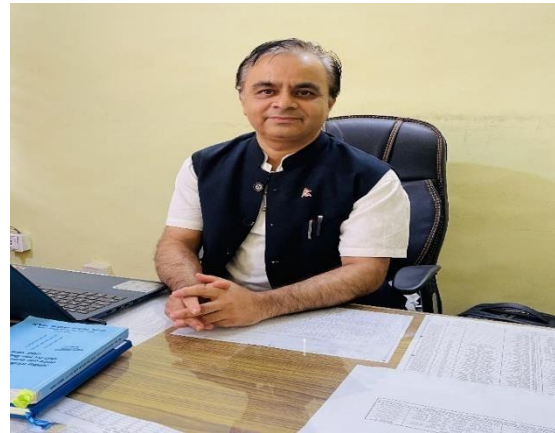
Figure 37 Mr. Bhusan Kumar Upadhaya (Information Officer)

located in Nepljung. So it is maintained in each region in accordance with the need for balanced development. There are three industrial districts in the valley, located in Kathmandu, Patan, and Bhaktapur, as a result of the increasing population and its usage.

Question: What are the problems in this industrial District in case of infrastructure?

Answer: Due to the high demand and limited supply in this area for production and growth is the major problem. In this case there are numerous issues, we also need land, a road, a security system, an energy facility, a water facility, and other different buildings for industrial development, all of which are highly expensive to build and maintain at first. Although it is expensive, we are creating it because of its many benefits, including job creation, economic growth, control over imports, promotion of internal production, and indirect support for national growth and development due to tax and VAT collection. So while it requires a significant initial commitment, the long-term rewards are greater. That is the basic strategy for its growth and development.

Question: what are the challenges in getting a labor force including skilled, semi-skilled, and non-skilled in this industrial district?

Answer: There are issues in this field since the education we receive from our various educational institutions is not appropriate for our industrial growth. We study a lot of theoretical material, but what we really lack is practical instruction, which is something that is really important but that is

lacking in our education system. For instance, the mechanical forces and labor force in this industry need to have strong technical backgrounds, but sadly, we are producing more highly trained MBA students than required. More students are studying accounting, he continued, and one company only needs one or possibly two accountants, what's the worth of studying those subjects for this sector? In his conclusion, he claims that the education system is ineffective without a system of practical implementation.

Question: In your opinion how much is it important to have a research center in this industrial sector?

Answer: It's the most important, and I'd rank it as the most crucial factor in every industry, not just this one. He asserted that we are not paying enough attention to such things and that Mahabir Pun's research work is underappreciated and poorly understood by the majority of us. He claimed that the government should be aware of this effort. My opinion is that we should first construct research institutes before developing industrial areas, but sadly, we are going about it the wrong way.

Question: What is the current state of the market in terms of supply and demand, proximity to the market, production, and distribution?

Answer: We don't have any issues with this market and its proximity, but our biggest issue is that we don't have our own raw materials, or if we have, it's limited. As an illustration, we produce biscuits, but the raw materials for its production is imported from India. Our industries are at risk and find it difficult to compete in the market since labor is more expensive here than it is in India, which drives up production costs. On the other hand, we compete with neighboring markets for our raw materials. We are unable to restrict our imports because we support the WTO, which negatively affects our market. I can think of one way by imposing high taxes on imports to promote domestic goods. In order to give national products a chance to succeed. It can be done, but for reasons I don't understand, it hasn't been put into practice, so this make our business at risk.

Question: what are the challenges in the industrial sector because of policies and unstable government?

Answer: There is a huge problem with the policy. I can illustrate it by giving you an example once there is a change in policy in importing raw materials from copy production industry that makes a lot of industries in a loss and make it shuts down of company as well. So basically what I want to say is that the system for policies and regulation is not appropriately designed or prepared when it

is formulated again. Unclear about the policies and less concerned about their implementation. Taking it I light way without understanding ground reality makes it more difficult to shuttle this case.

Question: what is your opinion about the development of industrial areas considering its environmental impacts and sustainable growth?

Answer: I believe that destruction goes hand in hand with development and that it is a normal occurrence. We are developing environmental protection laws based on European standards, which are inappropriate for implementation in Nepal due to the country's unique circumstances. It is seen in the Arun Hydropower Project, whose construction has just been approved after being put on hold many years ago due to environmental regulations. Due to ING/INGO's decision on the result the of construction of hydropower will lead to the destruction of certain species of butterfly's habitat, it is stopped at that point. Why was it stopped at that point if development has now been approved now after many years? My primary point in stating all of this is that while we are aware of environmental degradation, we must continue to consider its feasibility and what would be best for our developmental process.

Question: What are the management problems in these industrial districts?

Answer: There are issues that we ourselves have contributed to in this industrial area. While maintaining a disciplined workforce is necessary to operate industries but we are instead freeing up our workers. In our situation, political influence on the labor market is greater, which negatively affects our industries' management structures. It is difficult for us to execute programs for everyone equally because we are caught in between political authority and the people who work for it. Unions and political influence in the labor force should be eliminated if we are serious about developing this economic area. Therefore, my suggestion for excellent management is that all unions should be banned so that there will be no political influence so that better management can be done.

Question: what are the major problems that you observed or face in this industry?

Answer: My simple response to this question is that the two biggest problems I encounter in this profession are political instability and inappropriate policies.

Question: Suggestion about the location attributes for the new industrial area development?

Answer: The government should be in charge of handling all issues relating to residential areas, squatter settlements, and environmentally protected regions. In order to avoid future controversy, space should be allocated appropriately. In addition to this finance should funded by government so strongly that every required infrastructure can be constructed easily. Then after this construction there should be policies that are for long term vision and goal that should not be change for at least for 10 years. And in that industrial area there should not be allowed any political influence and completely absence of unions. Yes, people are allowed to express their concerns, but only in the appropriate forum and without shutting down the sector. The final requirement is to encourage domestic products by prohibiting or maintaining high taxes on imported goods. Or, if that is not possible, create policies encouraging the usage of Nepali products.

6.2.3 Late Mr. Mukunda Rijal (Ward chair Person)

He is the ward chairperson of ward no 16 of Kathmandu Metropolitan City (KMC). Balaju Industrial area locates in the ward 16 of KMC

Question: how much complain do we have from the people from the local community?

Answer: Yes we do have lots of complain regarding industrial area. It completely destroy the environment of this local community.

Question: In your opinion is that the Balaju Industrial Area in right place? Why?

Figure 38 Late Mr. Mukanda Rijal (Ward Chairperson)

Answer: It may be good at its establishment period but now it's completely not good because where government decides the area for residential purpose there cannot be a industrial area. Along with that when the population in higher number in that place there cannot be a suitable place for industrial area.

Question: What can be the alternative solution for this problem?

Answer: we have many alternatives and many solution to this problem. Such as this is the first industrial district of Nepal so that we can develop this industrial area as a museum along we that as our country economy manly depends on tourism we can develop that area for tourism and tourism industries such as focusing on handicrafts, paintings and many more that reduces the pollution can be operated. However the polluted industries should be closed are the demand of

people of local community. In Kathmandu the most polluted area is from Swayambhu to Buspark in which Balaju is the most polluted area and the main reason for that is because of industrial area is our findings.

Question: in your opinion how far it should be from the community? Why?

Answer: Most of the industries are established in the phase when there is no any policies regarding its establishment in my opinion. For Example the Nepal Gas industry which is extremely dangerous to the society as it is very explosive in nature and it's like bomb in city. For any gas industry it should be far in hills or in mountains but ours is in the core city. And we think that it is kept in valley when there is no policies regarding the establishment of gas industry.

Question: different accidents took place in that industrial area. What is the psychological impact on the local community because of this incidence?

Answer: Most of the people are in fear and scared of this industrial accidents and they have negative psychological impact of this area. There is Mobil factory which brings pungent smell and chemical that damages the lungs with other different lungs problems. Because of that problem many people leave that place as well. Because of policies we are facing problem to tackle with that Mobil industry.

Question: how you handle that specific problem?

Answer: As it belongs to the ministry of Industry which we find hard to controlled by local government. We request the particular government for the problem but the government is not giving us the much attention. We do have last option that if they don't give us the much attention then we will be forced full in the closure of the industry by locking them. This policies makes us difficult to deal with this challenges. Along with that I would like to say that the industrial district haven't pay its rent to the ward office and as well there is no any payment for the legal registration of any structure like buildings form that district. We are observing all this activities and we do alert ministry of industry for this activities.

Question: Any Social work contribution by the industrial district to the local community?

Answer: No, there is no any social work conducted by this industrial area. Instead they are causing harm to environment by causing different environmental pollutions. They kept water treatment plant but they are not using it and polluted water is discharged directly without treatment. So the public are dissatisfied in many cases.

Question: what is the scenario about the employment opportunities created by this industrial area?

Answer: In the beginning days it is said that the job priorities will be given to the local communities but in reality that is not happened in any cases. There may be problems to the labor inside to the factory but that is not in our control and case is not update in our ward office.

Question: in your opinion what are the location attributes should that should be considered when we established a industrial area?

Answer: first the infrastructure that are required the most is important for instance sewage, water, road, electricity, buildings, land areas etc. along with that the most important is the greenery and far from residential area. Balaju industrial area is more storage rather than industry so we don't consider such place as an industrial area.

Questions: what are the problems because of industrial area?

Answer: heavy loaded trucks that completely damages road and vibration effect to the houses. Lack of maintained of road and other damaged structure by industrial area. Lack of management inside as well as outside of industrial area. Damages done by plastic industries in sewage problems.

6.2.4 Er. Shushil Timilsina (Technical Officer)

He is the technical officer at the Balaju industrial area.

Question: What are the problems that you face in this industrial district as you are in this technical sector?

Answer: we all know that there is pollution from the industrial area. In the beginning days during its establishment time there is no any residence nearby and now there is massive population that surrounds this industrial area so now the industrial area is alone to fight for this issues. Now people nearby complains in different issues such as noise pollution, air pollution, water pollution and environmental pollution and other problems frequently.

Figure 39 Er. Shushil Timilsina (Technical Officer)

Question: How you tackle that issues from the public?

Answer: We keep on maintain the norms and standards which are regulated the by the ministry of environmental and forest for the industries. Because of this rules and regulation that are followed by the industries which helps to reduce the pollution and pollutions are in limits that helps to tackle with the local public. Even though we check them whether the industries are following there rules and regulations timely most of them follow in minimal amount but the international company like coca cola follows fully. Big company keeps there filtration plant and discharge but this filtration is lack in small industries. Now we can see that in old days the equipment's that are used produces lots of pollution such as use of more diesel, woods, different natural raw materials but in now a days technological shift makes reduction in use of those oldies materials and mostly replaced by electric equipment's which ultimately helps to reduce in pollution.

Question: what is the scenario of infrastructure in this industrial area?

Answer: Even though we have very old infrastructure we do maintenance yearly basis so we solve problems as budget as well as from internal source to maintain infrastructure. From the Government also we get support to promote and for the protection of this industrial area that helps to preserve and maintain infrastructure. Now we follow new standard and maintain each year from the allocated budget for the drainage, sewage, road and structure. The problem in this sector is that we have limited budget and that directly impacts in maintenance work that brings many complain in this institution from the industries. From all the industrial area we do have profit only from the two three industrial area. This is because most of them are small industrial area so they haven't generated much of revenue that directly hampers in the maintenances and growth of the industry.

Question: Is there any work done by the industrial district to the society?

Answer: As we do work for the society from the policy of Corporate Social Responsibility (CSR). We do work in the society such as construction of public tap, toilets, street lights and so where donation as well. We fulfill certain demands of local community according to its need.

Question: In your opinion what are the location attributes should that should be considered when we established a industrial area?

Answer: In my personal experience and my study we find that industrial area is the backbone of the country and it definitely helps in economic growth of the country. And this is realized by our government and start to allocated budget to established new industrial area from 2072/2073 B.S. This definitely good move from the government. When allocating the specific location for the industrial area development, in my study I saw that the government choose places so randomly that will definitely hampers in its growth and in development. In many cases there are squatter

settlements, near a river side, in forest area and allocates place where government sees open spaces because of which brings major conflict between the squatter settlements, local communities and local government bodies. Now DPR of many potential location are studies on however the conflict also are there in many cases. For instance in case of Motipur Industrial Area, around 800 bigga of land is separated for the industrial area development and Detailed Project Report (DPR) also prepared however the problem is that the squatter settlements claims that we don't have place to live and government is planning for industrial development. Because of this cause 4 people lost their life. This kind of conflict is major in many cases. In other hand there is forest area, river sides where the place is selected for the industrial growth but in this area there is also conflict that from the different environmental agencies and from the minister of forest itself. So in my opinion for the industrial development a virgin land should be chosen where there is no conflict at all. Along with that there should be a market that is key factor for the growth and the development of industrial area, availability of raw material, there should be a political stability as well as there should be no vulnerable site for industrial development. Along with that should have proper road infrastructure, there should be enough land for its expansion, along with that there should be good facility of electricity, water, road access, near from the highway and material and near from the market. Should be far from the residence zone and even if it constructed near residential zone then a buffer zone with specific distance of 50 to 100 meter should be allocated. In buffer zone there should not be any construction work and only Greener Park can be constructed in such place. Furthermore there should be a good policies that helps for sustainable growth of industrial area. In case of Nepal we have hazard development of industrial area. In resent case Nepal government decides to develop a one thousand Bigga for an industrial area development for each province and I think this is not a good idea because the government is unable to run all industries in properly however they are adding it that is definitely worst if that fails too. First is that a need or not we need to figure it out and in most of the case in industries they bring material from India and pack here and operate it as a industry and in my view I don't think that can be considered that as a industry. Maximum of them are like that for example they are industrial like making girls gates, windows of houses whether we call that industries or not that is the problem in our industrial area. What kind of industries should be allowed in the industries areas that should be in focused and policies should be made accordingly.

I am also surprised that we provide land in low rental rate, different infrastructure facilities, and security and the same industry which is established in the privately owned land, for the production cost definitely the cost of production is less for the industries that is inside the industrial area but the policies is same for all and that kind of issue in my opinion in my view. And this is the major

problem that many industrialist aims to be in political power and try to change the policies for more profit and to stay in comfort zone always. Along with that there is many union in each section with politics in every sector makes us difficult to perform our task.

6.2.5 Mr. Jibnath Giri (Ex-Chairperson of Tole Sudhar Sumati)

He is actively participating in the development of local community, he is as well the member of different local committee for development of the society.

Question: What are the problems that this locality mainly face because of this industrial area?

Answer: There are various problems in this community because of this industrial area such as pollution of air from chemicals that are used by the industries, smell pollution, problems due to heavy vehicles and mainly the threat of storage plant of gas.

Figure 40 Mr. Jibnath Giri (Ex-Chairperson of Tole Sudhar Sumati)

Question: In your opinion is this the right place for the industrial location?

Answer: It is definitely not a proper place for industrial setup because this place is full of residence and there is no any good planning and management from the industrial sector to reduce its impact in local community. Even though we raise our voice that is shut down and we are in problem. The problem that even though we raise our voice to the local bodies and different bodies then we got the answer that tells us the alternative place to put this industry. However we were able to replace some industries that are more source of pollution to industry that produce less pollution.

Question: what are the works that committee does for local community related to industrial area?

Answer: we did many goods works for the local community such as to raise our voice strongly to different governmental bodies if we face problem from industrial area, we listen problem of all the people of the society and resolve it I effective way. Similarly we discuss the issues, problems of the society and we were able to extend the road lane as we all mange the electric wire if few places. Because of this development committee we are more close to each other and we unite together in each other's problems.

Question: What are the major problem inside the industrial area in your experience?

Answer: I myself work in that institution for more than fifteen years so there are lots of problems in those institution the major one is internal politics, lack of management and poor policies and strategies which directly and indirectly hampers the local community. Because of weak policies, more industries are polluting the environment. For instance slow release of chemical gas from the form industry as well from the paint industry and Mobil industries.

Question: What can be the best way to reduce this problem in your opinion?

Answer: In my view, this industrial area cannot be shifted from this place because it's a very difficult process and we don't have an alternative for it. So, I think the adaptation of new technology to refine and release gas should be used. Strict and mandatory policies to reduce pollution of industries and the political stability should be there should be to reduce any problems related to industrial setup. We are not say that to remove the industry from this place but we are just requesting that it should be properly managed and should have less impact to the society.

Question: In your opinion what should be the location attributes for any place to develop an industrial area?

