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Industrial Parks Risks Identification

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Abstract
Risk identification in projects was established and recognized in the early 1970s. Over the years, advanced frameworks, principles, and concepts have emerged and developed, providing a new locus for various risks and their evaluation and management. Such developments hold relevant significance in many contexts, for example, industrial parks (IPs) where the risk concentration is higher than in other projects. Identifying and applying the principles and appropriate methods for risk identification represent the foundation or baseline for effective mitigation. The purpose of such risk identification models is comprehensively investigated in this paper while focusing on industrial parks as a risk field. We have explored different risk evaluation models and strategies from secondary data sources and reflected on the fundamental ideas pertaining to risk mitigation. The paper offers a sound background on the subject, integrating theoretical perspectives from stakeholder's theory (ST) of risk management and diverse perspectives to inform risk management strategies in IPs.

Keywords:*risk identification, concepts, models, industrial parks, stakeholder's theory, risk evaluation*

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I. Introduction

Research Background

Risks constitute a critical and inevitable aspect of our everyday lives. Without a mechanism to mitigate risks, the odds of failure remain high. Thus, risks and threats can impede the successful implementation of critical activities in a given project or undertaking.Prokopenko and Grygor (2018) observe that risks may cause uncertainty while implementing different projects, increasing the probability of failure, unexpected costs, and inefficiencies. Against this background, the ongoing research provides a conceptual framework for risk evaluation analysis, exploring common types of risks associated with industrial parks and mechanisms to ensure their effective mitigation. Industrial parks refer to isolated zones where large industrial operations take place. According to Massard et al. (2018), an industrial park (IP) refer to "a large tract of land, subdivided, and developed for the use of several firms simultaneously, distinguished by its sharable infrastructure and proximity of firms (p. 80). Massard et al. (2018) note a new trend toward constructing industrial parks in many countries worldwide. Mainly, the increased growth and proliferation of such projects result from the rapid industrialization in many countries and emerging economies. IPs allow the isolation and centralizing of industrial activities in specific areas, representing defined zones, enabling governments to spur economic growth, boost production, create job opportunities, expand the tax base, and transform people's lives(Vidová, 2010). Markedly, many IPs are designed, constructed, and managed with little regard for the risks emanating from their development and use, including financial issues, resource efficiency problems, health and safety, and environmental risks.

Given the scale of industrial operations that occur in industrial parks, there is a high probability that such environments may attract unprecedented risks. Centralizing industrial processes in industrial parks increases risk concentration, with many risks occurring as a domino effect from various operations in such environments. For example, the risk may result from loss of containment, leading to unexpected accidents, escalating fire emergencies, and operational failures. The critical causes of many threats in IP environments include errors resulting from poor design, insufficient or poorly implemented procedures, lack of maintenance, human errors that translate into omission and commission actions, lack of supervision, equipment failure, and inadequate staff training. Risks may also occur due to the absence of corrective actions whenever unexpected causal situations occur (Folch-Calvo et al., 2020). However, the highlighted causal situations provide a panacea for the financial problems many industrial parks face due to unmitigated and uncontrolled risks.

The United Nations Industrial Development Organization (UNDO) has encouraged many countries to embark on economic restructuring. This process will provide a strategy to boost native development and stimulate industrial enterprise in their economies. Amid these calls, the UNDO demands a critical focus on managing risks concomitant with such projects, from financial, business, safety, and sustainability risks emanating from various industrial operations(Jote, 2020). A meaningful way to achieve such objectives is by developing partnerships and adopting IP models that allow collaboration between diverse stakeholders. The primary purpose of risk control and mitigation is to eliminate the collateral costs and reduce the intensity of the unintended consequences of unexpected industrial hazards whenever they occur. The identified risks or threats imperil the lives of those who work in such environments and place organizations in trouble, causing uncertainties and increasing the odds of failure. In this view, the research comprehensively analyzes existing literature to uncover underlying risks and approaches toward effective control and management in industrial parks.

