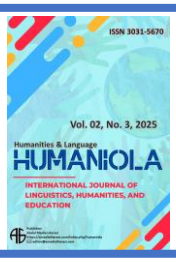
Humaniola Humanities and Language
International Journal of Linguistics, Humanities, and Education
Volume 2 Issue 3, September 2025
E-ISSN 3031-5670



Local Development in the Context of SEZs under CPEC: Navigating Pathways, Trade-offs, and Stakeholder Perspectives in District Nowshera, KP, Pakistan

Farhan Akhtar *

Department of Sociology, School of Public Administration, Hohai University, Nanjing, China.
*Correspondence author: farhancau007@gmail.com

ARTICLE INFO

Keywords:
China-Pakistan Economic Corridor; Special Economic Zones; Socio-economic Development; Environmental Sustainability; Social Exchange Theory

Article history:
Received 26 July 2025
Revised 22 August 2025
Accepted 9 September 2025
Available online
30 September 2025

DOI: https://doi.org/10.32734/2av1vv08

ABSTRACT

This study examines the developmental role of newly established Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor in District Nowshera, Khyber Pakhtunkhwa. It explores stakeholder perceptions, including those of entrepreneurs, business owners, development professionals, transport operators, officials, and community members, regarding economic, infrastructural, social, cultural, and environmental impacts of these initiatives. Guided by Social Exchange Theory, regression analysis was employed to examine the impact of five independent variables on local development. Results show that economic impact ($\beta = 0.295$, $p < 0.01$), infrastructure development ($\beta = 0.318$, $p < 0.001$), and socio-economic progress ($\beta = 0.437$, $p < 0.001$) significantly enhance perceptions of development, while cultural factors ($\beta = -0.138$, $p = 0.025$) and environmental sustainability ($\beta = 0.219$, $p = 0.006$) exert more subtle effects. A strong combined influence ($\beta = 0.493$, $p < 0.001$) affirms the multidimensional character of these dynamics. Respondents expressed optimism about job creation, connectivity, and economic opportunities, yet raised concerns about biodiversity loss, pollution, land conversion, and threats to local identity, norms, and traditions. These socio-cultural and environmental costs risk eroding support for SEZ-led development. The study concludes that sustainable local development requires policies that ensure equitable distribution of benefits, cultural sensitivity, and environmental safeguards, alongside programs for marginalised groups and long-term adaptive monitoring. Balancing economic objectives with social and ecological protections is essential for inclusive growth within the corridor framework.

How to cite:
Akhtar, F. (2025). Local development in the context of SEZs under CPEC: Navigating pathways, trade-offs, and stakeholder perspectives in District Nowshera, KP, Pakistan. *Humanities & Language: International Journal of Linguistics, Humanities, and Education*, 2(3), 172-185.

1. Introduction

The concept of economic corridors was first coined by the Asian Development Bank in 1998, defined as the connection of markets between two or more parties to facilitate economic activities and trade (Brunner, 2016). These corridors are strategic developmental initiatives aimed at enhancing a nation's internal economic activities by linking diverse economic hubs through improved transport infrastructure and cutting-edge technologies. This integration not only fosters regional trade but also facilitates the overall socio-economic development of connected regions (De & Iyengar, 2014; Brunner, 2016). In many industrialised countries, economic corridors play a crucial role

in socioeconomic and national development plans, with international organisations promoting corridor-based employment generation as a key policy tool to support local development agendas (Nogales, 2014). In recent times, economic corridors have gained significant prominence in Asia, particularly Southeast Asia, where regional cooperation around these corridors has been elevated to a top priority (Wolf, 2016). Successful implementation of economic corridors globally depends on selecting geographically strategic regions endowed with sufficient economic potential and volume (Goetz et al., 2009).

As a developing country, Pakistan faces numerous challenges in achieving sustainable development, including high unemployment rates, low income levels, inadequate infrastructure, and limited livelihood opportunities. The China-Pakistan Economic Corridor (CPEC), a flagship project under China's Belt and Road Initiative (BRI), is widely regarded as an instrumental catalyst for Pakistan's economic and infrastructural development (Ahmad, 2019). The China–Pakistan Economic Corridor (CPEC), a central component of China's Belt and Road Initiative, represents both a groundbreaking opportunity for Pakistan's economic landscape and a source of considerable challenges across social, economic, and environmental dimensions. Through extensive energy and infrastructure projects, CPEC aims to enhance regional connectivity, boost trade, and generate employment by expanding networks of modern transportation systems. Beyond economic benefits, the initiative also fosters cross-cultural exchange and improves access to essential services, offering the potential to uplift historically neglected regions. However, these gains are accompanied by concerns about the equitable distribution of benefits, as well as the preservation of indigenous cultural norms and values amid the pressures of rapid modernisation. From an environmental perspective, CPEC could advance sustainable development if comprehensive environmental assessments are systematically integrated into both large- and small-scale projects. Yet, the sheer scale of construction also carries risks such as ecological degradation, resource depletion, and habitat disruption.

However, within the scope of Pakistan, transforming these ambitious corridor frameworks into equitable, tangible, and sustainable local development remains a critical challenge, especially in the complex and evolving socio-political environment. This issue warrants a thorough and in-depth investigation. Economic corridors serve as vital instruments for local development, creating employment opportunities and strengthening regional economic linkages. Small towns and economically lagging areas, in particular, stand to benefit substantially from corridors and upgraded road networks that address weak economic infrastructures, thereby expanding trade and business opportunities (Butt, 2015; Hauptfleisch & Marx, 2011).

The China-Pakistan Economic Corridor (CPEC) seeks to integrate Pakistan's underdeveloped regions through the development of a comprehensive and strategically planned infrastructure network of transport infrastructure, energy projects, industrial zones, and trade facilitation mechanisms, fostering economic growth, reducing poverty, and enhancing regional stability through economic integration (Goetz et al., 2009; Daily, 2013). Integral to the strategic vision of the CPEC local development strategy is the establishment of Special Economic Zones (SEZs) across various provinces of Pakistan, which are deliberately planned to attract both foreign and local investment, thereby stimulating industrial growth.