Answer: In my opinion, there should be a proper infrastructure such as water resources, electric facility, and good accommodation facility for worker, transportation and good road infrastructure, availability of raw material and good proximity to market. Along with that there should not be any politics issues and enough space for expansion. Along with that the major one should be far from the residence and should adopt as much as new technology to reduce environmental impact and for sustainable development. Proper policies should be researched and implemented. And mainly production industries should be one in industrial areas not in private land. And long with that industrial area should be in place where there is plane area as it helps in expansion, construction logistic and so on. Mainly I think Terai belt of Nepal is more suitable for the industrial development. Final I want to say the we are facing problem and the public cannot solve that problem and I want to say that this should be case in new industrial area. And all Nepali should not be feel shy to perform any work.

Although numerous other stakeholders have been interviewed, only significant interviews are highlighted in this report. The opinions of all are somehow expressed in other chapters and in the report's appendix are addressed by some of the key informant surveys. Since it would make the report very long, not every interview is mentioned.

6.3 Observation of Balaju Industrial area and Local community

The Balaju Industrial Area is consist of verity of industries including many small to medium-sized enterprises, the area has strong involvement in economic activity.

6.3.1 Economic Observations:

One of the most common observations is the positive impact of the industrial area on the economy which is very obvious too. The industries provide employment opportunities, contribute to the GDP, and stimulate the growth of businesses in multiple sector. However, issues like underpayment of workers, lack of job security, and poor working conditions were also observed. Many workers lacked the necessary skill sets, resulting in a skill-gap issue.

Figure 41 Transportations inside Industrial Area for Economic Activities

6.3.2 Environmental Observations:

The industrial area's environmental impact raises some serious concerns. Poor waste management practices were observed in several companies, contributing to pollution in the area. Noise pollution

from the factories was another issue affecting the local communities. Also, improper disposal of industrial waste was observed, which may be contaminating local water bodies that is mainly Bishnumati River and surrounding. The smell from the poultry industry and mobile factories is worst and hurts numerous industries as well as the workers themselves. The factory's use of chemicals directly harms the neighborhood and the environment. The industrial activity in Balaju seems to contribute cause for air, water, and noise

Figure 42 Greenery Inside a Industrial Area

pollution. Smokes released from different factories can be observed easily every time while untreated discharges can be seen draining into nearby water bodies. Noise from machinery and heavy vehicles is constant, impacting local community health.

6.3.3 Social Observations:

The industries have brought about good changes to the local social structure. While they've led to good facilities to the society and brought economic prosperity, they've also disrupted traditional livelihoods and led to a rise in social inequality. There is a contrast between the workers' living conditions and those of the factory owners, leading to unhealthy social environment. Many People are worried with the gas factories and pollution caused by the industrial-area.

Figure 43 BID Gate and Local community Infrastructure Observations

In terms of infrastructure, the industrial area has developed significantly over the years. However, there are still issues with reliable electricity supply, poor road conditions, and lack of proper

sanitation facilities. These infrastructural issues limit the full economic potential of the area. The major problem is that the structure are outdated and poor management in those area.

6.3.4 Local Community Interaction:

Interactions with the local community revealed mixed feelings about the industrial area. While some appreciated the economic growth of the country saying that it has positive impact on the society, while others expressed concerns about environmental pollution, noise disturbances, and difficult in living due to different problems from the industrial area.

Figure 44 Side view of industrial Infrastructure (Building) from community

6.3.5 Industrial Activities and Work Environment:

Upon entry into the Balaju Industrial Area, there's direct industrial activities taking place. The area is home to various industries including textile, metal, food processing, and manufacturing. Each of these sectors brings a unique dynamic, contributing to the overall industrious atmosphere. Most of the industries are warehouse and there is lack of big infrastructure in industrial area.

In some factories, the work environment appears to be clean and well-organized, demonstrating good occupational safety and health practices. However, other factories show signs of poor safety standards, with inadequate protective gear for workers and hazardous work conditions.
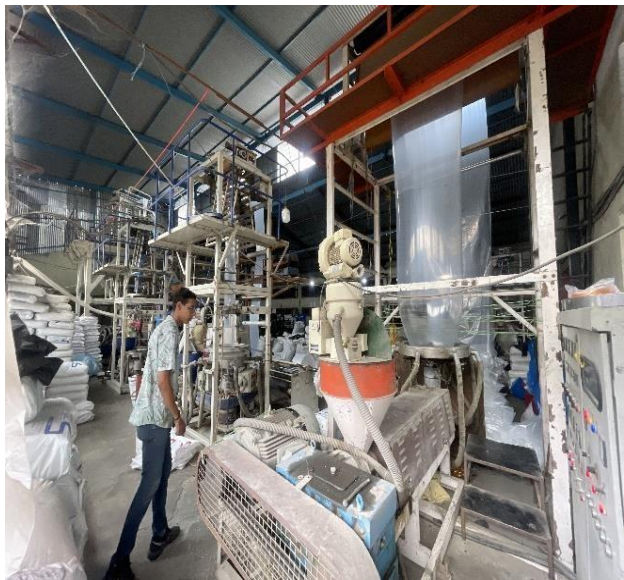
Figure 45 Inside a Plastic Factory

6.3.6 Workforce and Living Conditions:

The workforce primarily consists of local residents and workers from all over the Kathmandu valley, with some migrant workers. Living conditions vary with many workers live in nearby communities, some of which lack basic amenities like clean drinking water and proper sanitation. There are also concerns about the wages and benefits provided to the workers, with some interviews with the workers. It is found that many workers are from Bishnumati slump area.

6.4 Secondary Data Collection

Gathering insights from secondary data involves looking at previously collected data, such as government reports, research papers, surveys, and media articles. Here are few observations that could be made about Balaju Industrial Area and
local communities based on such secondary data:

6.4.1 Economic Impact:

According to various economic reports, the Balaju Industrial Area has been a major industrial estate to contributor to the local and national economy (Finance, 2021). It has many domestic investments and generated numerous job opportunities. However, data also suggests wage disparity and issues related to workers' rights in some sectors.

6.4.2 Environmental Concerns:

Environmental impact reports studies highlight the industrial area's significant pollution. Major pollution from industrial area caused more problems in land area as well as in landfill site (Dangi, 2015). Air quality reports suggest higher levels of particulates and pollutants in and around the industrial area. Local community people of Balaju industrial areas perception about the environment is that they think pollution is major in this area because of industrial area. The pollution is mainly caused by the discharge water also indicate contamination of nearby water bodies that is Bishnumati River due to improper industrial waste disposal.

Figure 46 Environment of Balaju Area

6.4.3 Infrastructure and Services:

Government records and local news reports indicate that the area has seen considerable infrastructure development over the years, such as improved roads and better electricity supply. However, some sectors still report frequent power outages, and water supply issues are common in the surrounding communities.

6.4.4 Social Impact:

Sociological studies (Chatterjee, 2018) and survey data reveal that while the industrial area has brought about development and economic growth, it has also affected the local society. Some communities report says that people left their house and shift far way form that area, and there's a noticeable change in traditional lifestyles due to the low level migrant workers and their activities.

6.4.5 Health Impact:

Health and medical studies (Thapa, 2009) indicate a higher prevalence of certain health conditions in communities located near the industrial area. This could be due to exposure to pollutants and hazardous materials, as well as stress from noise pollution. Air pollution from different factories are as the major cause for the pollution that affects the health.

6.4.6 Regulatory Compliance:

Government inspection data (Department of Industry, 2023) show varying degrees of regulatory compliance in the Balaju Industrial sectors. While some corporations respect by environmental and labor regulations, many do not and are fined.

6.4.7 Community Perceptions:

Media interviews, social media posts, and community surveys reveal mixed perceptions about the industrial area. While many appreciate the job opportunities and infrastructure development, but many concerns about pollution, health impacts, and cultural shifts.

7 CHAPTER SIX: FINDING AND ANALYSIS

7.1 Finding and Analysis from Questioner Survey

The Balaju Industrial Area, an important area for industrial activities, stands as an interesting subject of study due to its economic importance. It is a prime sector so investigating its relation with the community with socio-environmental impacts is crucial. At first the well-designed questionnaire was prepared and survey was conducted among the targeted audience. Major areas was covered with demographic details, occupational trends, living standard, health and hygiene, environmental concerns, employment opportunities, problems and prospects and the socio-economic impact of the industrial area on its surroundings. The sections below will deal into the methods that are used to analyze the data that is collected from field. The data are collected from the local community and from industrialist separately.

7.1.1 From Local Community

7.1.1.1 Regression Analysis

To conduct regression analysis, data were collected from the local community around the industrial area randomly. Then data was separated into two groups that is independent variable and dependent variable. The Independent variable is the overall impact whereas the dependent variable includes the satisfaction of the current location of the industrial area.

The independent variable include followings data: The disturbance, air quality, noise pollution, traffic problem, health impact, and psychological impact. Overall environmental quality, economic opportunities, overall development, cleanliness and maintenance, and social work or facilities. Similarly Dependent Variable (location of industrial District) includes The problems, overall positive or negative impact, overall visual appearance, and the satisfaction of the present location of the industrial area.

All this data are on Likert scale, So this data transferred to Excel form the google form and then with the help of IBM SPSS, regression test was performed. To perform regression analysis, Regression assumption were checked that is the data should be normally distributed, relation between the variable are linear and dependent variable in scale (metric). The results of the analysis are displayed below.

At First descriptive analysis was done to check the normality of the data. To conduct the normality test, we use IBM SPSS and Excel. From IBM SPSS we get,

As we have data that is less than 100 we choose Shapiro-Wilk as we have data set of 41. (if the data set is greater than 100 then use Kolmogorov-Smirnov)

Tests of Normality:

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Satisfaction_Current_Locat ion	.166	41	.006	.971	41	.384
Overall_Impact	.081	41	.200[*]	.986	41	.879

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

We see that from the Significance (p) value that is greater than **0.05**. So the data from the variables are normally distributed. Using 5% of significance.

Since the data are normally distributed we conduct further linear regression analysis

Reliability Test:

Reliability Statistics

Cronbach's Alpha	N of Items
.563	2

From Reliability Test Result .563 for data obtained. Since the data are 56.30% reliable this thet for linear regression can be conducted.
After conducting regression we got that, Components of the Regression Output

ANOVA:

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.171	1	2.171	8.117	.007[b]
	Residual	10.430	39	.267		
	Total	12.601	40			

a. Dependent Variable: Satisfaction_Current_Location

b. Predictors: (Constant), Overall_Impact

The ANOVA (or F-statistic) measures the overall significance of the model. It consists of calculations that provide information about levels of variability within a regression model, and form a basis for tests of significance.

The result confirms that the overall regression model is significant for the data, and this was captured by the ANOVA (F-statistic) value of 8.177 and its associated probability value of 0.007 ($F = 8.177$, $p < 0.05$), which was found to be significant at 5% level

Coefficient:

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.994	.526		1.890	.066
	Overall_Impact	.583	.205	.415	2.849	.007

a. Dependent Variable: Satisfaction_Current_Location

Regression Coefficients: The column labeled "Unstandardized Coefficient" depicts the estimated coefficients (β). The coefficients (β) show the sign and size or magnitude of change. They are

computed by the standard OLS formula. The "Std. error (Standard Errors) column reports the estimated standard errors of the coefficient estimates. It measures the statistical reliability of the coefficient estimates. The t-statistics or t-value, which is computed as the ratio of an estimated coefficient to its standard error is employed to test the statistical significance of individual regression coefficient. To interpret the t-statistic, you should examine the probability value (or P-value) captured as Sig. Given a p-value, you can tell at a glance if you are to reject or accept the null hypothesis

The overall impact coefficient value which was found to be 0.415, shows that a unit increase in overall Impact, on average, increases the satisfaction of the current location by 0.415 units.

From the table, the calculated t-value for the relationship between the overall Impact and the satisfaction of the current location is given by 2.849 with an associated p-value of .007. Since the p-value is less than 0.05 at a 5% level of significance, we conclude that the overall impact has a positive and significant impact on satisfaction of the current industrial location.
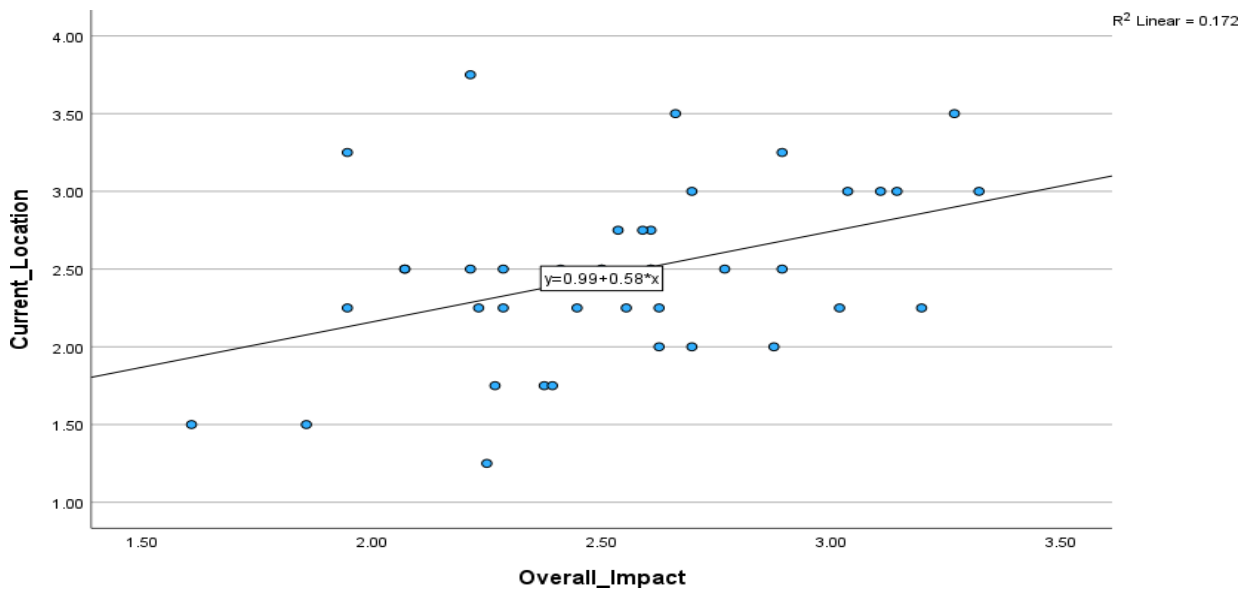
Figure 47 Regression Analysis Graph (Relation between Two Variable)

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Analysis:

From the graph, the equation of slope is given by $Y = \beta_0 + \beta_1 X$, where Y is the dependent variable, X is the independent variable, β_0 is the intercept, and β_1 is the slope coefficient.

Here, $\beta_1 = 0.58$ Which shows that the Impact is Positive as the value is positive.

As a result from the graph, there is a relation between the local community and the current industrial area.

Result from the analysis,

From the above result, we can conclude that from the regression analysis that there is a relation between the local community and the current industrial area.

Hence, Null Hypothesis was rejected and Alternative Hypothesis was accepted.

We accepted the result and proceeded with the test because the regression analysis was significant despite the weak regression value. Weak regression value is caused by a large amount of data averaged to a single dependent and same case for independent variable. Major analysis was done from Qualitative analysis and Quantitative data analysis was done only used to check the relation. Hence very low value and relation doesn't hamper the research process.

7.2 Finding and Analysis from Key Informant Survey

This section provides a comprehensive findings and analysis of the Key Informant Survey conducted in the Balaju Industrial Area and the surrounding local community. Survey conducted to understand the impact of the industrial area on the community, finding key issues, and identify potential opportunities. It involved gathering insights from key stakeholders including industry representatives, local community members, government officials, and non-governmental organizations. From careful analysis, this report aims to find the current situation, provide key findings, and suggest practical recommendations based on the survey's results. For the key informant survey interview was conducted to the different level of person as follows. Only the major findings will be mentioned below as chapter five includes overall question and answers.