Significance of the Research

Investigating causal situations and risks associated with industrial parks holds relevant significance for the effective design, development, and management of modern IPs in emerging economies in the face of rapid industrialization trends. The research identifies the variant risks and provides a framework for conceptualizing and controlling these risks to maximize the anticipated gains from upcoming and existing industrial parks. Kechichian and Jeong (2016) argue that mainstreaming risks in IP environments can provide the groundwork to promote efficiency in the development and utilization of such spaces, increase productivity, foster growth, enhance safety, and support strategic and sustainable conglomeration of industrial activities As mentioned earlier, industrial parks provide centralized areas or zones where different activities, including manufacturing, logistics, information exchange, and infrastructure services exist. Providing such activities in a centralized environment increases integration, producing significant payoffs by enhancing productivity and offering competitive advantages (Folch-Calvo et al., 2020). Given the potential benefits ofproperly designed and operated industrial parks, this researcher will investigate the risk landscape and provide a framework for evaluating these risks to ensure the effective utilization of IPs in emerging economies. Therefore, the research will provide a basis for understanding the different risks associated with industrial parks' design, development, and management. However, the scope of this study allows the researcher to cover multifarious risks, from physical threats to operational, business, financial, management, and project-related risks. Given the broad scope, the research will provide a theoretical baselinefor developers, economic policy teams, and governments to develop strategies and interventions for effective risk mitigation and control to maximize the economic gains from such investmentsinindustrial enterprise development.

Problem Statement

The current research explores the challenge of uncontrolled risks from various activities in industrial parks' planning, construction, and management. Industrial parks face different risks, which may vary in magnitude depending on the strategies or mechanisms formulated fortheir mitigation. Such risks reduce the payoffs from such projects by impeding the anticipated growth in long-range sectors, for example, industrial manufacturing and logistics(Kuznetsova et al., 2017). Despite the potential to enhance territorial production, boost industrial development, and provide competitive advantages, uncontrolled risks occurring in IP can affect the dynamics of innovation and other industrial operations, reducing the gains from such investments. The background highlights the salient risks associated with developing, utilizing, or managing industrial parks in different countries. Therefore, conceptualizing these risks from a theoretical and empirical perspective will provide a good starting point for their effective control and mitigation.

Research Aims and Objective

The research seeks to identify various risk categories emanating from industrial park projects and industrial activities that occur in such environments. Principally, the studywill take an evaluative approach to understand different risks and causal situations and develop insights on possible mechanisms for effective risk management, control, and mitigation. The objectives of this study include the following:

- To develop a conceptual framework for evaluating industrial risks.
- To understand the concept of industrial risks.
- To analyze the paradigm of risk management.
- To identify and categorize variant risks present in industrial parks.
- To determine the impact of various risks on industrial parks

Research Questions

The research investigated the following questions:

- What are industrial parks, and how do they differ from residential and agricultural zones?
- What are the commonly encountered risks in industrial parks?
- How do industrial parks' risks affect operations and gains from such projects?
- How can we evaluate variant risks residents in industrial parks planning, development, utilization, and management?
- How to evaluate the risks of industrial parks?

II. Literature Review

Concept of Industrial Park

In this research, the term "industrial park" describes a zone, environment, or secluded space where centralized industrial operations occur.This definition points to the specialized applications for such spaces and excludes the possibility of their use for commercial, agricultural, or residential purposes(Massard et al., 2018). Like business parks, an IP provides a secluded environment where industrial activities occur while exempting other non-industrial operations. Industrial parks comprise a community or group of firms that work through collaborative relationships to provide industrial enterprise and spur economic development(Bellantuono et al., 2017).These industrial parks exist in a centralized and isolated environment, mainly on the outskirts of large urban areas and away from residential environments (Song et al., 2018). The presence of efficient and interconnected transportation networks increases access and fosters collaborative relationships between various firms in the industrial park networks for the factories to work in a harmony.