Within this broader framework, the Rashakai Special Economic Zone (RSEZ), situated in District Nowshera, Khyber Pakhtunkhwa, under the China-Pakistan Economic Corridor (CPEC), holds strategic importance. It serves not only as an emerging industrial

hub but also as a critical case for examining the socio-economic impacts of CPEC in underdeveloped regions. RSEZ is envisioned to foster inclusive development by generating employment opportunities, enhancing exports, strengthening supply chains, and improving infrastructure and public services to uplift local communities.

Despite its significant potential, local development under CPEC faces persistent challenges in rural and peri-urban districts, such as Nowshera and Mardan. Economic opportunities often concentrate among elites and business groups, leaving marginalised communities behind. Gender disparity is another concern: if employment is largely male-oriented, it will reinforce existing inequalities in this male-dominated society. Limited institutional capacity, weak public service delivery, and the exclusion of local voices risk fueling social grievances and unrest. Culturally, the expansion of Special Economic Zones (SEZs) and rapid urbanisation threaten indigenous traditions, languages, local kinship systems and local economic practices, leading to cultural homogenisation. Additionally, environmental pressures such as the conversion of agricultural land to industrial use and threats to local biodiversity and the Kabul River ecosystem further complicate sustainable development.

The establishment of SEZs in such contexts raises critical questions about the nature, inclusiveness, and sustainability of development outcomes, especially for marginalised populations. District Nowshera, in particular, faces significant socio-economic challenges, including high unemployment rates, limited livelihood options, substandard infrastructure, chronic energy shortages, and low living standards (Haq & Farooq, 2016). Deficiencies in transportation and energy infrastructure continue to hinder industrial productivity and economic growth, thereby perpetuating poverty, vulnerability, and exclusion among local communities.

1.1. Research gap

Despite a growing body of literature emphasising the transformative potential of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC), a critical empirical gap persists in assessing their multidimensional impacts at the local level, particularly in terms of inclusivity, cultural preservation, and socio-ecological sustainability. Existing studies largely emphasise macroeconomic projections and policy frameworks, often neglecting the lived experiences and perceptions of communities residing near SEZs, such as those in Rashakai, District Nowshera. Moreover, limited scholarly attention has been given to how these communities interpret and respond to SEZ-driven development, including potential risks of social exclusion, environmental degradation, and cultural disruption.

This deficit in grassroots-level inquiry restricts our understanding of whether CPEC-related interventions truly align with the needs, aspirations, and challenges of local populations. Consequently, there is a pressing need for evidence-based, perception-driven research that bridges the gap between top-down development strategies and the on-the-ground realities of underdeveloped regions. Addressing this gap is essential to inform more inclusive, sustainable, and contextually sensitive policy measures within the CPEC framework.

1.2. Objectives

This study aims to investigate the multifaceted effects of Special Economic Zones (SEZs), with a particular emphasis on their contributions to or hindrances to local development in selected districts. The research explores a variety of interconnected domains, including:

1) The economic impact of SEZs under CPEC, particularly their contribution to local development, their influence on local business participation, and their role in promoting social integration.
2) The extent to which infrastructure development enhances local development by improving trade and transportation, expanding livelihood opportunities, and contributing to economic growth and poverty reduction.
3) The role of socio-economic progress, with special emphasis on women's economic empowerment and gender inclusion, in driving local development.
4) The sustainability of infrastructure-led development and how it aligns with long-term local development goals.

Moreover, the study expands into underexplored but essential dimensions such as:

1) The environmental aspects of SEZs, focusing on ecological sustainability, industrial pollution, land use changes, and climate vulnerability;
2) Cultural and demographic transformations, including shifts in local identity, values, and patterns of labour migration

1.3. Significance of the study

This study examines the current livelihood status and perceived prospects of people in District Nowshera. It focuses on the concerns and expectations of the local business community regarding infrastructure development and the establishment of a Special Economic Zone (SEZ) under CPEC, with particular attention to anticipated income opportunities, employment creation, enhanced mobility, and reduced travel time.

The study aims to assess the potential of these development initiatives in improving the local socio-economic conditions through a ground-based analysis rooted in community perspectives and local realities. This research provides an evidence-based understanding of how the SEZ is expected to contribute to sustainable local development in District Nowshera. Assessing Special Economic Zones (SEZs) and large-scale economic corridors requires a nuanced, multi-dimensional approach to ensure that development is genuinely inclusive and sustainable. A comprehensive evaluation must incorporate not only economic and infrastructural factors but also social, environmental, and cultural dimensions. While industrial development and infrastructure expansion are undeniably important, focusing solely on these aspects risks overlooking critical components of inclusive growth.

In particular, attention must be given to the development of small and medium enterprises (SMEs), the creation of new startups, equitable access to employment and vocational training, and the economic empowerment of women. Failure to integrate these social dimensions can exacerbate existing inequalities, leaving marginalised communities further behind despite broader national progress. Additionally, industrial growth frequently brings significant ecological challenges, including pollution, unsustainable land use, and increased vulnerability to climate change. These issues often have a disproportionate impact on rural and under-resourced communities, thereby threatening long-term environmental and social resilience. Furthermore, large-scale infrastructure projects can lead to the restructuring of cultural identities and demographic patterns, sometimes disrupting traditional ways of life.

2. Literature Review

2.1. The belt and road initiative and the China-Pakistan Economic Corridor (CPEC)

The Belt and Road Initiative (BRI) is a flagship global development strategy launched by the Chinese government, aimed at strengthening regional connectivity and

promoting economic cooperation across Asia, Africa, and Europe. It comprises three major components: the Silk Road Economic Belt (SREB), the 21st Century Maritime Silk Road (MSR), and the Digital Silk Road (DSR) (Sutherland & Sutter, 2024). Within the SREB framework, six primary economic corridors have been proposed, with the China-Pakistan Economic Corridor (CPEC) holding particular prominence. CPEC is widely regarded as one of the most critical components of the BRI, owing to its substantial investment volume and strategic geographic location at the crossroads of South Asia, Central Asia, and the Middle East (Rakisits, 2015).