S.N	Name of Stakeholder and Postion.	Findings	Discussion and Recommendation
1.	*Mr. Himal Bhandari* (Senior Officer at the Balaju Industrial District Management Limited.)	• Industrial area and local community are directly related to each other but lack of buffer zone and limited budgets are major problems. • More positive impact to the society. • Only few negative impacts	• Industrial area has positive relation with local community that is prime factor for economic growth of the nation. • For new industrial location water treatment plant is most crucial.
2.	Mr. Bhusan Kumar Upadhaya (Assistant director, and information officer in Balaju Industrial District.)	• Industrial Area have more internal problems than with local communities. • Where development occurs, destruction also occurs (equal positive and negative impact), so we have to consider negative impact.	• Industrial area has equal negative and positive impacts and highly related with local community but should be far from local community. • For new industrial location there should be no any politics and unions inside industrial area.
3.	Sailaja Khanal Ghimire (Senior Secretory and Board member of Balaju Industrial Union)	• Positive relation with local community creating numerous opportunities for workers in the society. • Industrialist are facing problems because of old infrastructure and limited budget for its maintenances and lack of effective management.	• For new Industrial location attributes there should be enough space for expansion and far from residence and finally there should be a union which take care of different units in inside industrial area. • Industrial area are important sector for economic growth and that should be managed properly.

4.	Late Mr. Mukunda Rijal Ward chairperson of ward no 16 of Kathmandu Metropolitan City (KMC)	• Highly related with the local community with completely negative impact to the society. • Lots of problems faced by the local community because of industrial area. • He don't consider BID as industrial area because it doesn't have proper industries with lack of manufacturing unites and most of them are like ware house. • So dangerous gas storage plant is inside that BID that has great psychological impact to the local community. • Balaju as most polluted area in Kathmandu because of BID.	• Industrial area is highly negatively related to the local community. • It's should be very far from the local community.
5.	Er. Shushil Timilsina (Technical officer at the Balaju Industrial area)	• Problems with policy implementation • Smooth relation between the industrial area and local community if managed properly.	• New industrial area should have proper infrastructure and policies implementation system.
6.	Mr. Jibnath Giri (Ex-Chairperson of Tole Sudhar Sumati)	• Industrial area cause great ham to local community directly and indirectly. • Most the air pollution, smell problem and other environmental pollutions. • Positive impact with the increase of sales and house rent. • Few local community people left their home because of air pollution causing health problem.	• New industrial area should be far from local residence with good facility for worker to stay in that place. • Enough greener should be near the industrial area so that it helps to maintain balance of pollution and for sustainable development.

S.N	Sector Observation	Findings	Discussion and Recommendation
7.	Mr. Pramod Ghimire (Owner of shree plastic Udhyod pvt. Ltd.)	• There are many positive impacts and less negative impact to the society. • Work culture and labor union with politics are major problems in the industrial areas. • Highly competitive market with unstable industrial policies are as well problems.	• He suggest that location attributes for new industrial area developments are there should be proper demand and must importantly production cost should be low so that high profit can be obtained.

7.3 Finding and Analysis from observation

According to the observation, various outcomes from various sectors are shown in the table below;

S.N	Sector Observation	Findings	Discussion and Recommendation
1.	Economic Observation	• More positive impact to the society with Job opportunities, Agglomeration of different business along Balaju Chowk. • Multi-dimensional economic advantages are observed.	• Positive Impact in economic activities can be observed but it is limited and unmanaged. • Industrial area has positive relation with local community that is very important for economic growth of the nation.
2.	Environmental Observation	• Development with highly impact on environment • Air pollution, Traffic Congestion and noise pollution, unmanaged solid waste disposal and smell problem are observed.	• Balaju area seems much polluted but it's not only because of industrial area but as well because of unpitched road and dust from ring road. • Local community are affected by the pollution.

3.	Social Observation	• Positive relation with local community • From social point of view there are numerous advantages such as open space, water facility in pipeline, facility of fire brigade, opening of small's shops targeting labor and others near industrial area.	• Industrial area play vital role in economic growth and other facilities for society.
4.	Infrastructure Observation	• Majority of structure are outdated such as buildings, compound walls and waste water drainage system and treatment plant. • Majority of road structure are well pitch and minority of them are unpitched and in worst condition. • Few footpaths are unmanaged and most of them looks good in Major Street. • Considering local community there is no buffer zones and lack of greenery in the community. • Inside an industrial area infrastructure looks managed whereas outside an industrial area it seems poorly managed as like other local places of Kathmandu.	• Seems that there is no budget for local community and the budget for industrial area is also not sufficient. So required high budget in this sector. • Outdated structure should renovated and utilization to its max limit which is not seen in industrial area. • It is observed that large travel from local community that has significant impact such as vibration of house and damages in road and electric lines are observed.
5.	Local community Interaction	• People from local community seems not satisfied with the present location of industrial area as industrialist lacks in following policy. • Few local community people left their home	• Mixed view about the industrial area from the industrialist point of view as some are happy because of business where as some are dissatisfied because of pollution.

		because of air pollution causing health problem.	
6.	Industrial Activities and Work Environment observation	• Unhygienic and mismanaged activities are observed in many industries and most of industries don't allow visitors to enter inside. • Unmanaged disposal of solid waste and untreated waste water discharge is observed.	• Seems that policies are not implemented properly by many industries only big industries like Coca-Cola, Hyundai etc followed policies properly.
7.	Work Force and Living Condition	• Many labor living low standard life inside as well as outside industrial area are observed. • Because of low standard living the image of locality as well as industrial area degrades.	• Need of good facilities and other services for labor as they are unsatisfied with the wages paid.
8.	Regulatory Compliance	• Industries are not following the policies properly so that local community are facing numerous pollution.	• Strict implementing agencies seems need to implement policies in this sector.

To conclude, while the Balaju Industrial Area is an economic hub contributing to the growth and development of the region, it is also facing challenges in environmental management, worker safety and welfare, and infrastructure. Balancing industrial growth with environmental sustainability and social welfare is crucial for the long-term success of this area.

These findings suggest a need for a balanced approach that allows for economic development while also addressing environmental, social, and health concerns. Stakeholders, including the industries, local communities, and government agencies, will need to work together to achieve this balance.

7.4 Finding and Analysis from secondary Data Collection

The findings and analysis drawn from secondary data collection provide valuable insights into the Balaju Industrial Area. This comprehensive analysis provides knowledge on various aspects such as the types of industries present, infrastructure, labor availability, transportation links, environmental considerations, government policies, and more. By studying existing data, we gain a deeper understanding of how Balaju functions as an industrial hub and its impact on the local economy and community. These insights are major in making informed decisions, addressing challenges, and fostering sustainable growth within the industrial area.

S.N	Sector Observation	Findings	Discussion and Recommendation
1.	From Articles	- Lack of implementation of labor act in industries. - Gender Inequality inside an industry. - Especially women face problem to satisfy owner from job and they don't have alternative job option in market. - Hired for part time and uncertainty of job.	- Gender equality should be maintained. - There should be good policies regarding the labor rights and wages. - Identification of the national priority sectors for industrial development should be performed.
2.	Industrial Development Perspective Plan	- Lack of micro management in industrial estates such as Road, Drainage, Culvert, Electricity, Water supply, Water filtration. - No any systematic arrangement of industrial site and location like no proper care given for Occupational Health and Safety when establishing the new industry. - Lack of sufficient budget for smooth operation and functioning. The revenue source of IDM is only rent and lease from land and building that is	- It is suggested to search new source of revenue for IDM operation and management - It is advised for micro management of industrial districts like Road, Drainage, Culvert, Electricity, Water supply, Water filtration services. - It is suggested on proper maintenance of existing infrastructure of IDM. - Reduction of centralized power and authority to different regional office of ID should be done.

		comparatively lower than existing market rates.	
3.	Central Bureau of Statics (CBS)	• No proactive planning and no new research of industrial districts on timely basis for promoting industrial innovation. • No Proper coordination between different ministry and department of Govt.	• It should bring special schemes to increase the competitiveness of manufacturing industries. • International co-operation for technological know-how and new innovation in industrial development of Nepal should be performed to be globally competitive • The electing of different member in BOD of IDM in from Business community and employee community and should be based on transparent and uniform manner to implement timely and concrete decisions.
4.	Periodic Plan	• Roadmap for the future, outlining strategies and goals for industrial sector development in upcoming periods. • The growth rate of the industrial sector, its contribution to the national GDP, and its role in generating employment opportunities. • Periodic plan outline policy initiatives and measures taken to promote industrial growth, attract investments, and address sector-specific challenges.	• Hiring of professional manpower for proper functioning of IDM. • Infrastructure developments, such as industrial zones, parks, and clusters, designed to attract and facilitate industrial activities. • Should have major focus on environmental footprint, including energy consumption, waste management, and efforts toward sustainable industrial practices.

7.5 Overall analysis

We discovered through the data and observation that the alternative hypothesis is accepted and the null hypothesis is rejected. Thus, we get the conclusion that the industrial sector in the neighborhood are related with the way of life of the people. We concluded that industrial zones had both positive and negative effects on society based on the evidence we observed and the calculations we made. People seem to be okay with the situation even if it appears that society is being affected more negatively than positively.

7.5.1 From local community Data

From the calculation we got the value of p=.007 which is less than .05(significance level) so we reject the null hypothesis and accept the alternative hypothesis. That is we find that the current location of the industrial area has a relation with the local community. In a conclusion from community data rejection of the null hypothesis, the analysis illuminates a clear and meaningful connection between the Balaju industrial area's present location and its consequential impact on the near local community. The study found that pollution has a negative impact on society, with health issues, economic difficulties, and disorder emerging as major outcomes.

This denial of the null hypothesis highlights the critical need for holistic interventions that address and mitigate the negative effects of the industrial area's proximity, including urban planning, environmental restrictions, and community participation.

7.5.2 From Key Informant survey data

The summary of the key informant survey reveals compelling findings that establish a notable connection between the present location of the Balaju industrial area and its impact on the local community. The opinions of many different people, including residents, company owners, community leaders, and engineer specialists, came together to form a prevailing agreement that highlighted the negative effects of the industrial area's closeness to the society

Among the main conclusions, there was consistency in the fear over high pollution levels related to the industrial area's close proximity. These factors added up making the area unsafe for people's health. There were issues with the disposal of trash as well as noxious smells in the air and loud mechanical noises. People frequently became ill from unhealthy substances that came from factories, such as respiratory and skin conditions. People didn't like that the region no longer had an attractive look due to ugly structures and poor management.

The Balaju industrial area, despite some challenges, also presents positive impacts on the local community. It serves as a major place for economic activity, generating employment opportunities and contributing to local businesses. The agglomeration of industries has the potential to enhance development and services to the society. Moreover, the industrial area could encourage skill development and technology advancement for the laborers. It supports public projects and services, fostering overall growth. Effective management and collaborative efforts help in positive outcomes, leading to a more balanced coexistence between the industrial area and the local society.

7.5.3 From observation

Personal observations have shown that the Balaju industrial area's present location has major effects on the neighborhood. Industrial operations are located close to residential areas, which raises pollution levels, affects air quality, and causes health problems. Daily life is disrupted by noise pollution, while garbage and industrial waste spoil the area. This unfavorable environment has effects on the economy, including drops in property values. Social indicators include weakening connections to the community. Degradation of the environment adds to the deep harmful effects. However, there is evidence of a favorable relationship between the industrial sector and the surrounding towns, as evidenced by the expansion of many small businesses. For the local community, facilities like fire fighters, water taps, and toilets, etc., are planned to be built.

Figure 48 Industrial Area showing Major Industries

7.5.4 From Secondary data

The location of the Balaju industrial sector and its effects on the closest communities can be clearly connected according to secondary data gathering. The information highlights a number of unfavorable consequences, including increased pollution levels that raise health concerns among locals. Additionally noticeable are the effects of industrial constructions on noise pollution and visual quality. There will undoubtedly be negative effects on the economy and property values

(Gautam, 2014). These findings are socially relevant, revealing interpersonal tension and community misery. A further source of worry is environmental degradation, which includes water and soil contamination.

7.5.5 From Literature Review

Weber's Theory of Industrial Location (Fearon, 2002) can be used to examine the existing location of the Balaju industrial sector. This approach emphasizes the importance of elements like labor availability, transportation costs, and agglomeration economies in selecting where industries should be located. The proximity of the industrial region to the local community in the Balaju context demonstrates Weber's awareness of transportation expenses. This near proximity has had unfavorable effects, including increased pollution levels and related health issues among people, despite the fact that it might initially be useful for transit cost savings. According to Weber's theory, labor availability and agglomeration economics are both favorable, making Balaju one of Nepal's primary industrial areas.

The overall analysis revealed that the location of the industrial area has an enormous effect on the current neighborhood. The neighborhood is affected both favorably and unfavorably. Overall, the negative impact is greater from a local perspective than it is from an industrial one, where there is some negative impact but few important positive impact. From this analysis that industrial areas have a big impact on the neighborhood, either positively or negatively. Therefore, it is demonstrated from all the data calculations, observations, secondary data gathering, evidence, and from literature review we find that that the local community is impacted more negatively than positively in case of Balaju Industrial area.

8 CHAPTER EIGHT: THE IDEAL LOCATION FOR INDUSTRIAL AREA IN THE URBANAIZING AREA

From the previous chapter finding and analysis from both quantitative and qualitative analysis the selection process for ideal location for an industrial area in context of Nepal in urbanizing area involves careful consideration of various factors to ensure the success of industrial area, sustainability, and minimal negative impacts on the environment and surrounding communities. From the finding and analysis this chapter focused on important factors to consider when determining the ideal location for an industrial area in an urbanizing area in context of Nepal. From the research six location attributes are identified as important for industrial setup and they are described in details in this chapter. The location attributes are identified as:

- ➢ Land Use Regulation and Legal Compliance,
- ➢ Energy and Resources,
- ➢ Investment and Workforce Synergy,
- ➢ Proximity and Impact,
- ➢ Stakeholder Engagement and Security Protocols and
- ➢ Market Dynamics and Profitability.

8.1 Land Use Regulation and Legal Compliance

This location attributes includes land availability, cost of land, enough land for expansion, land zoning, and land use regulations. This all attributes are kept in this section as from the survey done in Balaju Industrial Area the major problem is land availability, cost of land and expansion. Buffer zones and other legal problems in the balaju area and disturbance in society and the systematic development of communities are lacking in that area. So for the new industrial area there should be special laws and regulations that protect the both urban area and industrial sector. Enough space on site for the industrial expansion as well as open space for local community should be considered in land use regulation. The requirement for expansion in industrial regions with a vision that sufficient space must be considered when selecting a new industrial area. In terms of legislation, it's important to consider the development of industrial clusters that promote collaboration, resource sharing, and innovation with low negative impact on urbanizing place. Better laws and regulations that benefit the impacted areas as well as a variety of services should be included in

these policies. Political stability and business-friendly governing structures to attract more enterprises to the area and encourage their growth and finally laws that provide cash incentives, tax rebates, and other services should be considered for affected community and industries.

8.2 Energy and Resources

Infrastructure, raw materials, electricity, water systems, transportation systems, and other major facilities are all included under this heading. As seen from the case area the efficient road network is necessary for the transfer of resources and goods for urban areas. The most important and necessary infrastructure is the transportation system that links the industrial site to suppliers, consumers, and distribution centers. Availability of reliable and efficient infrastructure including buildings, warehouse, road network, electric power, and water treatment plant, sanitation, and communication facilities that is observed from the case area are major need and should be included in other industrial area. The various form of energy source including human and natural resources, renewable and nonrenewable resources for the industrial area should be considered in new industrial area. Modern technology and digital infrastructure with enough research and development in resources and energy management are the need in industrial area. Businesses will be attracted and their operations will be made easier by the availability various form of resources. Along with that good facility for urbanizing area for overall development of that area.

8.3 Investment and Workforce Synergy

It is clearly understood that Balaju Industrial Area is successful because of good investment and availability of good workforce. For a trained workforce that meets industrial expectations, collaboration between educational institutions and industries is necessary which is seen in Balaju industrial area as there is Balaju School of Engineering and Technology inside industrial area. Technical colleges and vocational training facilities is key to the growth of the industrial sector that is seen in case area. So, access to a highly skilled and qualified labor force by providing educational resources, guidance, and training programs major need for new industrial area. The attraction of the location for both employees and employers can be improved by providing benefits like low-cost housing, healthcare, and educational facilities for industrial workers. Industrial locations with a strong economy, a large market, trained labor, attractive rules, tax benefits, and excellent facilities are more desirable to investors. These elements lower risk and raise the potential of an investment's return. And finally, if the workforce is qualified and readily available, the area

can attract investors. With all of these resources, a healthy ecosystem for society can be established, enabling it to be well-managed and livable.