Concept of Risk Management

Risks can exist in any environment. However, the ramifications of such events depend on the frameworks, strategies, and mechanisms adopted by organizations to manage risks. As a scientific field, the process of identifying and managing risks dates three to four decades ago. Organizations started to adopt modern principles, standard procedures, and practical models to ensure effective risk management(Aven, 2016). Under this field, risk management focuses on two main tasks; employing risk assessment frameworks and developing mechanisms to control, treat, or prevent risks associated with specific activities. Otheractivitiesinclude developing generic frameworks to conceptualize, understand, evaluate, measure, characterize, and report variant risks to ensure effective management and subsequent risk governance (Aven, 2016;Aven& Zio, 2014). Such generic frameworks provide a method for predicting risks and developing proactive strategies for effective mitigation and damage control. Therefore, their practical application can minimize financial losses and other liabilities whenever unexpected risks occur. According to Samimi (2020), risk management can save an organization's financial returns by reducing avoidable collateral costs from unexpected risk events and liabilities.Manifestly, effective risk management eliminates legal liabilities, reduces the likelihood of operational, management, and technical errors, and reduces the uncertainty in the design, development, and implementation of industrial park projects.

Types of Risks

The initial sections have highlighted the diverse risks that may arise in developing and managing industrial parks in different countries.Industrial parks are highly vulnerable to systemic risks, which describe the financial problems that occur at a specific node in the industrial network and spread to other firms within an industrial park(Haraguchi&Lall, 2015). Such risks may result in inundated and non-operational industrial parks, reducing their economic gains and other expected gains in a particular country. Thailand provides a classic example of a country where IPs such as SahaRattaNanakorn, Rojana, and the recent Hi-Tech Industrial Estate (HTIE) have stalled or become non-operational due to unmitigated financial risks(Haraguchi&Lall, 2015). In most cases, financial risks result from many problems, includinginsufficient access to financial resources and issues with exchange rates (Valaskova, Kliestik&Kovacova, 2018).Unexpected fluctuations in exchange rates and volatility in financial markets may increase the cost of establishing or running industrial operations, increasing the odds of failure. Furthermore, a decline in cash flows may also cause shortages or limit access to financial resources, impeding the development and routine operations in existing industrial parks. From a financial and operational perspective, managing such risks demands considerable work in developing and defining probabilistic metrics to ensure effective measurement, interpretation, and mitigation of various financial risks.

Like other projects, industrial parks may result in high levels of fixed asset risk, creating unprecedented problems in their management and ongoing industrial operations.Ordinarily, such developments harbor different physical assets, including high-tech infrastructure, facilities, and other industrial investments that increase a firm's risk propensity (Yang et al., 2019). Many such assets rely on amenities such as a constant electrical

supply. Insufficient supply of energy resources to areas where industrial parks are established may result in operational problems, and the worst-case scenario, halt operations due to downtime issues. (Al Rahahleh, Ishaq Bhatti &NajunaMisman, 2019). The number of properties established in an industrial park determines the level of physical assets risk and the degree of operating leverage(Sohn et al., 2013). This translates to grander risks for advanced industrial parks than the least developed ones.

Property damages may also present a significant risk, reducing the operational potential and leverage in existing industrial parks. Fire outbreaks and other accidental scenarios resulting from natural or human-related causes such as explosions, hurricanes,typhoons,andheat radiation may result in risk concentration in industrial park projects(Folch-Calvo et al., 2020). For example, the Umm Said and Phoenix Industrial Parks in Qatar have sustained significant property damages from natural and human-related incidents, which indicates the high property risks in IP projects (Chang & Lin, 2016). Similar threats have become increasingly prevalent in countries like the UK and China, where the Southwell and Taichung Industrial Parks have reported significant losses from natural events such as typhoons and human-related causes. Such risks point to underlying management issues, increasing the time to respond to unexpected hazards. Following such circumstances, the management of industrial parks has taken severe actions to control and prevent variant risks for sustainable development. The efforts by the firm's management have also focused on moderating occupational hazards that expose workers to health and safety threats in IP environments.