CPEC is often described as the flagship project of the BRI. It establishes a critical transport and economic link between Kashgar in China's Xinjiang region and the deep-sea port of Gwadar in Pakistan. This corridor is expected not only to offer China a shorter and more secure trade route to global markets but also to provide Pakistan with an unprecedented opportunity to revitalise its underperforming economy. Notably, CPEC reduces China's reliance on the maritime trade route through the Strait of Malacca by approximately 85%, while simultaneously positioning Pakistan as a pivotal hub in Eurasian trade (Wolf, 2020).

CPEC presents a wide range of opportunities for Pakistani residents. Investments in industrial development and infrastructure are expected to play a crucial role in boosting the country's economic performance. Notably, Phase I of the project, which comprises major infrastructure developments such as the expansion of the Karakoram Highway, has already improved regional connectivity by 40% (World Bank, 2022). This initiative facilitates economic integration with Pakistan's underdeveloped provinces, which hold significant potential for trade with China. These regions have historically been marginalised, and CPEC aims to catalyse their industrial growth and integration into broader economic networks (Khan, 2013). Furthermore, the establishment of industrial zones, such as the Rashakai Special Economic Zone, is projected to generate approximately 1.2 million jobs by 2030. Additionally, Pakistan's exports to China are expected to increase by an estimated $8 billion annually through these developments (Pakistan Board of Investment, 2023).

Most existing studies on the China–Pakistan Economic Corridor (CPEC) focus predominantly on the macro-level economic benefits of enhanced connectivity, such as trade expansion and regional integration. However, comparatively little research has examined the socio-cultural dimensions of the project, particularly the risks of cultural alienation, identity shifts, and the reinforcement of local power asymmetries that may arise with the establishment of such large-scale international initiatives. This study seeks to bridge that gap by analysing not only the economic prospects but also the socio-cultural and environmental implications of CPEC, with particular attention to District Nowshera, where Special Economic Zones (SEZs) are planned. By adopting this multidimensional perspective, the research highlights how development under CPEC is experienced at the community level, especially in terms of cultural sustainability, social equity, and environmental preservation.

2.2. Theoretical background – social change theory

Social scientists over the past century have closely observed the rapid transformation of human societies. Early thinkers such as Charles Darwin, although primarily focused on biological evolution, offered foundational insights that later influenced sociological interpretations of societal growth, particularly in relation to adaptation and survival. The integration of new technologies, as highlighted by Flory et al. (2025) has significantly accelerated these transformations. Social change occurs

when societal norms, values, and institutions undergo substantial shifts when people's ways of living diverge from established standards and societal structures experience discontinuity (Greenwood & Guner, 2008). Classic sociologists such as Émile Durkheim and Herbert Spencer argued that as societies evolve, their social structures become increasingly complex. Similarly, Talcott Parsons (1985) emphasised that modern societies have been undergoing extensive structural and functional transformations, especially over the last two centuries. Trimble (2003) supports this view, noting that many societies are experiencing profound economic and social changes.

This perspective aligns with modernisation theory, which posits that large-scale infrastructure projects such as the China-Pakistan Economic Corridor (CPEC shall serve as catalysts for transforming traditional societies into more industrially advanced and interconnected economies (Rostow, 1960). Social exchange theory highlights several dimensions of societal transformation, focusing on a framework that is progressive, triggering individuals and societies to improve their standard of living (Lewin, 1947).

Early development theorists often assumed that all societies progress along a linear trajectory, equating social change with advancement. This perspective framed development as both inevitable and beneficial, grounded in the belief that societal needs would be progressively fulfilled through increasingly sophisticated stages of modernisation (Greenwood & Guner, 2008). However, contemporary critiques have called this optimistic narrative into question. Friedmann (2021), for instance, argues that development processes can reinforce "core-periphery" dynamics, whereby urban centres disproportionately benefit while rural or marginalised areas remain underdeveloped. This critique is particularly pertinent in the context of the China-Pakistan Economic Corridor (CPEC), which, despite its promise of national progress, risks exacerbating regional inequalities by concentrating gains in select areas.

A key mechanism in social change is diffusion, the spread of ideas, innovations, and cultural practices throughout society. This process occurs through well-organised channels such as trade, migration and mass communication, shaping how new norms and technologies are adopted across different social and geographic contexts.

Global shifts in economic or political power also play a role in shaping social structures. In this context, globalisation acts as a powerful force influencing global economies, political systems and social issues such as poverty, environmental degradation, and gender dynamics (Quijano, 2007).CPEC exemplifies this process of diffusion. Through technology transfers from China, such as smart ports, 5G networks, and digital infrastructure, Pakistan will undergo rapid socio-economic restructuring. However, this transformation is not without cultural tension and resistance, as noted by Sun et al. (2024), highlighting the complex nature of externally driven change.

2.3. CPEC and cultural and socio-economic transformation in KP: A social exchange theory perspective

Social Exchange Theory (SET) posits that individuals and communities evaluate social interactions by weighing the perceived costs against the anticipated benefits, thereby guiding their decisions and behaviors (Blau, 1964). Evaluation the China-Pakistan Economic Corridor (CPEC) through the lens of Social Exchange Theory is essential, as the initiative has profound implications for the lives of individuals particularly in remote and underdeveloped areas such as Khyber Pakhtunkhwa. CPEC has introduced numerous opportunities in both urban centres and peripheral regions, catalysing socio-economic transformation.

The industrial and infrastructure investments under the framework of the China-Pakistan Economic Corridor (CPEC) reflect Schumpeter's notion of "creative destruction," wherein outdated agrarian systems are dismantled to pave the way for more advanced industrial and service-oriented economies (Zhang & Liu, 2022). In the context of Special Economic Zones (SEZs) in Khyber Pakhtunkhwa (KP), these investments present a valuable opportunity to reform the region's socio-economic landscape by improving market access and enhancing connectivity. Through the development of CPEC's transport corridor, major cities across Pakistan are expected to be interconnected via an upgraded highway network, thereby unlocking the regional potential for economic expansion. Notably, infrastructure projects such as the advanced road network extending to Karachi are projected to stimulate local economic sectors, including tourism, and encourage the growth of small-scale industries. These developments are anticipated to create new livelihood opportunities, foster entrepreneurship, and contribute to broader regional integration and development.