8.4 Proximity and Impact

From the case are it analyzed that the most important factor for the industrial region is simple to reach by road networks. Investors are searching for highly desirable locations, which can be found by situating industrial areas close to important consumer markets, as well as raw material and vendor suppliers. Businesses wants reduce time and transportation expenses to remain competitive with the capacity to react more quickly to adjust to supply and demand. The location within or close to urban areas with a high concentration of consumers is favorable, however from the case area environmental effect is also an essential aspect, thus industries must use environmentally friendly practices that reduce environmental harm was analyzed as the major need. This means following the rules about the environment, finding ways to handle waste better, and using clean energy like solar, electricity and other alternative should be considered in in industrial area. It's important to obey environmental laws and have good plans to prevent pollution and manage waste. Sustainability plans and using renewable energy sources like the sun, hydro-power and wind energy are important. As a direct result of this kind of strategy, which also encourages improved community relations and decreases pollution.

8.5 Stakeholder Engagement and Security Protocols

From the case area i.e. Balaju Industrial Area a lack of involvement of a different level of stakeholder was observed and hence that is the major cause for the problem. Analyzed that different level of stakeholder with their concerns and involving them in decisions helps make the urban area with industrial zone a better place and more acceptable to everyone. In order to create a balanced, safe environment for everyone, local public and politicians must take into account the local community environment. Strategies for infrastructure resilience and preparedness for emergencies to protect industrial investments from natural disasters and other unanticipated incidents. To keep the company, its workers and community safe and make sure everyone is protected, it's important to have rules and security measures in place. These measures shoud be considered for the new industrial area to ensuring that everyone is safe in the sense that the community is protected from industry, industry is safe from society, and from a variety of unknown risk factors.

8.6 Market Dynamics and Profitability

Balaju Industrial Area is in the location that meets the market demand and hence company are in profit they calculate the need of that area to fulfill the demand. So for new industrial area it is important to have everything you need to operate an industrial zone effectively and meet market demands. Making a profit is the primary objective since it indicates how financially successful industrial zone are. Hence from case area analysis it is important to conduct a thorough feasibility study and market analysis to make decisions when selecting the ideal location for an industrial area in an urbanizing area.

In conclusion, a holistic approach that integrates the insights from literature and theoretical frameworks is essential for successful industrial development in Nepal. By following the suggested ideas and plans mention above as location attributes for any new industrial zone in urbanizing area in Nepal. Including this location attributes in industrial zone in context of Nepal will help the country to grow economically strong, creating more jobs, and make people's living standard better.

9 CHAPTER NINE: CONCLUSION AND RECOMMENDATION

9.1 Conclusion

In conclusion, choosing the right geographical characteristics for industrial growth in Nepal is a complex process that needs a comprehension of numerous elements. In order identify the essential characteristics that have a substantial impact on effective industrial development, this thesis studied the insights offered by several literature sources and theoretical frameworks. These findings helps different stakeholder with significant growth potential, strategically position itself as an industrial growth center.

The research emphasized the importance of factors like numerous infrastructure, the availability natural and human resources, source of energy, resource accessibility, and government rules and regulations. These characteristics work together to create the framework for industries to grow and advance the economy. An active accelerator for expansion, the ideas of clustering and supply chain integration have also emerged, allowing sectors to take advantage of opportunities for collaboration and the sharing of resources.

Finally, environmental considerations, quality of life enhancements, and security provisions emerged as key aspects of sustainable industrial development that makes urban area habitable. Achieving sustainable economic growth while maintaining the ecological balance and providing a comfortable living environment for individuals is essential for social harmony and prosperity in the long run.

9.2 Recommendations:

Chapter eight includes the major recommendation about location attributes. But findings and insights from the literature, several recommendations are proposed to guide industrial location. For any Industrial development the major focused should be on investment in infrastructure, skill development, strategic land use planning, and availability of resources, policy formulation and incentives, cluster development, environment responsibility, quality of life enhancement and risk mitigation in urbanizing area.

9.2.1 From Key Informant Survey and Self Observation

Depending on specific industry, geographical location, and economic conditions, location factors for industrial development can change. A few similar elements that are important for industrial development from analysis and study's shows that important locations attributes for industrial growth. Industrial area has positive relation with local community that is very important for economic growth of the nation. Water treatment plant location is critical for new industrial sites. Political parties and labor unions should not exist in new industrial locations. A framework for implementing policies and enough infrastructure should be in place in the new industrial region. The location of the new industrial area should be far enough from residential areas. Good facilities and incentives for impacted individuals should be given. Sufficient green space should be located close to industrial areas in order to support sustainable growth and the maintenance of the pollution balance. New industrial area developments should prioritize having a suitable demand and, more crucially, low production costs in order to maximize profits. Promoting gender equality is essential. There should be good policies regarding the labor rights and wages. It is advised for micro management of industrial districts like Road, Drainage, Culvert, Electricity, Water supply, Water filtration services and finally to suggested on proper maintenance of existing infrastructure of Industrial District Management.

Hence the comprehensive plan promotes economic growth while also ensuring the industrial area's long-term viability and profitability, which ultimately helps local businesses and the community. A holistic approach that integrates the insights from literature and theoretical frameworks is imperative for successful industrial development in Nepal. By taking into account the recommended qualities and approaches, Nepal can make particular benefits to promote the growth of industries in urbanizing area, which will ultimately lead to increased prosperity, the creation of jobs, and improved standards of living.

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11 ANNEX

11.1 Site Photos
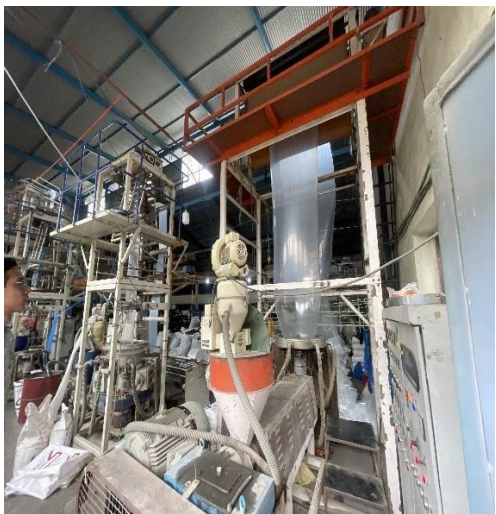
11.2 Key Informant Interviews

11.2.1 Sailaja Khanal Ghimire (Senior Secretory)

She is the board member of Balaju Industrial Union

Question: What is the purpose of this industrial union and it major purpose?

Answer: to look over all problems in the industrial districts including the major problem of labors, employee, staffs, industry itself and in overall problems related to industry.

What are major problems in this industrial sector that you have to face frequently?

Answer: I will say that the increase in rent of land that directly hamper the running problem of

Figure 49 Mrs. Sailaja Khanal GHimire (Senior Sectory)

factories. Increase in 700% directly from normal rent that is major problem of now. Along with that in some places there is blockage of sewage is the major problems in many areas. Outdate structure and difficult to locate the exact location of sewage line is as well challenging.

In your opinion how much is it important to have this kind of union in this industrial area?

Answer: Yes it is very important because we face problem anytime and anywhere so it is very important. We have 161 industries so to solve problem effectively and in smart way. It is so important.

Is there any problems for industries as it locates in inside a residential area?

Answer: My house is also in this community so I can understand the problems. As Industrial area is the backbone of country it is very important as an economic point of view, so we need it anyhow. As it is kept by the government there is not so much issues however there is risk of Gas (oxygen plant, Nepal Gas) Industry which should not be in local community. For instance there is huge problem in Patan Industry because of fire breakout in oxygen plant with human casualties. But we all industry operate with all precaution so its safe but from public point of view the are quite uneducated but there is no major problems.

Question: what is the availability of workers for the industries here?

Answer: Even though we have a lot of employees and labor around, there isn't enough work in industries. Because of covid, high import taxes, price inflation, and hard to manage raw materials makes undoubtedly challenging for industrialists to manage their businesses. Government measures should therefore be more successful in addressing this issue and enabling the corporation to function at full capacity. So that as a result we can provide job for more employees.

Questions: what are the expectation does industrialist expect from the government?

Answer: government should be responsible for the insurance that they should provide to the industrialist. As well as to solve the present problems like rent problems along with that facilities for employee by the government.

Question: what is the demand of produced material in the market?

Answer: yes of course there is decrease in demand of raw material in the market because of all these present economic condition as well as because of high competition in the market. For example there is less pastic factory before now there are many in number. Competition is high in the market so comparatively the demand has decreased.

Question: what is your opinion about the band in using plastic material by government?

Answer: yes of course the decision of government is good as it helps to reduce the pollution. But the use of plastic is huge and alternative option should be there for plastic bag. In our context we think plastic bag is only plastic products but we do have many plastic products. Yes the use of plastic is maximum for daily use and banning the production, import, sale, distribution and use of plastic bags thinner than 20 microns across the country by government is good decision and it it doesn't have great effect in plastic industry as the demand is still high in the market. It seems that the use of alternative for the plastic not properly adopted by the market and still the use of plastic bag is continuous in the market.

Question: what else the backup plan for the plastic industry if the mandatory rules for banning of plastic should be maintained by the industry?

Answer: It's impossible for government to ban the industry without our consultation, and we all union are here to discuss for the best alternative and we always have a backup plan for this case.

Question: what is the location attributes should a place have to establish an industrial area?

Answer: first thing is that it should be far from the local community. There is many problem when it is constructed with in the community. If we see this industrial area during its establishment it is

far from the residence and core city and there were only limited number of houses. However the lack of planning and as well for the convenient, people start living nearby this area. And well its neat the road access as it's just a side by ring road. What I want to say is that it should be open place, with good infrastructure such as electricity, water facilities, and transportation facilities, sewage system. Now in this generation time plays great role so the road without any traffic congestion is most important with good quality road structure. Should have enough space for its expansion. Anyplace whether it is geographically suitable or not should be studied otherwise the transportation cost is expensive with time consuming. We have lots of industrial districts but many of them are closed and only around five of industrial districts are in operation. This means that there is a problem and that should be investigated. In my analysis it is closed because of lack of facilities, far from consumers and transportation cost is high for raw material transport. For example surkhet industrial district. High cost for production and low profit are the major reasons. Should be in prime location.

Question: what is the impressive work that is done by this union in this industrial district?

Answer: I must say that we do have day care children center in this industrial district named as Diba Child care centre (montosary) which take care of the children of workers. That helped a lot for especially female worker as they can continue their work even after having children. We do have 5 staffs in that center two teachers and three other staffs to take care of children. Currently we have

Figure 50 Diba Child care centre inside Industrial area

31 children's and we care them from morning 8: 30 Am to 5:30 in the evening. We charge very little amount for the children that is twenty-one hundred per month. We do collect the money from parents to make it more valuable and the institute the self-sustaining. We do have a facility to teach them up to the level of class UKG. We do have a children from 3 months to higher in age. We have very good and hygienic food for children. We have very good system to make children healthy by changing clothes when they reached this center by provide clothes to them. Not only this we are we planning to provide facilities to the outer community too such as toilet for local

community, pure drinking water facilities for all. Along with this we can say that there is an ambulance for fire breakout that helps to local community as well. Along with that we do have clinic in this district to look pressure, sugar and normal first aid help and normal checkup for workers.

11.2.2 Pramod Ghimire (Plastic Factory Owner/ Industrialist)

He is the industrialist at balaju industrial area.

Question: What are the major problem that you face in this industrial area?

Answer: Mainly we face problem with local public and with the labor. Local public mainly complains about the pollution from the industrial area but in my opinion there is no such industries that pollutes a lot in the environment and this is the one of the cleanest industrial area in the Nepal among other. And second there is problem with the labor we have

Figure 51 Industrialist Mr. Pramod Ghimire

lot of labor and they are also easily available in the market but the problem is that we they become expert in any sector they left the company for abroad. So the major is that they trend of travelling abroad by the labor is the major problem in this
Figure 52 Industrialist Mr. Pramod Ghimire
sector.

Question: Who is the condition of the industries because of this economic crisis?

Answer: Because of this economic crisis we industrialist face major problems because we are unable to operate our industry full as there is lack of demand in the market. Now have 60% down in the business because of this economic crisis. And as we will say that there is not good and appropriate policies regarding this issues.

Question: what is the condition of you factory and the problem that you feel in this sector?

Answer: This is open market and we do have same industry in this area. Out of 155 industries there is about 40 industries that are related to plastic industries. And because everyone try to involve in same sector there is huge competition in the market.

Question: Is there any problems in the availability of raw material and market proximity?

Answer: most of the material are imported from abroad so there is no problem but the high competition and that is the problem. Most of the material from Saudi Arabia, Singapoor, Quatra and so on. There are more supplier that consumer and that is issue for us.

Question: what are the location attributes do you think is important for industrial development?

Answer: As a manufacture we think of profit so the place where industrial area is going to setup that place should have good facility of infrastructure with low/ appropriate pricing. Should have good facilities of new technology and growth of the industry. Extra costing should be minimized so that we can make higher profit. Politics is the major problem so in new district there should not have any politics.

Question: what is the problem that other industrialist face in this area?

Answer: There is problem in the industries which share boundary with the local community such as problem of getting strike of stone in the windows, throwing different substance in the industrial area and in some places fight with the local community. Fortunately we are in middle so we don't face such kind of problems. And this should be managed by the management board but this is lack in the industrial district because of lack of responsible in such issues. They are unaware about their responsibility and problem solving skills. The local government bodies are also not in favor of this industrial area which is also the problem for the industrialist.

11.3 Questionnaires
11.3.1.1 Urban Geography Study

How far you lived from the industrial area ?
11 responses

- with in 1 km
- with in 5 km
- with in 10 km
- with in 50 km

54.5%
18.2%
27.3%
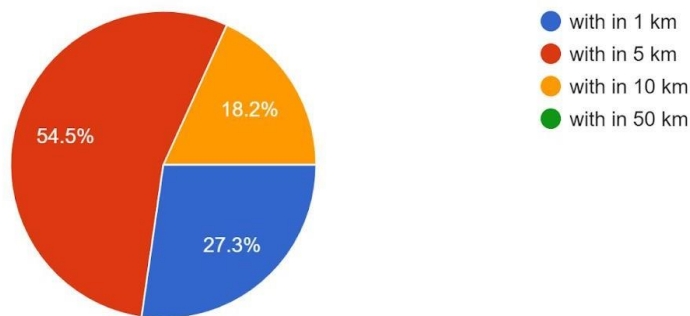
How difficult do you feel to travel to work place from home? (Rate on a scale of 1-5, with 1 being very difficult and 5 being very easy)

11 responses
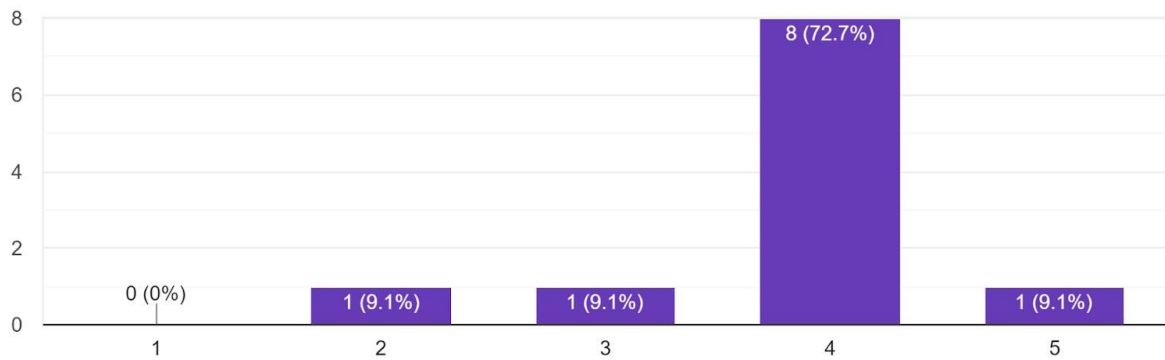
11.3.1.2   Question about the satisfaction of industrial are and graphs

How much you are satisfied with the availability of labor (unskilled, semi skilled and Semi Skilled) ?
(Rate on a scale of 1-5, with 1 being less satisficed and 5 being highly satisfied)
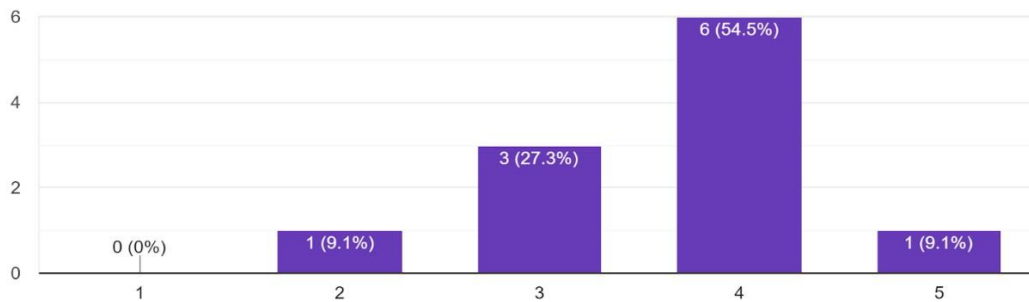
11 responses