Impacts of Risks

Issues such as the lack of financial and land resources may slow the development and effective operation of industrial parks. Besides, the cost of building industrial parks and providing ongoing maintenance may considerably impact the operations and feasibility of such projects, given that some countries may lack the capacity to supply the required resources (Xiao, Dong, Yan, Yang &Xiong, 2018). Therefore, the management must develop suitable tools for predicting risk levels and managing the anticipated risks. For example, many industrial parks use the Equifax Credit Risks Insights (ECRI) to monitor financial risks based on intuitive scoring and analytics and develop meaningful insights on pragmatic actions to control identified risks(Canals-Cerdá& Kerr, 2015). Credit Risk Insight Servicing McDash (CRISM) and Insight Gateway includes other tools that industrial parks can utilize to manage financial risks.

Focusing on fixed asset risks, unforeseen events such as fire outbreaks or explosions in the IP site can result in unprecedented damages, leading to safety hazards, financial losses, and legal liabilities.The risk of depreciation inflows is relatively higher, increasing the cost of industrial park projects(Graboviy, 2019). The value of the properties, infrastructure, equipment, and other resources harbored in industrial parks declines over time, and the property risks increase accordingly. Therefore, the community of firms operating in such zones should consider suchissueswhile managing fixed assets to maintain their value over an extended period and keep their knowledge assets and innovations from intellectual property leakage or thefts.

Theoretical Frameworks

Stakeholders Theory of Risk Management

The stakeholder's theory (ST) provides multifarious lenses for evaluating the variant risks in IP projects and plausible mechanisms for their mitigation. According to ST, businesses or establishments involve complex interactions between multiple stakeholder groups. These interactions may escalate or minimize specific risks, hence the need to perform a solution analysis as the basis for decision-making to ensure effective risk management(Brower & Mahajan, 2013). An industrial park project involves diverse stakeholder categories, from governments, directors for various firms, employees, management, financiers, and labor organizations(Jones, Harrison &Felps, 2018). Therefore, managing the risks from cooperative processes between multiple stakeholders can enhance the outcomes, boost operational leverage, and increase the industrial enterprise development potential for industrial parks.

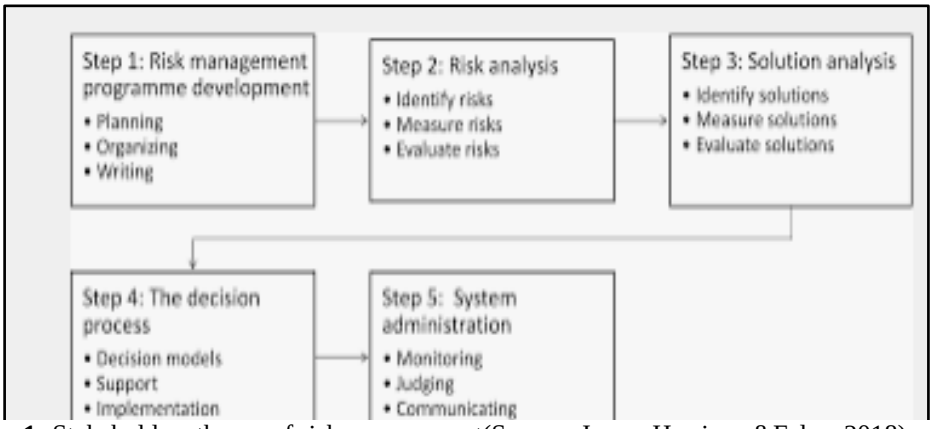

Figure 1: Stakeholders theory of risk management(Source: Jones, Harrison &Felps, 2018)

The ST framework specifies the stakeholders whose direct or indirect contributions can affect the operations, risk management efficiency, and sustainable development of industrial parks in different countries.These stakeholders design a work pattern and collaborative relationships that support effective risk mitigation. For example, the stakeholders adopt a communication structure that facilitates information flow between multiple nodes or touchpoints within the IP network. Secondly, the actors develop a platform where the management of different firms can consolidate and design an integrated risk mitigation framework to serve the needs of all organizations. The stakeholder theory highlights the value of technologies in risk governance, most notably in risk prediction and assessment,thedevelopment of integrated frameworks,andautomated risk processes(Bourne & Walker, 2015). Lastly, the management framework should reflect the specific risks, the number of firms, and the complexity of stakeholder relationships in the industrial park network.