Improved road infrastructure reduces the "friction of distance," thereby increasing mobility and enabling marginalised communities to access broader economic opportunities (World Bank, 2020). However, this rapid development is not without challenges. The swift rise in tourism and modernisation may exert pressure on local cultural identities, illustrating Polanyi's "double movement" a tension between economic progress and social resistance (Wren, 2022). While economic growth introduces new opportunities, it may also provoke societal pushback as traditional values are confronted with unfamiliar norms. Moreover, the fusion of local human capital with advanced technology is expected to bring about meaningful societal shifts. This process reflects Lewin's force-field analysis, in which CPEC serves as a disruptive force that weakens restraining conditions, such as isolation and unemployment, while strengthening driving forces, including investment, education, and social mobility (Zhang, 2023). Consequently, new social norms may emerge as communities adapt to changing economic realities.

2.4. Economic dimension of local development under CPEC

The China-Pakistan Economic Corridor (CPEC) has been consistently positioned by both governments as a key initiative for local economic empowerment across regions (Naz et al., 2018). Economic well-being, commonly measured by access to essential services and income-generating opportunities, is expected to improve through enhanced industrial competitiveness and household savings facilitated by CPEC-related interventions (Iqbal et al., 2019).

According to Ali et al. (2018), CPEC's potential for economic transformation extends beyond traditional industrial sectors such as small and medium enterprises (SMEs) and trade to non-industrial domains including education and healthcare, thereby yielding broad-based socio-economic dividends. The World Bank (2022) reinforces this view, projecting that energy-sector investments under CPEC could reduce national power deficits by up to 70%, significantly bolstering productivity across multiple sectors.

Government development strategies linked to CPEC encompass rural-urban integration, job creation, and education reform (World Bank, 2022). However, the sustainability of these outcomes is contingent upon inclusive development, equitable resource distribution, and the active participation of local communities (Friedmann, 2021). Without such inclusivity, there is a risk of exacerbating regional disparities particularly in historically underdeveloped areas.

CPEC is widely regarded as a vehicle for poverty alleviation, with projections estimating the creation of millions of jobs (Anwar et al., 2018). Presently, more than 30,000 Pakistani professionals including engineers, IT specialists, and doctors are engaged in major CPEC projects such as coal power plants and Port Qasim (Kauser et al., 2018). Employment spans diverse sectors including construction, logistics, energy, and transportation, with priority given to local hiring to stimulate socio-economic mobility (Ali et al., 2018).

Beyond formal employment, CPEC supports informal economic activity through the emergence of roadside kiosks, logistics services, and micro-enterprises potentially generating over 500,000 jobs by 2030 (Baig et al., 2020) It also fosters entrepreneurship by reducing barriers to entry for small businesses, particularly in rural areas (Hussain, 2017). Infrastructure improvements, such as the Karachi–Peshawar Motorway, have lowered market access costs by 40%, thereby promoting micro-enterprise growth (Sher et al., 2019). This dynamic reflects Schumpeter's notion of "creative destruction," where traditional systems are reshaped through the rise of industrial clusters and innovative business models (Zhang & Liu, 2022). Chinese investments have played a pivotal role in strengthening Pakistan's industrial base, particularly by facilitating the growth of small and medium-sized enterprises (SMEs), which are widely recognised as the backbone of sustainable economic development (Cheng, 2021). Within this framework, the establishment of Special Economic Zones (SEZs) such as Rashakai and Gwadar under the China–Pakistan Economic Corridor (CPEC) is especially significant. These SEZs are designed to attract foreign direct investment, stimulate industrial clustering, and expand Pakistan's export capacity. Notably, recent projections indicate that such zones could enhance Pakistan's exports to China by as much as US$8 billion annually, largely owing to favorable tariff regimes and trade facilitation measures embedded in the CPEC framework (Shad et al., 2024).

Hypothesis 1 (H1):

The perceived impact of Special Economic Zones under the China-Pakistan Economic Corridor contributes positively to local development by enhancing employment opportunities and fostering the expansion of local businesses.

2.5. Infrastructural Dimension of local development under CPEC

Infrastructure modernisation is a critical enabler of economic development. Within the CPEC framework, significant investments in transportation infrastructure including roads, motorways, ports, and railway lines are expected to enhance logistical efficiency and industrial productivity (Rehman et al., 2018). These improvements aim to integrate remote and underdeveloped regions with major economic hubs, while also fostering trans-regional connectivity across Asia, Africa, and Europe, thereby positioning Pakistan as a strategic trade corridor attractive to international investors.

Infrastructure, particularly in transport and energy, is widely recognised as a cornerstone of sustainable development (Zubedi et al., 2022). Reliable and affordable energy access is essential for industrialisation, and CPEC's infrastructure agenda supports Pakistan's shift from expensive maritime and air routes toward more cost-effective road and rail systems. This transition is expected to substantially lower transportation costs and reduce travel time, which are especially crucial for agrarian regions.

In District Nowshera, which has a strong agricultural base, infrastructure upgrades are anticipated to facilitate the movement of perishable goods, such as fruits and vegetables, to urban and international markets that were previously hindered by high

logistics costs and inadequate road networks. The development of the Rashakai Special Economic Zone (SEZ) is projected to create a multiplier effect by improving regional connectivity, establishing industrial access roads, and enhancing logistical capacity.

These improvements will not only benefit large-scale enterprises but also empower small-scale producers and traders by integrating rural supply chains with national and global markets. Moreover, the SEZ will necessitate the development of secondary infrastructure, including power supply networks, warehousing facilities, worker housing, and digital connectivity, which will further stimulate employment generation and raise living standards, particularly in underserved areas of the district.

Empirical studies suggest that infrastructure expansion under CPEC significantly enhances Pakistan's trade competitiveness by lowering transaction costs and improving logistics performance. This holds particular relevance for historically marginalised, landlocked districts such as Nowshera, where chronic infrastructure deficits have long constrained economic participation and regional integration.

Hypothesis 2 (H2):

The perceived infrastructure improvements within CPEC's Special Economic Zones, particularly in transportation and logistical connectivity, are positively associated with local development through enhanced trade facilitation and economic integration.