How much you are satisfied with supplier and with the availability of raw material for your industry ? (Rate on a scale of 1-5, with 1 being less satisficed and 5 being highly satisfied)
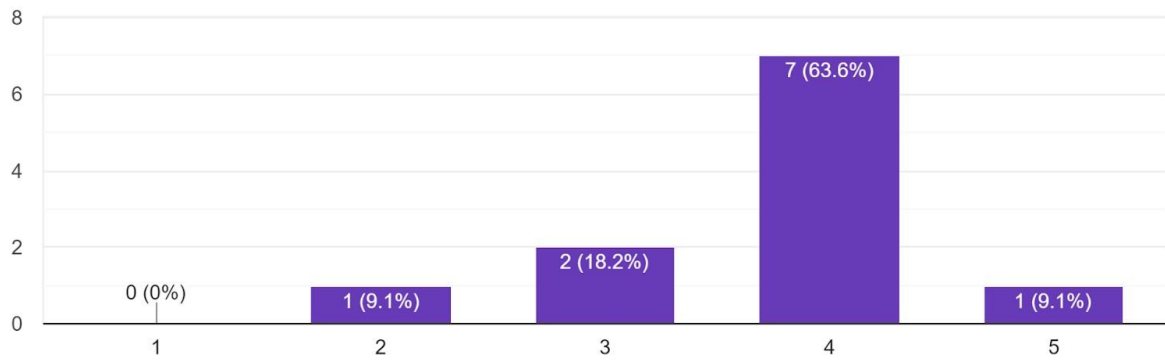
11 responses

how satisfied you are with your business/ salary / profit ? (Rate on a scale of 1-5, with 1 being less satisficed and 5 being highly satisfied)
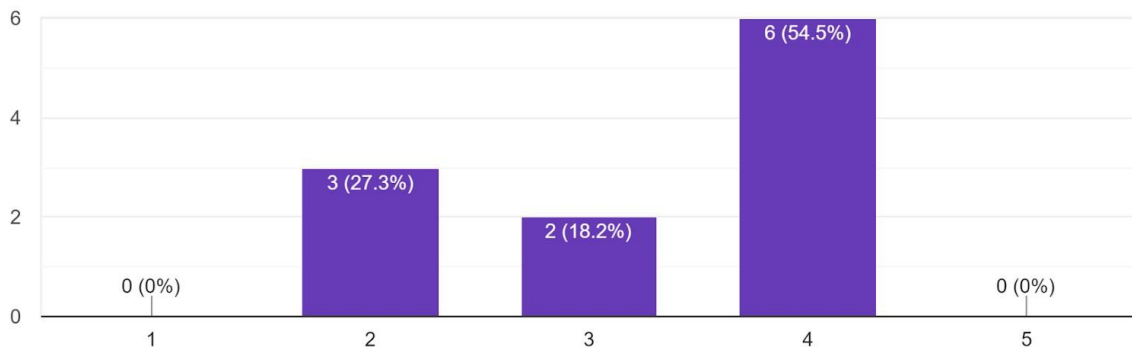
11 responses

How much you are satisfied with the market and its proximity?   (Rate on a scale of 1-5, with 1 being less satisficed and 5 being highly satisfied)

11 responses
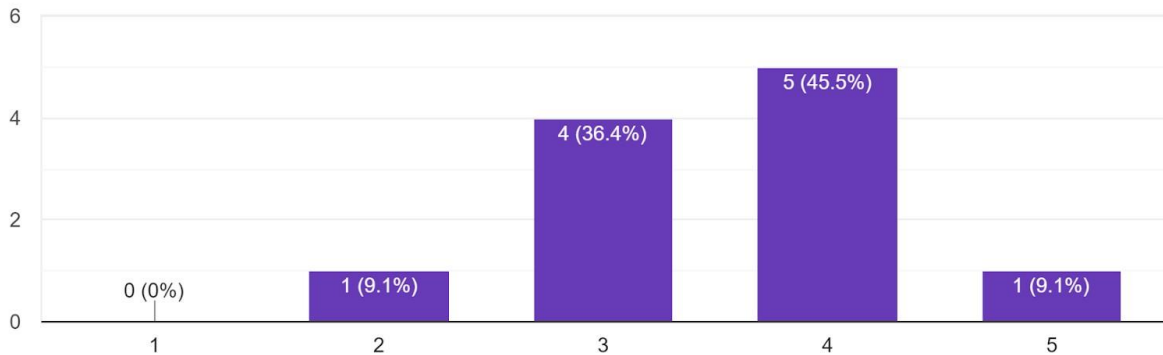
11.4 Miscellaneous

Regression from Industrialist

Test of data for normality test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
satisfied_current_location	.213	11	.176	.934	11	.449
overall_Impact	.248	11	.057	.896	11	.167

a. Lilliefors Significance Correction

We see that from the Significance (p) value that is greater than **0.05**. So the data from the variables are normally distributed. Using 5% of significance.

Since the data are normally distributed we conduct further linear regression analysis

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Here from the data obtained from the industrialist we conduct regression test in IBM SPSS and we the got following result.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.420	1	1.420	1.046	.333[b]
	Residual	12.216	9	1.357		
	Total	13.636	10			

a. Dependent Variable: satisfied_current_location

b. Predictors: (Constant), overall_Impact

• The result confirms that the overall regression model is insignificant for the data, and this was captured by the ANOVA (F-statistic) value of 1.046 and its associated probability value of 0.333 ($F = 1.046$, $p>0.05$), which was found to be insignificant at 5% level.

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.595	1.591		1.002	.342
	overall_Impact	.459	.449	.323	1.023	.333

a. Dependent Variable: satisfied_current_location

The overall impact coefficient value which was found to be 0.323, shows that a unit increase in overall Impact, on average, increases the satisfaction of the current location by 0.323 units.

t-Statistics and p-values (sig):

•The calculated t-value for the relationship between the overall Impact and the satisfaction of the current location is given by 1.023 with an associated p-value of 0.333. Since the p-value is greater than 0.05 at a 5% level of significance, we conclude that the overall impact has a positive and insignificant impact on satisfaction of the current industrial location.

Result

From the above test examination, we can conclude that there is a relationship between an overall impact on the local community and the satisfaction of the industrialist but that is significant at 0.333 and we can say that at 66.70% confidence level from the test.

As data from industrial it is very limited and the to operate regression analysis is ineffective in this scenario.

Even though the regression analysis is conducted from the data that is generated from the we found that the p value obtained is greater than .05 which shows that the regression model is insignificant.

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Date: November 26, 2023

To Whom It May Concern:

This is to certify that the paper titled "*Investigating Location Attributes For Industrial Area Development: A case area of Balaju Industrial Area*" (Submission# **266**) submitted by **Ashish Simkhada** as the first author has been accepted after the peer-review process for presentation in the 14th IOE Graduate Conference being held during Nov 29 to Dec 1, 2023. Kindly note that the publication of the conference proceedings is still underway and hence inclusion of the accepted manuscript in the conference proceedings is contingent upon the author's presence for presentation during the conference and timely response to further edits during the publication process.

Bhim Kumar Dahal, PhD
Convener,
14th IOE Graduate Conference

Investigating Location Attributes For Industrial Area Development: A case area of Balaju Industrial Area.

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Abstract
Industrial areas play a significant role in the economic growth and sustainability of any region. The choice of an ideal location for industrial growth is an important choice with an impact on several stakeholders, including enterprises, communities, and governments. This study focuses on the investigation of location attributes for industrial area development, with a specific case study of the Balaju Industrial Area, situated in Kathmandu, Nepal. The study takes a different approach to examine the major variables affecting industrial growth in particular region. In-depth literature reviews, surveys, and interviews are conducted to collect data. Regression analysis was then used to investigate the relationship between the impact and industrial location satisfaction. Following the discovery of such relationship, location attributes are investigated and recommended. The study examines and assesses several geographical characteristics that are necessary for the industrial development are studied and identified. One of the key findings of this study is that the site of an industrial development directly affects the community and can have both positive and negative effects. As a result, it is essential to allocate location attributes for industrial development carefully. According to this study, it is major to consider a variety of factors, including infrastructure, a skilled and semi-skilled labor force, availability of land, safety and security, new technology, research center, effective laws and policies, accessibility to markets, financial viability, and environmental sustainability, when choosing a location for industrial development. The study's conclusion emphasizes the necessity for a holistic approach for developing industrial areas that takes into account the interaction between location attributes and their effects on economic, social, and environmental issues. Finally, by using the Balaju Industrial Area as a case study to highlight important lessons and best practices, this research serves as a valuable guide for urban planners, policymakers, and other stakeholders interested in recognizing the fundamental elements that influence and required for the growth of industrial regions.

Keywords
Industrial Area, Location Attributes, Local Community, Balaju Industrial Area.

1. Introduction

An industrial area is a specified geographic area that was created and planned with industrial companies and business operations where various manufacturing, processing, and production activities take place. The industrial sector's progress has led to many achievements such as increasing regional economic growth, employment, and business opportunities. However, industrial activities also led to a variety of negative impacts associated with environmental and social problems that can degrade the quality of the environment and in turn, will reduce the carrying capacity of the environment [1]. Industrial area development plays a vital role in economic growth and development of a region. The selection of an appropriate location for industrial development is crucial, as it can significantly impact various factors such as productivity, efficiency, transportation, and overall economic performance. In this context, this study provides an overview of the study conducted to investigate the location attributes for the development of the Industrial Area, considering Balaju Industrial Area as a case area for this study. The establishment of the industrial zone has been started by laying the foundation stone of Balaju Industrial District at Balaju, Kathmandu in 2016 B.S. with the support of the joint effort of Government of Nepal and the American government. Taking into consideration the geographical and regional economic balance of the country,

industrial zones were established in different places of the country by the Nepal government itself and with the cooperation of various friendly countries to encourage local investment, labor and raw material based industries and industrial promotion. To coordinate and manage the management aspects of the industrial districts Nepal Government established Industrial District Management Ltd. under Company Act in 2045 B.S. According to the policy of the Nepal government, this company has been playing an important role as an agency for industrial promotion and serving the industry in a systematic, unified manner [2]. Industrial Development Management Limited (IDML) was constituted by the Government of Nepal in order to boost the balanced regional development by making optimum utilization of local capital, natural resources (agriculture and forest based etc.) and human resources for industrial promotion [2]. There are 11 industrial estates and 10 are in operation except Dhankuta, six are being developed and five are proposed for consideration [3]. It is crucial for well-informed decision-making, strategic planning, and long-term industrial growth to conduct research on examining geographic attributes for industrial area development, with a focus on the case study of Balaju Industrial Area. The results of this study can help develop efficient rules and regulations, allocate resources accurately, and build successful business environments in industrial zones.

According to M.C. Ruiz [4], agreements on balanced

development, the relationship between an urban environment with optimal social services, and the search for a quality physical environment to be conserved have taken on a key role in the combination of industrial activity and environment. Industrial areas play a crucial role in economic development, but their impacts on nearby communities are often a subject of concern.It is important for well-informed decision-making, strategic planning, and long-term industrial growth to conduct research on examining geographic attributes for industrial area development, with a focus on the case study area. The results of this study can help develop efficient rules and regulations, allocate resources accurately, and build successful business environments in industrial zones[5]. It is important for making better decisions, plan strategically, and ensure sustainable industrial growth. It guides policymakers, attracts investments, and creates thriving business environments in industrial areas.

There were no homes nearby when the industrial area when it was first built, but because it is in the capital city of Nepal, the urbanization took place rapidly. As the industrial area located in Balaju there are lots of prospects and problems to the local community. The absence of any buffer zone around the Industrial Area is the main issue. As a result of numerous forms of pollution brought on by enterprises, there is a conflict between the public and industrialists on several agendas. These issues manifest as significant problems, including environmental pollution, posing threats to air, water, soil, and sound quality. The local population faces health risks stemming from exposure to industrial pollutants, while continuous noise and vibrations disrupt their well-being. Furthermore, the movement of vehicles associated with industrial activities contributes to traffic congestion and safety concerns, causing damage to infrastructure and road accidents. Lastly, the presence of the industrial area impacts land use and property values, with pollution, noise, and safety concerns affecting property sales and degrading the visual appeal of the local community.

The main objective of this research is to examine the relationship between the industrial area and the communities that surround it. It then looks at the potential and consequences of the industrial area from different perspectives, and then finally suggests location attributes for the ideal industrial zone in an urbanizing area.

The research have limitations regarding the time frame of the study. Industrial areas are dynamic and subject to changes over time. The findings of the research reflect the conditions and factors present during a specific period, potentially overlooking recent developments or future trends that could influence industrial area development. Considering these limitations is important to ensure a comprehensive understanding of the research findings and to encourage further studies that complement and expand upon the existing research in investigating location attributes for industrial area development.

2. Literature Review

2.1 Industrial Revolution

The Industrial Revolution was a period of most needed technological advancements and socio-economic transformation that occurred during the 18th and 19th centuries. It marked a shift from an agricultural and handicraft-based society to one characterized by mechanization, mass production, and urbanization [6]. The main characteristics of the Industrial Revolution were technological advancements, mass production in factories, urbanization, specialization of labor, the rise of capitalism, social and economic changes, improved transportation and communication, and environmental consequences [7].

2.2 Industrialization

Industrialization refers to a process which has occurred in the history of all economically 'developed' nation states and which remains an aspiration for most of the governments of those many populations which remain today relatively undeveloped [8]. A nation's economy undergoes a major transformation during industrialization. When machinery and energy sources like coal and oil replace the majority of labor done by humans and animals in the production of goods. This makes production quicker and more effective[9].

2.3 Types of Industries

From the industrial theory [6], industries are classified into four main types based on their characteristics:

Primary Industry: This industry [6], involves the extraction and production of natural resources. It includes activities like farming, fishing, mining, and forestry. Primary industries provide the raw materials needed for other industries.

Secondary Industry: This industry [6], also known as the manufacturing industry, this sector transforms raw materials from primary industries into finished products. Examples include factories that produce cars, electronics, clothing, and machinery.

Tertiary Industry: This is the service industry [6], where businesses provide various services rather than physical products. Tertiary industries encompass areas like healthcare, education, retail, hospitality, banking, and entertainment.

Quaternary Industry: This is a subset of the tertiary sector [6], that deals with knowledge-based activities. It includes industries focused on research, technology, information technology, and intellectual services. Quaternary industries play a crucial role in the modern knowledge-based economy

2.4 Theory for Industrial Area

Agglomeration Theory: According to Marshall [10], agglomeration economies arise from three main sources: labor pooling, knowledge spillovers, and shared infrastructure. In regions with a concentration of industries, a larger pool of skilled labor is available, allowing firms to access a diverse and specialized workforce. This leads to efficiencies in recruitment, training, and labor mobility.

Growth Pole Theory: The growth pole theory, proposed by economist François Perroux, suggests that concentrated growth in specific regions or "growth poles" can stimulate overall economic development. According to this theory, these growth

poles act as catalysts for economic growth by attracting investment, generating employment, and stimulating economic activity. The positive effects of growth radiate outwards from these concentrated areas, benefiting surrounding regions and creating a ripple effect of development. The growth pole theory highlights the importance of identifying and nurturing these focal points of economic growth to achieve broader regional development and balanced economic expansion.[11]

Gravity Model Theory: The gravity model for industrial development is an economic concept that draws an analogy between the force of gravity and the patterns of trade and industrial activities between regions. The model suggests that the flow of goods, services, and economic activities between two regions is directly proportional to their economic sizes (measured by GDP or population) and inversely proportional to the distance between them [12]. In the context of industrial development, the gravity model implies that industries tend to concentrate in regions with larger economic markets and closer proximity. Larger markets offer a greater potential for sales and access to customers, while closer proximity reduces transportation costs and facilitates supply chain management.