Future Prospects of Risks in Industrial Parks

Current risk management models have provided successful hazard mitigation methods, promoting sustainable development in long-range sectors, such as industrial manufacturing. In the future, high-tech industrial parks can evade different risks by observing the stipulated protocols and frameworks to maximize the gains from capital-intensive projects. Undoubtedly, risks will continue to dominate the 21st-century industrial world, necessitating suitable frameworks and parameters for effective management and mitigation. In this regard, the planning, construction, and management of business organizations in industrial service areas should consider the multiple issues that can affect their operations, strategic objectives, and sustainability. The stakeholders should pay attention to potential risks specific to the location of industrial parks to keep unexpected events at a minimum and reduce management and operational uncertainties(Deser et al., 2020). However, failing to account for such issues while establishing industrial parks increased the odds of stalled or failed projects and limited gains that are not commensurate with the scale of investment.

ConceptualFramework

Figure 2.0: Conceptual framewor

III. Methodology

The research adopted two strategies for evaluating risk identification models applicable to industrial parks. The first strategy involved conducting semi-structured interviews to gather insights from business managers in selected industrial parks. As a method for qualitative inquiry, SSIs allowed the researcher to gather first-hand information on risk identification frameworks adopted by industrial parks for risk assessment. In the second phase, the researcher selected eight publications and performed a comprehensive review of these articles to obtain data on risk identification models adopted in IPs, their allocation and strategies for risk mitigation. The study maintained a positivist philosophy while evaluating risks resident in industrial park projects. The choice of positivism resulted from the need to apply a hypothetical-deductive lens while evaluating various risks or constructs and developing explanatory associations to answer the research questions(Park et al., 2020). Maintaining a positivist stance allowed the researcher to explore posterior or external knowledge to test hypotheses on the causal situations contributing to industrial parks' risks. The knowledge extracted from external or secondary sources offered a baseline for evaluating various risks and developing a framework to ensure effective mitigation for successful business development (Ryan, 2018). Therefore, positivism provides a process to build knowledge on the subject objectively and accurately.

A combination of descriptive research design and inductive approaches provided a robust, rigorous, and flexible strategy to gather insights on risk concentration in industrial parks and risk management frameworks applicable to such contexts. In the upshot, a descriptive design provides an opportunity to investigate a problem elaborately and comprehensively. Performing a detailed investigation of the risk landscape in industrial parks offers a point of departure in creating a holistic risk management framework for the specific context – industrial parks. Furthermore, the design provided an option to develop a knowledgeable description of variant risks and possible solutions to contain them in industrial parks (Siedlecki, 2020).Overall, a descriptive design offers more strengths than an exploratory design, hence valuable for this research.

Bibliographic Review

The evaluation of risk assessment frameworks focused on eight peer-reviewed studies on PPP projects. In 2015, Carbonara et al. undertook a comprehensive study to investigate risk management frameworks applicable to motorway PPP projects based on a Delphi survey. In 2020, Folch-Calvo et al. compared and characterized different risk identification models employed in industrial park environments. In 2017, Kuznetsova et al. proposed a risk evaluation framework based on input and output variables that provides suitable measures for operability or inoperability.In 2019, Chen et al. studied the significance of risk frameworks that respond to safety and security risks ubiquitous to industrial park environments. A different study by Wu et al. (2017) examined the role of symbiotic networks in averting occupational hazards that emanate from industrial processes in industrial parks. In 2019, Han et al. embarked on a study that investigated environmental risks and highlighted the need for environmental risk identification and subsequent mitigation. In 2020, Valenzuela-Venegas et al. performed a study on multi-objective optimization through sustainable processes, resiliency, and greener industrial parks. The study aimed at developing a new model for evaluating sustainability risks and recommending strategies to achieve sustainable development in industrial parks. Finally, in 2019, Aravossis et al. (2019) investigated a new comprehensive framework for holistic risk analysis and effective mitigation in industrial park environments.