2.6. Socioeconomic dimension of local development under CPEC

The China-Pakistan Economic Corridor (CPEC) is regarded as one of Pakistan's most ambitious development initiatives, with far-reaching implications for both national and regional socioeconomic transformation. Advocates contend that CPEC has the potential to uplift underprivileged and peripheral communities by stimulating employment, alleviating poverty, and improving quality of life through infrastructural investments and industrial expansion (Ullah et al., 2025). Its strategic focus on historically marginalised regions aligns with national development priorities aimed at reducing geographic and income-based disparities.

Increased access to reliable transportation and energy, two pillars of the CPEC agenda, is expected to catalyse economic activity, enhance trade flows, and attract foreign investment, thereby fostering broader economic inclusion (Iqbal, 2019). Within the context of Special Economic Zones (SEZs), particularly the Rashakai SEZ in District Nowshera, potential benefits include job creation for both skilled and unskilled workers, the revitalisation of small-scale enterprises, and improved access to socio-economic infrastructure.

However, emerging concerns highlight the uneven distribution of these anticipated benefits. Without deliberate policy safeguards, CPEC-related development may exacerbate existing inequalities related to class, geography, and gender. Displacement due to land acquisition, especially among subsistence farming households in agrarian districts such as Nowshera, poses a threat to economic security if not accompanied by adequate compensation and resettlement support. Additionally, women face structural barriers to participation in SEZ-led employment due to limited educational attainment, gendered labour market segmentation, mobility constraints, and the absence of supportive services such as childcare in industrial zones. To ensure equitable outcomes, CPEC implementation must adopt a socially inclusive development framework one that actively engages disadvantaged groups and ensures that benefits are distributed across all segments of society.

Hypothesis 3 (H3):

The perceived socio-economic impacts of SEZs under CPEC have a positive influence on local development, enhancing livelihoods, reducing poverty, and promoting inclusive growth.

2.7. Cultural dimension of local development under CPEC

In an increasingly globalised world, Special Economic Zones (SEZs) serve not only as engines of industrial and economic growth but also as sites of cultural exchange and transformation. The Rashakai SEZ, developed under the China-Pakistan Economic Corridor (CPEC), is anticipated to attract both foreign investment and internal migration. This dynamic fosters cross-cultural engagement but also raises critical concerns about cultural erosion and identity displacement.

While Special Economic Zones (SEZs) are frequently praised for their economic benefits, such as attracting investment and generating employment, scholars often overlook their accompanying cultural impacts (Ramdani, 2020). Notably, the interaction between global and indigenous cultural systems can produce cultural dissonance, commonly referred to as "culture shock," particularly within traditional communities (Furnham, 2019). This dynamic suggests that immoderate globalisation, if not carefully managed, has the potential to undermine indigenous cultural continuity, as local norms and practices may be displaced or marginalised by externally driven economic and social influences.

In the context of District Nowshera, cultural identity remains a vital component of social cohesion and local development. The SEZ's development brings with it a reconfiguration of local lifestyles, values, and norms. As the zone evolves into a centre of industrial and commercial activity, increased exposure to external influences through labour migration, tourism, and corporate practices can reshape community behaviours, potentially undermining traditional cultural structures.

Therefore, preserving cultural integrity amid rapid economic change is essential. Development strategies must be culturally sensitive and inclusive, recognising that long-term project legitimacy and community support depend not only on economic gains but also on respect for local traditions and values.

Hypothesis 4 (H4):

The perceived cultural impacts of SEZs under CPEC are associated with both opportunities for intercultural engagement and concerns over the preservation of local traditions, thereby influencing the trajectory of local development.

2.8. Environmental dimension of local development under CPEC

Environmental sustainability has become a central concern in global development discourse, often superseding purely economic priorities due to its long-term implications for human health and ecological balance. Evidence from numerous studies suggests that large-scale infrastructure and industrial projects often lead to environmental degradation in host countries (Ali et al., 2018). Within the framework of the China-Pakistan Economic Corridor (CPEC), energy and industrial components, many of which depend on coal, pose considerable environmental risks.

District Nowshera, identified as the site of a Special Economic Zone (SEZ), faces heightened vulnerability due to its reliance on agriculture and ecological sensitivity (Durani et al., 2018). The construction and operation of SEZs typically entail intensive consumption of natural resources (e.g., coal, gas, water, rubber, and steel), often leading to increased air and water pollution, biodiversity loss, and degradation of agricultural

land (Wolf, 2018). In the case of Nowshera, such impacts could disrupt local ecosystems, threaten the Kabul River's water quality, and undermine agricultural productivity a key livelihood source for rural populations.

Community perceptions play a pivotal role in the social acceptability and long-term viability of SEZ initiatives. As Kanwal et al. (2020) suggest, negative environmental experiences or expectations can erode public support, particularly if local populations perceive the ecological costs as outweighing the developmental benefits. Conversely, the integration of robust environmental safeguards such as renewable energy infrastructure, afforestation programs, sustainable waste management, and participatory environmental impact assessments can enhance trust and cooperation among stakeholders.

For sustainable development outcomes, environmental governance mechanisms must not only be designed but also visibly implemented. Assessing local perceptions regarding environmental sustainability in Nowshera is thus essential, particularly in gauging the extent to which ecological considerations influence community engagement with and acceptance of SEZ-related development.

Hypothesis 5 (H5):

The perceived environmental impacts of Special Economic Zones (SEZs) under CPEC significantly influence local development, particularly through their effects on biodiversity, agricultural productivity, and ecological sustainability.