Weber's theory of industrial location: Weber's theory of industrial location [6], also known as the location theory, was developed by German economist Alfred Weber in the early 20th century. The theory focuses on explaining why industries tend to be located in specific areas. Weber argued that the location of an industry is influenced by three main factors: transportation costs, labor costs, and agglomeration economies. Weber's theory of industrial location [13] emphasizes the interplay between transportation costs, labor costs, and agglomeration economies in shaping the spatial distribution of industries. While it provides insights into the factors influencing industrial location decisions, it does not account for other important factors such as market demand, government policies, and technological advancements, which have gained significance since Weber's time.

3. Methodology

The research used a mixed-method approach to collect and analyze data to solve the problem. Ontology and epistemology are to research what 'footings' are to a house: they form the foundations of the whole edifice [14]. The study's ontological position for the study is that the current location of the Balaju Industrial Area affects the local community in both positive and negative ways, making it important to look into location-related factors. Epistemology [15], deals with what can be considered valid knowledge to claim the ontological assumption. The epistemological position for the study is that the location attributes of industrial location can be obtained from qualitative and qualitative analysis. Valid knowledge can be obtained through observation, interviews, and interpretation of secondary data.

Research paradigm, as defined by [16] is a collection of shared assumptions and understandings among scientists regarding how issues should be understood and solved. Research paradigm helps to examine the social and natural realities of the world. Research paradigms can be characterized by the way Scientists
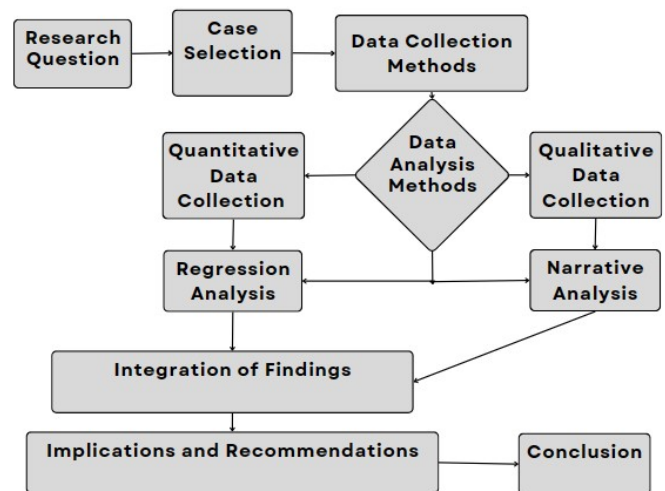
Figure 1: Research Design

respond to three basic questions: ontological, epistemological, and methodological questions[17]. Lub[18] put forward "the beliefs the researcher holds, will reflect the way the research is designed, how data is both collected and analyzed and how the research results are presented." Thus, recognizing a paradigm is critical to aiding the research process, finalizing the course of action, and determining opinions.

Both quantitative and qualitative along with primary and secondary data sources were utilized to gather comprehensive information about the location attributes of Balaju Industrial Area. Primary data collection involved surveys, interviews, and field visits to industries and relevant government authorities. Secondary data sources included literature reviews, reports, and statistical data from government agencies and industrial associations.This study is primarily qualitative in nature and involves data analysis obtained from the interviews with key informants. However, it also incorporates quantitative data derived from gathering, analyzing, and integrating the results of on-site household surveys that were conducted as part of the investigation of the Balaju Industrial Area and Local Community.

Regression analysis was used to evaluate hypotheses about the relationship between local community satisfaction and the overall impact of industrial areas on local communities using quantitative data. After the establishment of the relation, the narrative analysis was carried out for the qualitative data because both methods were used for resolving problems. Based on the narrative analysis, which also incorporates self-observation, key informant interviews, and secondary data analysis. Triangulation was used in this method to analyze the data and validate the data that had been collected. After the data were successfully validated, the analysis and integration of the results took place and eventually a conclusion and suggestions were drawn.

4. Context of Study

Balaju Industrial Area is a industrial zone located in Balaju Area along the rig road in kathamndu. It is one of the main industrial zone in Nepal and is located in the northwest of the Kathmandu

Figure 2: Balaju Industrial Area in Aerial View

Figure 3: Tests of Normality

5. Analysis and Result

At first the well-designed questionnaire was prepared and survey was conducted among the targeted audience. We cover crucial areas such as demographic details, occupational trends, environmental concerns, different issues, and the socio-economic impact of the industrial area on its surroundings.

5.1 Quantitative Analysis (Regression Analysis)

Data collected from the local public and industrialist in google form in rating scale which was then separated into independent variable and dependent variable. The Independent variable is the overall impact whereas the dependent variable includes the satisfaction of the current location of the industrial area. The independent variable include data such as The disturbance, air quality, noise pollution, traffic problem, health impact, psychological impact,Overall environmental quality, economic opportunities, overall development, cleanliness and maintenance, and social work or facilities. Similarly Dependent Variable (location of industrial District) includes The problems, overall positive or negative impact, overall visual appearance, and the satisfaction of the present location of the industrial area. All this data are on Likert scale, So this data transferred to Excel form the google form and then with the help of IBM SPSS, regression test was performed. Then inde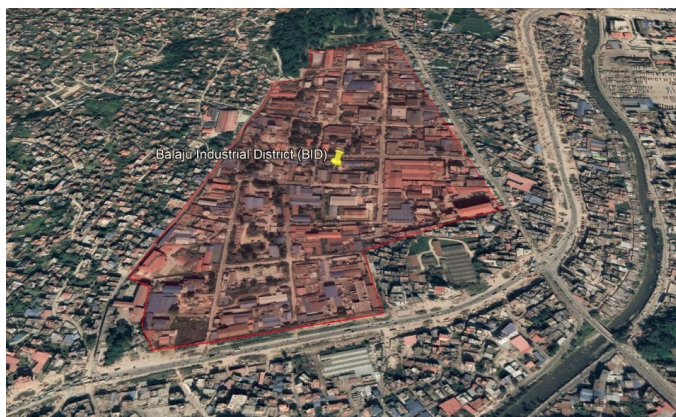pendent variable and dependent variable is produced by averaging the likert scale data and then to perform regression analysis,at first descriptive analysis was done to check the normality of the data. To conduct the normality test, IBM SPSS and Excel were used. As we have data that is less than 100 we choose Shapiro-Wilk as we have data set of 41. (If the data set is greater than 100 then use Kolmogorov-Smirnov) We see that from the Significance (p) value that is greater than 0.05. So the data from the variables are normally distributed. Using 5 percentage of significance. Since the data are normally distributed we conduct further linear regression analysis. After the normality test reliability test was conducted.

From Reliability Test Result .563 for data obtained. Since the data are 56.30 percentage reliable. So for the data linear regression can be conducted. The result confirms that the overall

Valley. This region is home to a large number of manufacturing and processing businesses that have a significant impact on the industrial development of the nation. The main centre of Kathmandu is easily accessible from the Balaju Industrial Area. It lies approximately 6 kilometers northwest of Kathmandu Durbar Square, one of the city's major landmarks. The industrial area is well-connected to the rest of the city through multiple transportation routes, making it easily accessible for both commuters and logistics purposes. The industrial area covers a 670 ropanies of land area, featuring a well-organized layout to accommodate a diverse range of industries. Balaju Industrial District has a total area of 670 ropanies out of which 540 ropanies are well developed. The land occupied by service sector are 130 ropanies. Currently there are 131 industries established inside the district out of which 97 industries are in operation [2]. From the data from IDM [2], Balaju Industrial Area consists of numerous industrial plots designated for different types of industries. These plots vary in size and are demarcated to accommodate factories, manufacturing units, warehouses, and other industrial establishments. The plots are usually rectangular or square in shape, with clearly defined boundaries. Balaju Industrial premises is directly connected to the local community. The local community consist of diverse group of people, including employees, business owners, labours and other residence. Neighborhood residents have a strong sense of support and community, which promotes a welcoming environment who are little far from the industrial area however there is conflict who shares boundary with industrial area. Most of them value cooperation and regularly participate in initiatives to promote social harmony. The concentration of diverse industries in Balaju Industrial Area can create an agglomeration effect, good collaboration, knowledge-sharing, and economies of scale inside industrial zone as well as can be observed outside an industrial area. The proximity of different industries allows for the efficient exchange of resources, services, and ideas. Hence the clustering result in increased productivity, innovation, and competitiveness for businesses in this area. The area as a whole benefit from the presence of the Balaju Industrial Area. It attracts investments in social services, commercial establishments, residential construction, and infrastructure. Because of industrial location most people are happy with the agglomeration of small business which directly and indirectly gets opportunities for income and few of them are unhappy because of negative impact of the industrial area. There is park near by industrial area that has positive impact to community.

ANOVAa						
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2.171	1	2.171	8.117	.007b
Residual	10.430	39	.267		
Total	12.601	40			
a. Dependent Variable: Satisfaction_Current_Location					
b. Predictors: (Constant), Overall_Impact					

Figure 4: ANOVA Test

Coefficientsa					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.994	.526		1.890	.066
Overall_Impact	.583	.205	.415	2.849	.007
a. Dependent Variable: Satisfaction_Current_Location					

Figure 5: Coefficients Test

regression model is significant for the data, and this was captured by the ANOVA (F-statistic) value of 8.177 and its associated probability value of 0.007 (F = 8.177, p¡0.05), which was found to be significant at 5 percent level. We accepted the result and proceeded with the test because the regression analysis was significant despite the weak regression value caused by a large amount of data averaged to a single dependent and independent variable. To interpret the t-statistic, you should examine the probability value (or P-value) captured as Sig. Given a p-value, you can tell at a glance if you are to reject or accept the null hypothesis The overall impact coefficient value which was found to be 0.415, shows that a unit increase in overall Impact, on average, increases the satisfaction of the current location by 0.415 units. Since the p-value is less than 0.05 at a 5 percentage level of significance, we conclude that the overall impact has a positive and significant impact on satisfaction of the current industrial location.

Result from the analysis: From the graph, the equation of slope is given by

$$Y = a + bX \tag{1}$$

, where Y is the dependent variable, X is the independent variable, a is the intercept, and b is the slope coefficient. Here, b is equal to 0.58 Which shows that the Impact is Positive as the value is positive. As a result from the graph, there is a relation between the local community and the current industrial area. Result
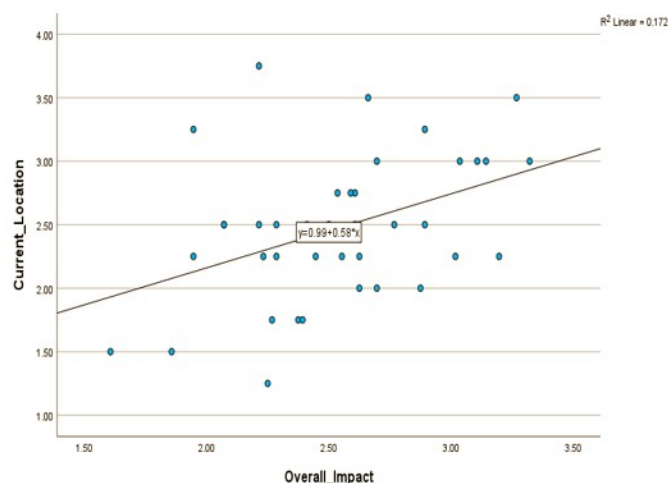
Figure 6: Regression Analysis Graph

from the analysis, From the above result, we can conclude that from the regression analysis that there is a relation between the local community and the current industrial area. Hence, Null Hypothesis was rejected and Alternative Hypothesis was accepted.

5.2 Qualitative Analysis (Narrative Analysis)

From the key informant survey, self-observation and secondary data analysis qualitative analysis was conducted and the following analysis and output was obtained.

From key informant Interviews (KII) The Key Informant Interviews are conducted with different stakeholders that includes high level officers from Balaju Indistrial area such as Mr. Himal Bhandari (Senior Officer), Mr. Bhusan Kumar Upadhaya (Assistant Director, Information Officer), Sailaja Khanal Ghimire (Senior Secretory) and Er. Shushil Timilsina (Technical Officer). Similary other stakeholders such as Late Mr. Mukunda Rijal (Ward chair Person of Kathmadu Metropolitan City ward number 16), Mr. Jibnath Giri (Ex-Chairperson of Tole Sudhar Sumati), Pramod Ghimire (Plastic Factory Owner/ Industrialist) and conduct with local public and with planners as well. And analysis was done and finding are industrial areas and the communities nearby are closely linked. When there's no buffer zone between them, conflicts often arise, and limited budgets make things even tougher. As these areas develop, they also bring destruction, which can be both good and bad. We need to think about the negative effects, especially on society as a whole. Industrial areas create many problems in our society. This happens because there are not enough factories and mostly just warehouses. Gas storage can also affect the mental well-being of local people, and places like Balaju in Kathmandu suffer from high pollution because of industrial areas. Issues with implementing policies make things more complicated.

But if we manage things properly, there can be a good relationship between industrial areas and local communities. Unfortunately, industrial areas harm the local community in many ways, like causing air pollution, bad smells, and other environmental issues.

However, there are some positive effects too, like higher sales

and higher rents for houses. Overall, if we handle things well, there can be more positive impacts and fewer negative ones on society.

Yet, industrial areas have their own problems, like work culture, labor unions, and political involvement. It's important to strike a balance to make sure that industrial development benefits the local community while also considering society's well-being.

From Self Observation The presence of job opportunities and a variety of businesses near Balaju Chowk brings more positive impacts to our society. There are some problems we need to address that include air pollution, traffic jams, noise, and issues with handling garbage and unpleasant smells. On the bright side, there are open spaces and access to water facilities, as well as fire brigade services and small shops that helped local labor force. But, we do have challenges like poorly maintained sidewalks, a lack of greenery, and no buffer zones. Inside the industrial areas, infrastructure is usually well-maintained, but outside, it's often poorly managed. Due to the air pollution causing health problems, some local community members have even had to leave their homes. Moreover, many industries appear unclean and mismanaged, with restricted access for visitors. The disposal of solid waste and untreated wastewater is also a problem that needs attention. We need to work together to improve these issues for a healthier and happier community.

From Secondary Data Analysis The Secondary Data that are studied for this analysis are Economic Survey Data 2020/21, environmental impact assessment report, report on small- and medium-scale enterprise, Remote Sensing data on urbanization patterns in Kathmandu Valley, Datas from Department of Industry, 2023 and so on. In many industries, they don't follow the rules about how they should treat their workers, and this can be a big problem. Their lack of labor rights inside a industrial area. For women often don't have good job options, and they're not always happy with the jobs they can find. Some jobs are part-time, which means they might not be secure, and there aren't many jobs opportunities to choose from.

The condition of roads, drainage, electricity, and water systems need fixing .Lack of planning at work sites, and need of making sure workers are safe and healthy. Don't have enough money to do all these things, and lack of money collection from leasing land and buildings. There is need of creative and come up with new ideas for industries.

Lastly, different parts of the government need to work together better, and should have a clear plan for our future development. Most need is to understand how our industries affect our country's economy and job opportunities. And most importantly, take action to make things better growth of industrial sector considering sustainable development.

6. Finding and Discussion

Finding From Quantitative Analysis (Regression Analysis)
From the quantitative analysis we find that the there is a positive relation between the location of industrial area and the community. We prove it from the hypothesis testing by using regression analysis that the location of the industrial area does affect the local community.

Finding From the Qualitative analysis (Narrative analysis)
In this analysis data are analyzed with the help of interpretation from the data that are collected from KII, Self-Observation and secondary data. And from the data analysis we find that the location of industrial area affects the local community in positive as well as in negative way. So with the verification of data by triangulation method it was found that the location of industrial area is directly or indirectly related to the settlement.

Discussion from the narrative analysis Building strong ties with the neighborhood is essential for the country's economic development. However, inadequate facilities and an insufficient framework for implementing policies make this difficult. Even though there are some favorable economic effects, they are still few and uncoordinated. Pollution is a problem in areas like the Bajaj area, not just because of industrial activity but also because of unpaved roads and ring road dust. Unfortunately, it seems that there isn't enough money in the budget to support both the local economy and the industrial sector, which makes the problem worse. It is vital to address these problems for the general welfare and prosperity of the country since outdated infrastructure structures and the fees that a lot of traffic on the infrastructure takes on the infrastructure increase these difficulties.

7. The Ideal Location for Industrial Zone In Urbanizing Area

The selection ideal location for an industrial zone for urbanizing area in context of Nepal involves careful consideration of various factors to ensure the success of industrial area, sustainability, and minimal negative impacts on the environment and surrounding communities. Following the research, we learned that, in the context of Nepal, the best location for an industrial zone in an urbanizing area should have six distinct location attributes. The location attributes they are identified are as follows.