Risk Selection

The research took an inductive approach to towards risk selection. The process focused on identifying specific patterns of variant risks in industrial parks. Inductive approaches presented a flexible method for selecting and characterizing risks based on observable patterns from an empirical study or secondary data sources. The researcher opted for induction as a strategy to drive a comprehensive analysis of multiple risks and management solutions in the IP context. The researcher compared different categories various risks identified from the literature review including, financial risks, fixed asset risks, property damage, and occupational hazards against the risk matrix specified for industrial park projects. As a result, 11 risk categories were identified, including operational, financial, construction, natural, project selection, design, legal, political, social, relationship, and macroeconomic risks. The research approach offered a rigorous method for developing generalizations based on a literature analysis and diverse perspectives from SSIs and secondary analysis of the research problem (Woiceshyn&Daellenbach, 2018). Moreover, the inductive approach allowed the researcher to identify explanatory associations of all risks contributing to causal situations and develop a framework for effective management.

Interview

The study employed semi-structured interviews (SSIs) as the primary method of qualitative inquiry. The target interviewees included business managers with prior experience building and managing establishments in one of the selected industrial parks. A key benefit of qualitative interviews is that they allow the researcher to gather first-hand insights and perspectives from the respondents on various risks and approaches toward their management. Further, semi-structured interviews provide a way to perform an in-depth reconnaissance or extended probing into a research problem. However, collecting data through SSIs demands interviewer sophistication and extensive knowledge about substantive issues in the research(Newcomer et al., 2015). The interviews provided a basis for understanding risk management strategies applicable to industrial parks to achieve business improvements(Murto et al., 2020). Focusing primarily on the insights obtained through semi-structured interviews, the research explored the strategies employed by various firms in managing variant risks in industrial parks.

Data Analysis

Besides using SSIs, the study relied on qualitative data obtained from secondary data sources through thematic analysis (TA). The thematic analysis explored observable themes from secondary sources based on the participant's opinions and perspectives on the subject. Simple random non-probabilistic sampling provided a valuable method for selecting various secondary data analysis sources. Unlike primary data collection, analyzing evidence from archival records, including primary studies, company reports, and newsletters,provides cost and timesaving benefits, allowing the researcher to complete the study within a short timeframe. (Cheng & Phillips, 2014; Cole & Trinh, 2017).Significantly, the analysis of archival data can increase research efficiency, mainly by promoting access to research ideas based on existing evidence on the risk management landscape from high-quality research.

IV. Findings and Results Analysis

Risks Identification Frameworks

At least 13 risk identification frameworks were identified from the eight peer-reviewed articles.The study explored eight scholarly articles to evaluate the risk factors and understand risk management frameworks adopted in various industrial parks. Undertaking a secondary data evaluation provides a comprehensive understanding of the research topic by providing insights into common risks and risk management strategies employed in industrial parks.

Table 1.0:
Risk identification frameworks

Carbonara et al. (2015)	Contextual-specific risk-identification framework.
Folch-Calvo et al. (2020)	Standard risk identification model, preventive frameworks, probabilistic, traditional, modern, and dynamic evaluation frameworks.
Kuznetsova et al. (2017)	Kuznetsova et al. proposes a risk identification framework based on input and output inoperability variables.
Chen et al. (2019)	Chen et al. proposes a strategic approach to identifying safety and security risks in industrial parks.
Wu et al. (2017)	Symbiotic networks for handling occupational hazards emanating from industrial processes.
Han et al. (2019)	Market research as a method for identifying environmental risks
Valenzuela-Venegas et al. (2020)	Multidimensional approaches for sustainability risk assessment.
Aravossis et al. (2019)	Holistic model for comprehensive risk assessment.