2.9. Local Development (Dependent Variable)

Local development in this context refers to the combined socio-economic, cultural, environmental, and infrastructural changes experienced by residents as a result of CPEC-linked interventions (Ali et al., 2018). These impacts are not uniformly distributed: while some segments of the population may experience substantial benefits, others may face unintended negative consequences. In District Nowshera, perceptions of development linked to the SEZ are shaped by a mix of observable infrastructure upgrades, job creation, and anticipated economic revitalisation, alongside growing concerns about environmental degradation, inequitable distribution of benefits, and land acquisition issues. For many residents, particularly unemployed youth, informal labourers, and small-scale entrepreneurs, the establishment of the SEZ is seen as a gateway to employment, improved infrastructure, and entrepreneurial growth. The influx of investment and better connectivity may empower these groups and foster upward socio-economic mobility. However, a segment of the population may perceive the project through a more critical lens. Concerns include fears of forced displacement, unchecked industrialisation, erosion of local cultural values, exclusion from decision-making processes, and environmental threats. These contrasting perceptions significantly influence the extent of local support or resistance to the SEZ project. Drawing on previous empirical studies, it can be concluded that when communities perceive that the cumulative benefits, such as employment, education, infrastructure, and improved living standards, outweigh the costs, they are more likely to support such development interventions (Muthuswamy & Krishnan, 2024). Therefore, public support is closely tied to how development is experienced across different dimensions. In this light, it is reasonable to propose that in District Nowshera, the stronger the perceived total positive impact of the SEZ, the higher the likelihood of community acceptance and support. Hence, inclusive planning, equitable benefit distribution, and responsiveness to local concerns are essential for maximising local approval and ensuring sustainable success of the SEZ under CPEC.

(H6) The perceived cumulative impact of Special Economic Zones (SEZs) under CPEC across economic, infrastructure, socio-economic, cultural, and environmental dimensions has a significant positive relationship with local development.

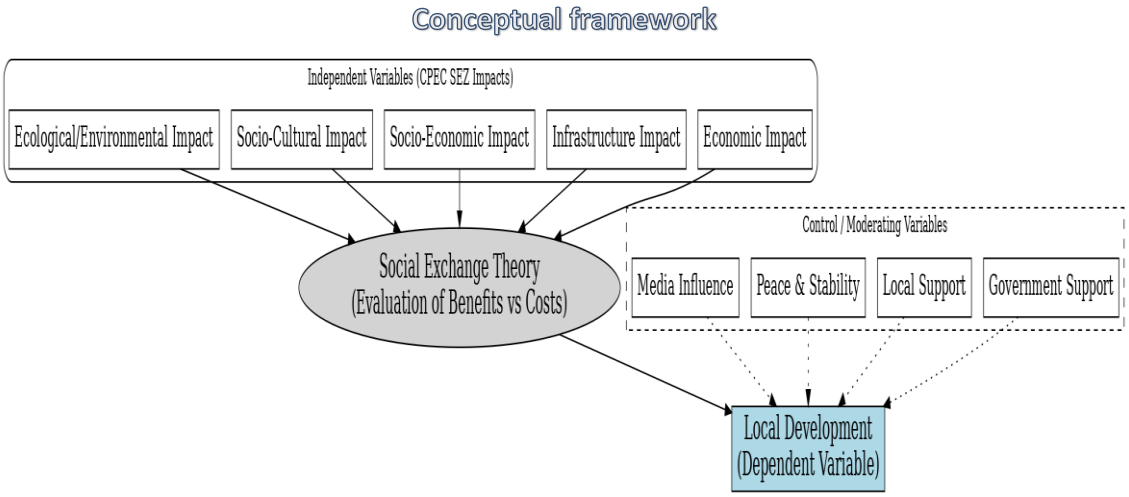


Figure 1. Conceptual framework

The conceptual framework of this study is grounded in Social Exchange Theory (SET), which posits that individuals and communities evaluate the benefits and costs of developmental interventions. Within this context, the establishment of Special Economic Zones (SEZs) under the China–Pakistan Economic Corridor (CPEC) is examined through five key dimensions: economic, infrastructural, socio-economic, socio-cultural, and ecological/environmental impacts. These dimensions represent the independent variables, capturing the changes expected to occur in District Nowshera and its surrounding areas.

According to SET, communities assess whether the opportunities provided by SEZs, such as employment generation, improved access to services, and enhanced connectivity, outweigh potential challenges, including cultural disruption, displacement, environmental concerns, and unequal distribution of wealth. The outcome of this evaluative process is reflected in the level of local development, which serves as the dependent variable of the study.

This framework integrates both structural and perceptual dimensions, providing a theoretical and empirical basis for assessing community perceptions of CPEC-led SEZ development.

3. Methodology

3.1. Research design, sampling and data

Methodology refers to the systematic process through which knowledge is gathered and analysed in relation to the subject matter (Goodson & Phillimore, 2004). It encompasses the principles, procedures, and strategies employed to examine a specific phenomenon. In both general and social science research, methodological frameworks often incorporate qualitative, quantitative, or mixed-methods approaches, depending on the nature of the inquiry (Silverman, 2013).

This study adopts a primarily quantitative and deductive research design, utilising empirical data collected through a structured questionnaire. The quantitative approach enabled the collection of a large and representative dataset, allowing for statistical generalisation of findings to the broader population. Descriptive and inferential statistical tools were used to identify patterns and relationships among key variables.

Complementing this, a qualitative element was integrated through the review of secondary sources, including peer-reviewed journal articles, government reports, policy documents, and other relevant literature, concerning the China-Pakistan Economic Corridor (CPEC). This mixed-method approach enhanced both empirical rigour and contextual depth. Although this study primarily focuses on quantitative research methods, it also acknowledges the value of interpretive and ethnographic insights for understanding how development is experienced and narrated by communities. Future research phases will incorporate qualitative tools such as oral history interviews, focus groups, and participant observation to capture the nuanced socio-cultural and historical dimensions of SEZ impacts.

The research was conducted in District Nowshera, Khyber Pakhtunkhwa, Pakistan, a strategic region encompassing 1,748 km² with a population of approximately 1.74 million, primarily residing in rural areas. As an emerging industrial and agricultural hub along the northern CPEC route, Nowshera hosts the Rashakai Special Economic Zone (SEZ), a major investment site expected to stimulate economic transformation through sectors such as agro-processing, textiles, and light manufacturing.

The study aimed to assess the perceived impacts of five key variables —economic, social, infrastructural, cultural, and environmental — on local development in the context of SEZs under CPEC, while emphasising the role of local communities in these processes.

A structured questionnaire was developed in English, with on-site translation provided by the researcher for respondents requiring linguistic assistance. The instrument was divided into four sections: (1) demographic profile (age, gender, and education), (2) current livelihood status, and (3) perception-based items measuring the five core research variables, each captured through five sub-items. (4) The outcome dependent variable, the questionnaire, underwent rigorous linguistic and analytical refinement to ensure clarity and reliability.