Land Use Regulation and Legal Compliance This location attributes includes land availability, cost of land, enough land for expansion, land zoning, and land use regulations. Social harmony and the systematic development of communities are important considerations, and there should be special laws and regulations that protect the both urban area and industrial sector. Enough space on site for the industrial expansion as well as open space for local community should be considered in land use regulation. The requirement for expansion in industrial regions with a vision that sufficient space must be considered when selecting a new industrial area. In terms of legislation, it's important to consider the development of industrial clusters that promote collaboration, resource sharing, and innovation with low negative impact on urbanizing place. Proximity to different urban areas can enhance supply chain integration and promote overall industry growth. The government should establish beneficial programs that support research and development, encourage investment, and make it simple for businesses to operate. Better laws and regulations that benefit the impacted areas as well as a variety of services should be included in these policies. Political stability and business-friendly governing structures to attract more enterprises to the area and encourage their growth and finally laws that provide cash incentives, tax rebates, and

other services should be considered for affected community and industries.

Energy and Resources Infrastructure, raw materials, electricity, water systems, transportation systems, and other major facilities are all included under this heading. An efficient road network is necessary for the transfer of resources, goods and connectivity with different cities. The most important and necessary infrastructure is the transportation system that links the industrial site to suppliers, consumers, and distribution centers.Availability of reliable and efficient infrastructure, including buildings, warehouse, road network, electric power, and water treatment plant, sanitation, and communication facilities is major need for industrial operation in smooth way. Modern technology and digital infrastructure with enough research and development is the need in industrial area. Businesses will be attracted and their operations will be made easier by good infrastructure. Along with that good facility for urbanizing area for overall development of that area.

Investment and Workforce Synergy For a trained workforce that meets industrial expectations, collaboration between educational institutions and industries is necessary. Technical colleges and vocational training facilities is key to the growth of the industrial sector. Access to a highly skilled and qualified labor force by providing educational resources, guidance, and training programs. The attraction of the location for both employees and employers can be improved by providing benefits like low-cost housing, healthcare, and educational facilities for industrial workers. Industrial locations with a strong economy, a large market, trained labor, attractive rules, tax benefits, and excellent facilities are more desirable to investors. These elements lower risk and raise the potential of an investment's return. And finally, if the workforce is qualified and readily available, the area can attract investors. With all of these resources, a healthy ecosystem for society can be established, enabling it to be well-managed and livable.

Proximity and Impact Most important factor for the industrial region is simple to reach by road networks. Investors are searching for highly desirable locations, which can be found by situating industrial areas close to important consumer markets, as well as raw material and vendor suppliers. Businesses must lower time and transportation expenses to remain competitive with the capacity to react more quickly to adjust to supply and demand. The location within or close to urban areas with a high concentration of consumers is favorable. Environmental effect is also an essential aspect, thus industries must use environmentally friendly practices that reduce environmental harm. This means following the rules about the environment, finding ways to handle waste better, and using clean energy like solar, electricity and other alternative. It's important to obey environmental laws and have good plans to prevent pollution and manage waste. Sustainability plans and using renewable energy sources like the sun, hydro-power and wind energy are important. As a direct result of this kind of strategy, which also encourages improved community relations and decreases pollution.

Stakeholder Engagement and Security Protocols Listening to different level of stakeholder with their concerns and involving them in decisions helps make the urban area with industrial zone a better place and more acceptable to everyone. In order to create a balanced, safe environment for everyone, local public and politicians must take into account the local community environment. Strategies for infrastructure resilience and preparedness for emergencies to protect industrial investments from natural disasters and other unanticipated incidents. To keep the company, its workers and community safe and make sure everyone is protected, it's important to have rules and security measures in place. These measures help keep things like company property and people safe. It ultimately comes down to ensuring that everyone is safe in the sense that the community is protected from industry, industry is safe from society, and so on, and so on, from a variety of unknown risk factors.

Market Dynamics and Profitability Determining the location and needs of your target market is essential. Knowing this the need of that area talks about the demand. Supply is all about having everything you need to operate an industrial zone effectively and meet market demands. Making a profit is the primary objective since it indicates how financially successful your industrial zone is. To pick the best place for your business it's important to conduct a thorough feasibility study and market analysis to make decisions when selecting the ideal location for an industrial area in an urbanizing area.

8. Conclusion and Recommendation

Conclusion In conclusion, from the case area study of Balaju Industrial Area we find the appropriate location of industrial area plays a key role to make community livable as well as the success of industrial area. Location attributes plays major concern for industrial growth and development of that area. By focusing on accessibility, infrastructure, proximity to suppliers and markets, workforce development, environmental sustainability, safety, zoning, and incentives should be for industries zones as well as for the affected communities. Careful planning and collaboration with stakeholders is must need for the full potential of this industrial area, fostering economic growth and job creation in the region while ensuring sustainability and prosperity for sustainable growth. In the end, this comprehensive plan contributes to the creation of a living community by encouraging economic growth and sustainable development, which guarantees the continued prosperity and sustainability of both urban and industrial areas.

Recommendation Depending on specific industry, geographical location, and economic conditions, location factors for industrial development can change. A few similar elements that are important for industrial development from analysis and study's shows that important locations attributes for industrial growth. Industrial area has positive relation with local community that is very important for economic growth of the nation. Water treatment plant location is critical for new industrial sites. Political parties and labor unions should not exist in new industrial locations. A framework for implementing policies and enough infrastructure should be in place in the new industrial region. The location of the new industrial area should be far enough from residential areas. Good facilities and incentives for impacted individuals should be given. Sufficient

green space should be located close to industrial areas in order to support sustainable growth and the maintenance of the pollution balance. New industrial area developments should prioritize having a suitable demand and, more crucially, low production costs in order to maximize profits. Promoting gender equality is essential.There should be good policies regarding the labor rights and wages. It is advised for micro management of industrial districts like Road, Drainage, Culvert, Electricity, Water supply, Water filtration services and finally to suggested on proper maintenance of existing infrastructure of Industrial District Management.

As a result, if a region in Nepal plans to establish a new industrial area, the ideal location for an industrial zone in context of Nepal can be take in consideration from above section and other features are in recommendations mentioned above are suggestions for the study and, if possible, for implementation in the best way possible.

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medium-scale enterprises after 2015 Nepal earthquake and impact on resilience building", Elsevier BV, 2018
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Final Term Thesis Defeence Presentation

Investigating Location Attributes For Industrial Area Development: A case area of Balaju Industrial Area.

Submitted To:
THE DEPARTMENT OF ARCHITECTURE

Submitted By:
Ashish Simkhada
(078musrp003)

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I would like to express my sincere gratitude to all who have offered their help in my this research. I am very much thankful to my thesis supervisor Assoc. Prof. Dr. Sanjay Uprety for his valuable time and ideas that have been very helpful to shape this research.

Also, my sincere gratitude to the teachers of the department for their kind support, assistant, and advice whenever needed.

2

Background

Industrialization:

➢ **Transforming the economy from a agriculture to a manufacturing**
➢ **Industrial Revolution** from Britain in the **18th century**
➢ Technological advancements
➢ **Urbanization**: growth of cities
➢ Economic growth: **production and trade.**
➢ **Infrastructure development**: transportation and communication networks
➢ Industrialization **reshapes economies and societies**

Industrialization In Nepal:
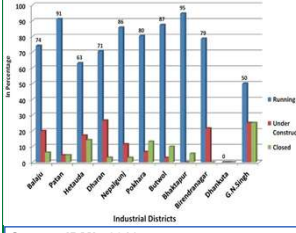
➢ "**The Industrial Council**" **established in 1993 B.S.** For industrial development.
➢ **Rana Regime** (Industrial development Relatively **late**)
➢ **Cigarette and Match factories** were among the **first enterprises**
➢ **Establishment of the industrial zone** has been started by **Balaju Industrial District at Balaju, Kathmandu in 2016 B.S.**
➢ Industrial Development Management Limited (**IDML**) was constituted by the **Government of Nepal in 2045 B.S.**

3

Background

Industrialization In Nepal

Source: IDML, 2018.

➢ **Ministry of Industry (MoI)** identified land plots **in all provinces** for the **construction of industrial estates**.

Location for Industrial Estates	Province
Damak of Jhapa	Province 1
Murtia of Sarlahi	Province 2
Mayurdhap of Makawanpur	Province 3
Chyalingtar of Gorkha	Province 4
Naubasta of Banke	Province 5
Surkhet	Province 6
Daiji of Kanchanpur	Province 7

4

Problem Statement

➢ Industrial Location Issues : Conflict Between Industrial Zones and Local Communities

➢ Poor Industrial Development and Management

➢ Unsuitable Zoning Laws and Regulation, and

➢ Industrial Activity and its Effects

5

Need and Importance of research

➢ Guidelines for

✓ Policy maker
✓ Urban Planner and
✓ Industry Stakeholders

➢ Zoning Laws and Regulations
➢ Industrial Activities and its impacts
➢ Industrial Location problem and prospects

6

1

Research Question:

➢ What is the relationship between the industrial area and the surrounding community?

➢ What should be the location attributes for Industrial Development in urbanizing area?

7

Research Hypothesis:

➢ Null Hypothesis: The current location of industrial zone doesn't affect the local community.

➢ Alternative Hypothesis: The current location affects the local community.

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## Research Paradigm

Research Paradigm

➢ **Pragmatist research philosophy**, acknowledging the value of **both quantitative and qualitative approaches**.

➢ **Ontological Claim**: Industrial areas **set up** without **anticipation** for development **harm urban life & environment.**

➢ **Epistemologically**, needs **a review of the literature, a field study of the past events**, and **qualitative and qualitative approach** to obtain **a valid source of knowledge.**
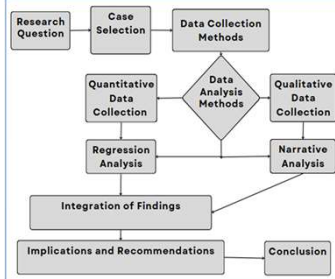
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Limitations

➢ **Sample Size and Selection: Large population in case area** affects findings generalizability and broader conclusions

➢ **Low Response Rate**: low interest in interview and **unable to conduct effective Focused Group Discussion.**

➢ **Resource Constraints:** Lack of access to certain resources, such as **specialized expertise, and older records** and data that impact the scope of the research

➢ **Response Bias**: Potential **untruthful or socially desirable responses** from some survey participants.

➢ **Time Constraint**: Limits data collection and study comprehensiveness.

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Literature Review

➢ Industrial Revolution
➢ Industrialization
➢ Types of Industries (Primary, Secondary, Tertiary and Quaternary Industry)
➢ History of Industries in Nepal
➢ Industrial Policies and Acts in Nepal
➢ Periodic Plan and Industrial Development
➢ Location Attributes for Industrial Development
➢ Theory for Industrial Area Development
➢ Agglomeration Theory
➢ Growth Pole Theory
➢ Gravity Model Theory
➢ Weber's theory of industrial location
➢ Case Area Study

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Industrial Situation In Nepal

S. N.	Industrial Estates	Estd. Year	Financial Assistance	Location	Employment	Land Area (in ha.)	No. of Industries		
							Total	Running	Closed
1	Balaju	1960	USA	Kathmandu	4200	34.09	141	125	5
2	Patan	1963	India	Lalitpur	2000	14.91	118	113	2
3	Hetauda	1963	USA	Makwanpur	4100	158.73	134	102	4
4	Dharan	1972	India	Sunsari	797	10	35	29	3
5	Nepalgunj	1973	India	Banke	991	11.65	35	33	2
6	Pokhara	1974	Nepal	Kaski	3000	25.5	89	81	3
7	Butwal	1976	Nepal	Rupandehi	1859	22.09	72	65	3
8	Bhaktapur	1979	Germany	Bhaktapur	800	3.63	37	36	1
9	Dhankuta	1980	Nepal	Dhankuta	NA	3.26	NA	NA	NA
10	Birendranagar	1981	Netherlands	Surkhet	300	4.58	28	22	2
11	Gajendranarayan	1986	India	Saptari	40	14.96	11	5	4
	Total				18087	303.40	700	611	29

Source: IDML, 2018.

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2

Industrial Situation In Nepal

Source: IDML, 2023

- According to Decision from Council of Ministers of **The Government of Nepal 2072 B.S.**
- **Currently Under Study and Planning**: Detailed Project Reports (DPRs) and **Comprehensive Master Plans**.
- **Daiji Chhela**
- **Naubasta**
- **Mayurdhap and**
- **Motipur**

Daiji Chhela

Naubasta

Mayurdhap

Motipur

PROPOSED SITE PLAN

Industrial Situation In Nepal

- As per **government decision**, the places to **establish the industrial village according to Government spokesperson** and **Minister for Communications and Information Technology, Rekha Sharma** announced on **Feb 18, 2023** are:

Location for Industrial Village	Province
Mandandeupur-6	Bagmati Province
Bethanchowk-2	Bagmati Province
Likhu-4	Koshi Province
Raghuganga-2	Gandaki Province
Tatopani-4	Bagmati Province
Ribdikot-3	Lumbini Province
Ruruchhetra-4	Lumbini Province
Apihimal-4	Sudurpashchim Province

Industrial Policies and Acts in Nepal

S.N.	Policies	Main Features
1	Industrial Policy 1960	➤ **Boosting Remote Industry Growth**: Enhanced Facilities and Reduce customs duty.
2	Industrial Policy 1974	➤ Empowering Small Industries: Strategic Growth, and Government Enterprises
3	Industrial Policy 1981	➤ **Attract foreign investments** and Special attention for **export promotion zone** (EPZ).
4	Industrial Policy 1987	➤ Encouraging private sectors and **Promoting industrial development**.
5	Industrial Policy 1992	➤ Classification of industries in Nepal and Special attention for development of cottage & small scale industries. ➤ Privatization of the public enterprises and Promoting competitiveness among the private industries for reducing the production cost and Developing industrial zones.
6	Industrial Policy 2010	➤ new technology and **Focused on joint efforts of public, private and cooperative sectors.** ➤ **Prioritized export** potential products **by using local resources**. ➤ Enhancing enforcement capacity of the government. ➤ Promotion of good governance and Development of agriculture and forest sector. ➤ **Increase employment generation** and boost per capita income and Promote Special Economic Zones (SEZs). ➤ 'One-widow Policy for industries and No work, no pay.

Periodic Plan And Industrial Development

- 5 year Periodic Plan (B.S. 2049-2054):

Industrial Policy, 2049 Industrial Business Act 2049 and Privatization Act 2050 are made which helped to promote this sector even more.

- 5 year Periodic Plan (B.S. 2054-2059):

Promoted industries sector with many provisions.

- **5 year Periodic Plan (B.S. 2059-2064):**

Industrial sector faced challenges due to political instability and conflict.

- 3 year Periodic Plan (B.S. 2064-2067):

New Industrial Policy, 2067 was made and issued.

- **3 year Periodic Plan (B.S. 2067-2070):**

Promoted industries sector with many provisions.

- **3 year Periodic Plan (B.S. 2070-2073):**

Foreign Investment Policy 2071 is made and implemented.

- 3 year Periodic Plan (B.S. 2073-2076):

Planned to increase contribution of industry sector to GDP.

- **5 year Periodic Plan (B.S. 2076-2081):**

Many provisions to promote this sector with **strategies to increase contribution to national economy.**

Agglomeration Theory

- **Overview:** Agglomeration Theory explains **why businesses cluster in specific locations**.
- **Key Factors:** Economies of scale, **knowledge sharing, and resource accessibility drive clustering.**
- **Significance:** Understanding agglomeration **guides for planning and policy-making** for economic growth and innovation

---

Growth Pole Theory

Growth Pole Theory

- **Overview:** Growth Pole Theory focuses on strategic development in **specific areas to drive regional economic growth**.
- **Concept:** Certain "**growth poles" act as catalysts**, stimulating economic activities and investments around them.
- **Importance:** Understanding this theory helps direct resources for **balanced regional development and maximizes economic impact**.

3

Gravity Model Theory

- **Overview:** Gravity Model predicts **interactions between urban areas** based on size and distance.
- **greater the populations, greater the interaction.**
- **Key Factors: Population size and distance influence movement**, trade, and interactions.
- **Importance:** concept used to **optimize transportation, infrastructure, and resource allocation between cities**.
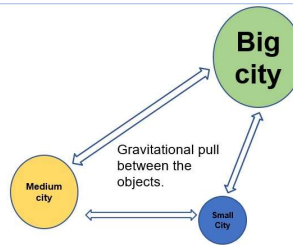

Gravitational pull between the objects.