V. Discussion

Analysis and Characterization of Risk Methodologies Applied to Industrial Parks

In this article, Folch-Calvo et al. (2020) emphasize the need to perform effective and holistic risk evaluations from planning to implementing and managing industrial parks. Every industrial park harbors unique risks, hence the need to evaluate and manage these risks using appropriate frameworks. According to Folch-Calvo et al. (2020), business managers must develop mechanisms to predict, assess, and characterize operational and financial risks, given their iniquitousness with industrial park projects. Describing IP risks can eliminate common challenges encountered while deciding what mitigation strategy to adopt. The researchers reflect on six evaluation models, focusing on how these frameworks can help while analyzing and characterizing IP risks. The models explored by Folch-Calvo et al. (2020) include standard, preventive frameworks, probabilistic, traditional, modern, and dynamic evaluation. Based on the research, it is apparent that no specific model provides principal applicability in all industrial parks. However, the developers and business managers can identify the most effective model based on the anticipated risks and causal situations in a particular industrial park.

Input and Output Inoperability

Like Folch-Calvo et al. (2020), Kuznetsova et al. (2017) explore suitable models that industrial parks can use to assess, characterize, and mitigate multiple risks. The study by Kuznetsova et al. (2017) proposes a risk evaluation framework based on input and output variables that provides suitable measures for operability or inoperability. Such variables help identify disruptive event propagation, providing a basis for predicting risks. Similarly, the study recognizes different approaches for evaluating and differentiating disruptive and non-disruptive events. The author's position is that industrial risk evaluation should focus on input and output parameters that provide a high predictive value for potentially disruptive events to increase efficiency in their mitigation.

Safety and Security Approaches of Risk Management

The study highlights the domino effect of human-related actions and how they contribute to risk events – including actual or anticipated situations – in industrial parks. The primary intention of the researchers while evaluating the domino effect and how it increases risk propagation and concentration was to distinguish different risk categories that characterize industrial park environments. Consistent with the findings from the literature analysis, Chen et al. (2019) note the variant risks associated with industrial parks, from operational to management, property, financial, and physical risks. Given the differences in prevalence and magnitude of such risks, industrial parks should take a resource-based approach to ensure effective mitigation. For example, the management can allocate resources to alleviate safety and security issues, a fundamental step toward effective risk management. Additionally, risk management demands a strategic approach toward resource protection and management, mitigating the risk of adulteration or improper use and wastage. For example, industrial parks can protect their infrastructure and informational resources by investing in sound and impenetrable cloud computing systems, thereby averting security risks. Likewise, businesses can eliminate operational risks by devising methods for allocating, managing, and developing human resources to increase organizational efficiency.

Symbiosis Network in Risk Management

The article identifies physical hazards and chemical threats as some of the most prevalent risks that industrial parks confront from time to time. Mainly, these risks are attributed to industrial manufacturing activities, with significant environmental consequences. The discharge of toxic gases and chemical wastes from industrial activities results in severe effects on workers and the environment. Therefore, individuals who work in industrial settings may endure life-long adverse health impacts due to prolonged exposure to harmful gases and other lethal compounds used in manufacturing units. According to Wu et al. (2017), industrial parks can mitigate occupational hazards by implementing symbiotic networks where the waste from manufacturing processes goes through a recycling system to produce a circular economy model. Constant recycling of harmful wastes from manufacturing operations can mitigate occupational hazards and offer extra payoffs by providing operational leverage.