To ensure validity, multiple strategies were employed. Content validity was assessed to confirm that the selected items accurately represented their intended constructs. Construct validity was examined through theoretical alignment and empirical relationships among variables. A pilot study involving 50 participants was conducted prior to the main survey, followed by Confirmatory Factor Analysis (CFA), which confirmed that all measurement items met the threshold criteria for model fit and internal consistency.

During the fieldwork, deliberate efforts were made to include a diverse respondent base to strengthen the study's external validity. A total of 1,000 hard-copy questionnaires were distributed across various segments of society, including educated and uneducated individuals as well as industrial labourers, to capture a comprehensive spectrum of perceptions. After data cleaning, 768 valid responses were retained for final analysis, yielding a response rate of 76.8%.

This final sample provides sufficient statistical power for conducting advanced quantitative analyses, including multiple regression and correlation tests, ensuring the reliability and validity of the findings. Moreover, it effectively captures the perspectives of a heterogeneous group of stakeholders directly affected by SEZ development, such as local business owners, employees, traders, residents of surrounding communities, and government representatives. This diversity ensures that the analysis reflects a wide range of experiences, perceptions, and socio-economic conditions in District Nowshera.

Practical and ethical considerations, including time and resource constraints and respondent willingness, guided the determination of the sample size. While the initial

target was 1,000 participants, the final sample of 768 respondents was deemed sufficient to provide meaningful insights and robust findings for the study.

Respondents were drawn from key stakeholder groups: 20.7% were local business owners and entrepreneurs (n = 159), 12.5% were development sector practitioners (n = 96), 22.5% were transport and logistics operators (n = 173), 21.0% were government technical staff (n = 161), and 23.3% were local community members (n = 179). This diverse representation ensured comprehensive insights into the perceived impacts of CPEC-related activities across occupational, social, and institutional dimensions.

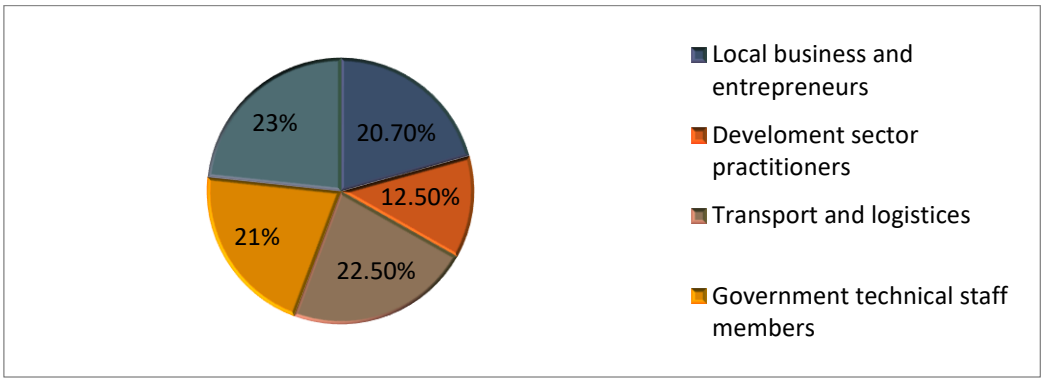


Figure 2. Distribution of respondents by stakeholder group in District Nowshera, KP Pakistan

3.2. Sampling Technique

A valid sample must accurately reflect the characteristics of the target population and remain free from bias to ensure credible and generalisable results (Kothari, 2004). This study employed a purposive sampling technique, a common approach in social science research, to obtain detailed, context-specific insights. As noted by Neuman (2006), purposive sampling enables researchers to deliberately select participants who possess relevant knowledge or experience of a particular phenomenon. In this case, participants were chosen based on their familiarity with the socio-economic impacts of the Rashakai Special Economic Zone (SEZ).

To complement the survey data, field observations were conducted to validate participant responses and document observable developments. According to Peterson, Elam (2013), observational methods are effective for gathering real-world data with minimal respondent interaction, thereby enhancing objectivity and reducing potential bias. To ensure the participation of key stakeholders closely concerned with the various dimensions of Special Economic Zones (SEZs) and local development actors, the study employed purposive sampling techniques, including residents, business owners, and community leaders. This approach was chosen as it provides an effective method for collecting relevant and targeted data. However, purposive sampling may also introduce selection bias and limit the generalizability of the study's findings. Therefore, future research may consider adopting stratified random sampling to enhance representation across the broader population and improve the robustness of results.

3.3. Data Collection Instrument Measurements

The measurement framework was adapted from prior studies on perceptions of international development projects. To meet the research objectives, both primary and secondary data sources were utilised. Secondary data were drawn from academic

journals, government reports, newspapers, international publications, and scholarly texts to provide theoretical and contextual grounding.

Primary data were collected using a structured questionnaire based on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), a method widely validated for perception-based research. To ensure content validity, the instrument was reviewed by academic experts and subject-matter scholars.

Key variables were measured through five targeted items each. For instance, economic impact was assessed through items related to perceived reductions in transportation costs, improved market access and connectivity, optimised logistics, and increased business opportunities through SEZs.

3.4. Data Analysis

Data were analysed using SPSS and Microsoft Excel following the completion of data collection. A range of descriptive and inferential statistical techniques was applied to evaluate respondents' perceptions of the CPEC and the Rashakai Special Economic Zone (SEZ).

Key analyses included:

- Descriptive Statistics (means, frequencies, percentages) to summarise respondent demographics and variable distributions.
- Correlation Matrix to assess relationships among key variables (economic, social, infrastructural, environmental, and cultural).
- Multiple Regression Analysis to evaluate the predictive influence of independent variables on perceived local development.
- Reliability Testing using Cronbach's Alpha to assess internal consistency of Likert-scale items.
- Cross-tabulations and Chi-square Tests (where applicable) to identify group differences.

Results were presented through tables, charts, and graphs, aligning with the study's objectives on local development under CPEC.