Fig: Illustration of the Gravity Model

19

Weber's Theory of Industrial Location

- **Overview:** Weber's theory aims to **minimize costs in industrial location** decisions.
- **Focuses on Factors:**
- ✓ **Agglomeration :** Proximity to markets and suppliers affects costs.,
- ✓ **Labor:** Availability and wage rates influence location choices,
- ✓ **transportation and raw material costs:** Distance to raw materials impacts production expenses.
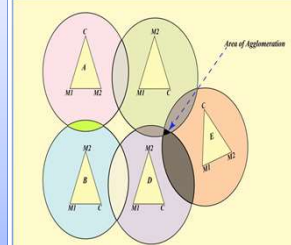
Alfred Weber: Industrial Location Theory

20

Weber's Theory of Industrial Location

- **For Industrial Location :**

- Best is that locations that **reduce overall costs.**

- **Importance:** Weber's theory aids in **rational decision-making** for businesses, industrial and urban planning

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Literature Review

❑ **Major location attributes are:**

- **Access to Raw Materials**
- **Infrastructure and Facilities**
- **Energy Availability**
- **Transportation Infrastructure**
- **Skilled Workforce**
- **Market Access**
- **Supportive Business Environment**
- **Environmental Considerations**

Locational factors for industries
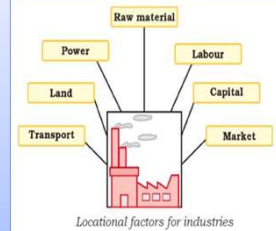
Source: Industrial location and public infrastructure. Journal of International Economics

22

Case Area

Balaju Industrial District (BID)
- Established in 1960 A.D.
- US support
- All Infrastructure in one place
- Area: 670 Ropanis
- Total: 131 industries

Case Area Problem
- No buffer Zone
- Inside A city
- Conflict between local community and industrialist
- Pollution
- Accidents/ Damages
- Management Problem

Case Area: Time Series Analysis Mapping

| Year 1960 A.D. | Year 2022 A.D. |

24

4

Slide 25

Case Area: Time Series Analysis Mapping

1985 A.D. | 2003 A.D. | 2008 A.D.
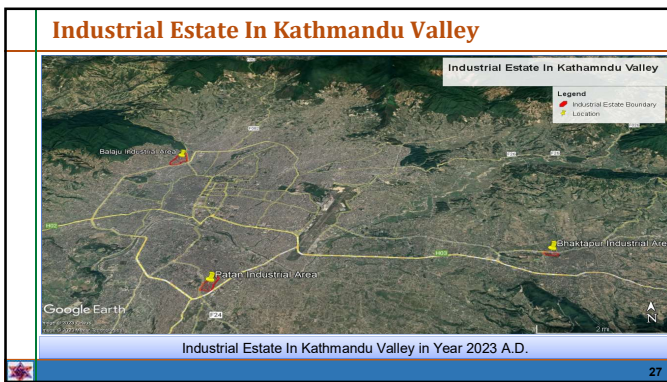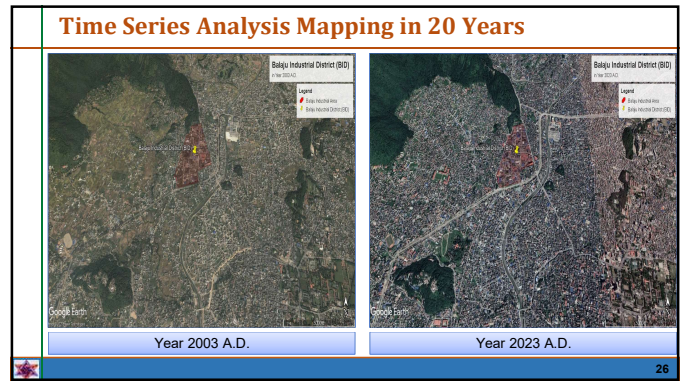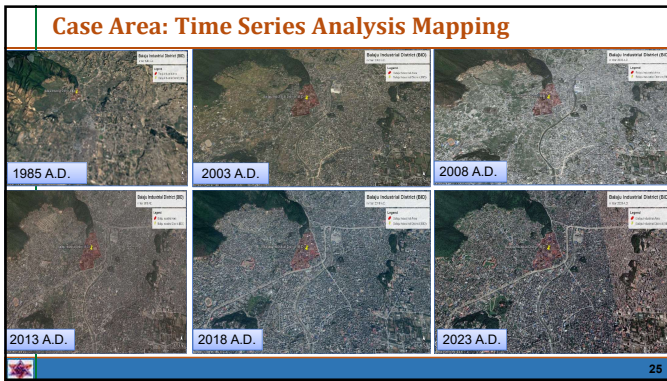2013 A.D. | 2018 A.D. | 2023 A.D.

25

Slide 26

Time Series Analysis Mapping in 20 Years

| Year 2003 A.D. | Year 2023 A.D. |

26

Slide 27

Industrial Estate In Kathmandu Valley

Industrial Estate In Kathmandu Valley in Year 2023 A.D.

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Slide 28

Methods and Techniques for Data Analysis

- **Questioner Survey** with **Rating Scale** was prepared.
- Data collection were **from community and industrialist** with the questioner survey in **Google form**.
- Data were **transferred** to **Excel** and then to **IBM SPSS** from the google form.
- As the data are in **Likert Scale**.
- **Two groups** of data were separated which are:
- **Independent Variable (Overall Impact)**
- **Dependent Variable (satisfaction with the current location)**

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Slide 29

Data Analysis

- After the **Normality Test**
- **Regression assumption** were checked.
- We see that from the **Significance (p) value that is greater than 0.05**. So the data from the variables **are normally distributed**. Using 5% of significance

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Satisfaction_Current_Location	.166	41	.006	.971	41	.384
Overall_Impact	.081	41	.200*	.986	41	.879

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Reliability Statistics

Cronbach's Alpha	N of Items
.563	2

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.171	1	2.171	8.117	.007[b]
	Residual	10.430	39	.267		
	Total	12.601	40			

a. Dependent Variable: Satisfaction_Current_Location

b. Predictors: (Constant), Overall_Impact

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Slide 30

Finding And Analysis

- From Reliability Test Result .563 for data obtained.
- Since the data are 56.30% reliable, linear regression can be conducted
- The **ANOVA (or F-statistic)** measures the **overall significance** of the model and **model fit for the test.**
- The **result confirms that the overall regression model is significant for the data**, and this was captured by the **ANOVA (F-statistic) value of 8.177** and its associated probability value of 0.007 (F = 8.177, p<0.05), which was **found to be significant at 5% level. And the regression model is fit for the test.**

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Finding And Analysis

From the graph,

- $Y = \beta_0 + \beta_1 X$, where **Y** is the **dependent variable**, **X** is the **independent variable**, β_0 is the intercept, and β_1 **is the slope coefficient**.
- **Here, $\beta_1 = 0.58$ (Impact is Positive)**
- From linear regression Analysis, we can **reject the null hypothesis and accept the alternative hypothesis.**
- **Hence, the current location affects the local community and there is a relation between the local community and the current industrial area.**

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Findings and Analysis

➢ From the **Qualitative Analysis (Narrative Analysis)** following methods are used and data are generated:

- Key Informant Survey

- Self Observation and

- Secondary Data Collection.

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Findings and Analysis

S.N	Name of Stakeholder and Postion.	Findings (Positive/Negative Impact)	Result and Analysis
1.	**Mr. Himal Bhandari** (**Senior Officer** at the Balaju Industrial District Management Limited.)	• Industrial areas and local communities are **directly related to each other** • **Buffer zone and limited budgets** are major problems.	• positive relation with local community • **Economic growth** of the nation.
2.	**Mr. Bhusan Kumar Upadhaya** (Assistant director, and **information officer** at the Balaju Industrial District Management Limited.)	• **Where development occurs, destruction also occurs** (equal positive and negative impact), so we **have to consider negative impact**.	• **politics and unions inside the industrial are the major problems**.

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Findings and Analysis

S.N	Name of Stakeholder and Postion.	Findings (Positive/Negative Impact)	Result and Analysis
3.	Late Mr. Mukunda Rijal **Ward chairperson** of ward no 16 of Kathmandu Metropolitan City (KMC)	• Highly related to the local community with a **completely negative impact to society**. • **Lots of problems** • He **doesn't consider BID as the industrial area** • **gas storage with great psychological impact** to the local community. • **Balaju as most polluted area in Kathmandu** because of BID.	• Industrial area is **highly negatively affect and creates many problems** to the local community. • Industrial area **should be far from the local community**.
4.	**Er. Shushil Timilsina** (**Technical officer** at the Balaju Industrial District Management Limited)	• Problems with **policy implementation** • **Smooth relation** between the industrial area and local community **if managed properly**.	• **Poor infrastructure and policies implementation system inside as well as with in urban area as a problem**.

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Findings and Analysis

S.N	Name of Stakeholder and Postion.	Findings (Positive/Negative Impact)	Result and Analysis
5.	**Mr. Jibnath Giri** (**Ex-Chairperson** of Tole Sudhar Sumati)	• Industrial areas cause **great harm to the local community directly and indirectly**. • Most of the **air pollution, smell problems, and other environmental pollution**. • Positive impact with the **increase of sales and house rent.**	• **Prioritize distance from local residences**. Ensure **excellent on-site facilities** for worker comfort and convenience are in need . • Enough **greener space and sustainable development practice**
6.	**Mr. Pramod Ghimire** (**Owner** of shree plastic Udhyod pvt. Ltd.)	• **More positive impacts** and less negative impacts to society. • **Work culture and labor unions with politics are major problems** in the industrial areas.	• **Emphasize low production costs to achieve higher profits**

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Findings and Analysis

S.N	Sector Observation	Findings (Positive/Negative Impact)	Result and analysis
1.	Economic Observation	• More **positive impact to the society** with **Job opportunities. Agglomeration** of **different business along Balaju Chowk.**	• **Positive Impact in economic activities** can be observed but it is limited and unmanaged. • **Industrial area has positive relation with local community**
2.	Environmental Observation	• Air pollution, Traffic Congestion and noise pollution, unmanaged solid waste disposal and smell problem are observed.	• Bajaj area **seems much polluted** but it's not only because of industrial area but as well because **of unpitched road and dust from ring road.** • **Local community are affected by the pollution**.

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Findings and Analysis

S.N	Sector Observation	Findings (Positive/Negative Impact)	Result and analysis
3.	Social Observation	• open space, water facility in pipeline, facility of fire brigade, opening of small's shops targeting labor, house rent.	• Positive relation with local community.
4.	Infrastructure Observation	• Unmanaged foot paths , no buffer zones and lack of greenery in the community. • Inside industrial zones: Well-managed infrastructure • Outside industrial zones: Poorly managed infrastructure	• Seems that there is no budget for local community and the budget for industrial area is also not sufficient. • Outdated structure • Impact of Heavy Traffic on Infrastructure.

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Findings and Analysis

S.N	Sector Observation	Findings (Positive/Negative Impact)	Result and analysis
5.	Local community Interaction	• Few local community people left their home because of air pollution causing health problem.	• Mixed view about the industrial area from the industrialist point of view as some are happy because of business where as some are dissatisfied because of pollution.
6.	Industrial Activities and Work Environment observation	• Unhygienic and mismanaged activities are observed in many industries and most of industries don't allow visitors to enter inside. • Unmanaged disposal of solid waste and untreated waste water discharge is observed.	• Seems that policies are not implemented properly by many industries only big industries like Coca-Cola, Hyundai etc. followed policies properly.

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Findings and Analysis

S.N	Secondary Data	Findings (Positive/Negative Impact)	Result and Analysis
1.	From Articles	• Labor Act Compliance: Inadequate implementation in industries. • Gender Inequality: Women face job dissatisfaction, limited alternatives. • Part-time Employment: Uncertain job security, lack of alternatives.	• Gender Equality: Equal opportunities for all. • Labor Rights & Wages: good policies in need.
2.	Industrial Development Perspective Plan	• Infrastructure Deficiency: Roads, drainage, electricity, water supply, filtration. • Lack of Planning: Absence of systematic site arrangements, occupational health oversight. • Budget Constraints: Insufficient funds, low revenue from land and building leases.	• Revenue Sources: Explore new income streams for operations. • Management: Prioritize careful infrastructure management. • Maintenance Need: Ensure proper upkeep of existing facilities. • Decentralization: Distribute authority for improved control.

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Findings and Analysis

S.N	Secondary Data	Findings (Positive/Negative Impact)	Result and Analysis
3.	Central Bureau of Statics (CBS)	• Innovation Gap: Lack of active planning and research for industrial innovation. • Interagency Coordination: Improve collaboration among government ministries and departments	• Special Schemes: Enhance industry competitiveness. • Global Innovation: International collaboration for tech and innovation. • Transparent Governance: Inclusive BOD selection for effective decisions.
4.	Periodic Plan	• Strategic Vision: Future strategies and goals for development. • Growth Impact: Contribution to GDP, employment generation. • Policy Actions: For growth, investment, and challenges	• Professional Manpower: Essential for IDM efficiency. • Infrastructure Focus: Industrial zones, parks, clusters to attract activities. • Sustainability Emphasis: Address environmental impact, energy use, waste management.

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THE IDEAL LOCATION FOR INDUSTRIAL AREA IN THE URBANAIZING AREA

1. **Land Use Regulation and Legal Compliance,**
2. **Energy and Resources,**
3. **Investment and Workforce Synergy,**
4. **Proximity and Impact,**
5. **Stakeholder Engagement and Security Protocols and**
6. **Market Dynamics and Profitability.**

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1. Land Use Regulation and Legal Compliance

Location attributes includes
➢ Land availability,
➢ Cost of land,
➢ Enough land for expansion,
➢ Land zoning,
➢ Systematic community development,
➢ Cash incentives
➢ Tax rebates and other services
➢ Land use regulations.

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2. Energy and Resources

Location attributes includes

- Transportation Network
- Comprehensive Infrastructure: buildings, warehouses, electric power, water treatment plants, sanitation, and communication facilities.
- Modern technology and digital infrastructure,
- Renewable and non-renewable options for energy
- Utilizing local resources
- Responsible resource management

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3. Investment and Workforce Synergy

Location attributes includes

- Access to a **highly skilled and qualified workforce**
- Collaborative **Education-Industry Partnership**
- **Attractive facilities for investors**.
- **Healthy ecosystem for sustainable industrial development**

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4. Proximity and Impact

Location attributes includes

- **Time and transportation expenses**
- **Close to urban areas** with high consumer concentration
- Improved **market accessibility** for businesses
- Decrease pollution, **major environmental consideration** and
- Positive impact through **sustainability concept**.

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5. Stakeholder Engagement and Security Protocols

Location attributes includes

- Listen to **diverse stakeholders** : Address concerns and **involve them in decisions**
- Ensure a balanced, **safe urban-industrial zone**
- Preparedness for **emergencies and natural disasters**
- Ensure **safety for company, workers, and the community**
- Ensure the community is protected from industry
- Industry is safe from societal impacts
- **Mitigate various unknown risk factors**

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6. Market Dynamics and Profitability

Location attributes includes

- Determine **target market location** and needs
- Understand **demand for industrial products/services**
- **Financial success of the industrial zone**
- Market demands through **efficient supply chain**
- **Market analysis to inform decisions**

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Result

- Choosing **best location** for industrial growth in **Nepal is a complex process**.
- Emphasis on **infrastructure**, **natural and human resources**, **energy sources**, **resource accessibility**, and **government regulations** for industrial development
- **Clustering and supply chain** integration as **active accelerators** for **industrial expansion** and **resource sharing**
- **Environmental considerations, quality of life enhancements**, and **security provisions** are crucial **for sustainable and habitable** urban areas
- Achieving sustainable economic growth while maintaining **ecological balance for social harmony and long-term prosperity** is very important **for new industrial area**.

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Recommendations

➢ Adequate **infrastructure and policies**
➢ Critical **water treatment plant** location
➢ **Absence of political parties and labor unions** in new industrial locations
➢ New industrial areas should be sufficiently **distant from residential areas**
➢ Ensures **minimal impact on local communities**
➢ **Facilities and incentives for impacted individuals**
➢ Sufficient **green space for sustainable growth and pollution balance**
➢ Promoting **gender equality and ensuring good labor rights and wage policies** inside industrial area.

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Conclusion

"For best industrial development, a comprehensive and dynamic approach is required for long-term success in Nepal's urbanizing areas"

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THANK YOU

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