Environmental Risk Analysis

The researchers look at the risk management discourse from an environmental perspective. Han et al. (2019) suggest energy efficiency as a strategy for minimizing environmental risks in industrial parks. The study identifies environmental risks as an aftermath of inefficient technologies, processes, and infrastructure, which makes it difficult for industrial parks to engage in energy conservation. Energy conservation encompasses industrial processes where the consumption ratedoes not deplete the available resources (Han, Sun & Feng, 2019). Critically, the study emphasizes energy efficiency as a strategy through which industrial parks can eliminate environmental risks by ensuring responsible actions toward energy conservation. A good starting point is undertaking extensive market research to identify environmental conditions and develop market-based mechanisms for risk mitigation. Undertaking market research will enhance the understanding of the existing regulatory frameworks and implement appropriate strategies to ensure compliance.

Sustainability in Risk Management

The study suggests multi-objective optimization through sustainable processes, resiliency, and greener industrial parks in light of social and environmental risks associated with industrial parks. Valenzuela-Venegas et al. (2020) argue that industrial parks can deal with sustainability risks by developing mechanisms to improve flow integration and increase resiliency. Because many industrial parks are involved in large-scale manufacturing operations, such activities may result in uncontrolled utilization of limited resources, leading to their depletion. In this vein, Valenzuela-Venegas et al. (2020) maintain a sustainability view on potential strategies that industrial parks can use to mitigate such risks. Sustainability encompasses multidimensional approaches, such as shifting to renewable resources to reduce adverse social impacts, adopting efficient operational methods to maximize output while saving on scarce resources, and going green in manufacturing

operations, sourcing raw materials, and consumer products. Following such steps will ensure that industrial parks maximize sustainability gains and keep social and environmental risks under control.

Holistic Approach of Risk Evaluation in Industrial Parks

Risk evaluation should take into consideration all possible threats or hazards. Unlike other studies that suggest different approaches to managing variant risks, Aravossis et al. (2019) emphasize holistic risk analysis as an ideal framework for effective mitigation. Focusing on various risks observed in industrial parks, the article presents a comprehensive model where organizations deal with all threats holistically instead of singling and handling them separately. However, Aravossis et al. (2019) argue that a holistic approach may suffer shortcomings due to its inability to dissect and characterize different. The holistic model examines the peripherals of the IP risk environment while simultaneouslyexploring potential strategies to manage these threats. Furthermore, evaluating risks from a broader perspective provides a comprehensive view of potential threats and implements actions to prevent them or reduce the magnitude of unintended consequences from anticipated threats.

VI. Conclusion and Recommendation

The literature evaluation and qualitative inquiry provide significant insights into risk evaluation and subsequent approaches toward risk mitigation. A secondary analysis of archival data from previous studies reveals different risks and methods adopted by industrial parks to evaluate these risks. Markedly, the study shows that uncontrolled risks can contribute to unintended outcomes, including operational failure, loss of productivity, and slowing growth of existing industrial parks. The researcher based the investigation on a comprehensive analysis of eight scholarly sources that explored risk evaluation models for industrial parks and related projects. The study responded to the research objectives by distinguishing possible risks, evaluating frameworks, and outlining solutions applicable to industrial parks to mitigate these risks. The evidence from archival data has addressed the objectives by offering a solution analysis and specifying different options for businesses to manage risks in industrial parks.

Recommendation

Based on the evidence from the secondary data analysis, one recommendation is that the management of industrial parks should establish standard procedures for evaluating, characterizing, and managing risks. The purpose of developing and applying standard methods is to enable ongoing risk assessments and data collection on potential causal situations to prevent unexpected incidents and minimize the unintended outcomes of various risks. For example, this may entail adopting sequential methodologies, investing in technologies to enable dynamic and automated risk assessment, data mining and analytics, and implementing risk barriers. Such interventions offer simultaneity, efficiency, and immediacy in identifying, defining, and characterizing risks. These aspects enable industrial parks to embark on operational work procedures to suppress the threats before they escalate into severe events. Imperatively, industrial parks should align their operations with the global sustainability agenda by embracing responsible practices and resilient and integrated methods of producing goods in such environments.

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