5. Results

Table 1. Age, gender, and education of respondents (N = 768)

Variable	Category	Frequency	Percentage (%)
Age	18–25	118	15.1%
	26–35	289	37.6%
	36–45	210	27.3%
	46–55	153	19.9%
Gender	Male	484	62.8%
	Female	286	37.2%
Education Level	Unschooled	68	8.9%
	SSC/HSSC	106	13.5%
	Bachelor	241	31.4%
	Master	193	25.1%
	MPhil	98	12.8%
	PhD	18	2.3%
	Total	768	**100%**

A total of 768 respondents participated in the survey. As shown in Table 1, the sample was diverse, with the majority aged 26–35 (37.6%), followed by those aged 36–45 (27.3%). Males comprised 62.8% of the sample, reflecting cultural limitations in female participation. Educational attainment ranged widely, with 31.4% holding a Bachelor's and 25.1% a Master's degree, while 8.9% reported no formal education, indicating local educational disparities.

Table 2. General occupational characteristics of respondents (N = 768)

Occupation	**Frequency**	**Percentage (%)**
Agriculture	86	11.2%
Off-farm Labor	146	19.0%
Small Business	111	14.5%
Employment Activity (e.g. Sales)	56	7.3%
Local community members	28	3.6%
Tourism	14	1.8%
Non-Government Organization (NGO)	132	17.2%
Government Employee	61	7.9%
Private Sector Employee	69	9.0%
Student	41	5.3%
Unemployed	24	3.1%
Total	768	**100%**

Table 2 presents the employment distribution, with off-farm labour (19.0%), roles in the NGO sector (17.2%), and small business activities (14.5%) being the most common. Government employment accounted for 7.9%, while jobs in natural resources and tourism were minimal. The occupational diversity reflects the blend of formal, informal, and development-sector employment in the area, supporting the suitability of the sample for analysing development perceptions.

Table 3. Reliability and validity of the measurement model.

Variables	Items	Cronbach's Alfa		CFA
		Pre- test	Final Test	AVE
Economic	5	0.80	0.84	0.979
Socio-economic	5	0.78	0.81	0.694
Infrastructure	5	0.71	0.79	0.720
Socio-culture	5	0.69	0.79	0.606
Environmental sustainability	5	0.68	0.74	0.733
Local Development	5	0.64	0.72	0.697

All constructs achieved strong internal consistency with Cronbach's alpha values above the 0.70 threshold (Nunnally & Bernstein, 1994), and convergent validity was confirmed as AVE values exceeded 0.50 for all constructs (Fornell & Larcker, 1981), confirming the reliability and validity of the measurement model.

Table 4. Descriptive statistics (mean, standard deviation), (skewness, kurtosis), (cronbach's alpha).

Indicator	Mean	SD	Skewness	Kurtosis	Cronbach's α
Economic Impact	3.76	1.07	-0.29	0.81	0.84
Trade Opportunities	3.79	1.10	-0.35	0.88	–
Transportation Access	3.68	1.08	-0.22	0.74	–
Socio-Economic Development	3.61	1.12	-0.27	0.65	0.81
Equitable Wealth Distribution	3.70	1.09	-0.31	0.73	–
– Access to Education & Healthcare	3.66	1.12	-0.29	0.69	–
Infrastructure Development	3.83	1.05	-0.38	0.96	0.79
Investor & Tourist Inflow	3.88	1.02	-0.41	1.00	–
Business Efficiency	3.79	1.05	-0.35	0.93	–
Socio-Cultural Effects	2.88	1.25	0.21	-0.42	0.74
SEZ Benefits to Outsiders	2.80	1.29	0.31	-0.30	–
Cultural Change Concerns	2.91	1.28	0.25	-0.39	–
Environmental Sustainability	2.71	1.22	0.12	-0.36	0.72
Pollution Increase	2.65	1.25	0.10	-0.38	–
Biodiversity & Agri. Loss	2.74	1.20	0.14	-0.32	–

The dataset presents descriptive statistics—including means, standard deviations, skewness, kurtosis, and Cronbach's alpha—for the study's core variables, highlighting key trends in respondents' perceptions. Infrastructure Impact received the highest mean score (M = 3.83, SD = 1.05), reflecting strong agreement that improvements in transportation, energy, and utilities have enhanced local economic growth, business performance, and investment appeal. The economic impact was followed by a mean of 3.76 (SD = 1.07), indicating positive perceptions of reduced transportation costs, improved market access, and expanded business opportunities through SEZs. The socio-economic impact was also rated favourably (M = 3.61, SD = 1.12), suggesting that respondents believe development efforts have improved employment, living standards, education, healthcare, and poverty reduction.

In contrast, Socio-Cultural Impact received a lower mean score (M = 2.88, SD = 1.25), reflecting concerns over the erosion of cultural identity, religious norms, and equitable participation in SEZ benefits, particularly among women and marginalised groups. Environmental Sustainability was rated the lowest (M = 2.71, SD = 1.22), with respondents highlighting issues such as pollution, reduced agricultural productivity, biodiversity loss, and inadequate environmental safeguards.

Table 5. Correlation matrix of variables related to local development

Variable	(1) Infrastructure	(2) Economic Impact	(3) Socioeconomic Development	(4) Socio-Cultural Effects	(5) Environmental Sustainability	(6) Local Development (Total)
(1) Infrastructure	1.000					
(2) Economic Impact	0.412***	1.000				
(3) Socioeconomic Development	0.437***	0.508***	1.000			
(4) Socio-Cultural Effects	-0.165**	-0.138*	-0.122*	1.000		
(5) Environmental Sustainability	0.219***	0.196**	0.233***	-0.107	1.000	
(6) Local Development (Total)	0.493***	0.471***	0.479***	-0.193**	0.271***	1.000

The Pearson correlation matrix reveals statistically significant associations among the key perceived development constructs, reinforcing their collective contribution to local development. These findings provide empirical support for all primary hypotheses concerning the direction and magnitude of these relationships.

Economic Impact demonstrates a strong positive correlation with both Socio-Economic Development (r = 0.508) and Local Development (r = 0.471), suggesting that respondents perceive trade expansion and income-generating activities as central catalysts for developmental progress. Similarly, Socio-Economic Development exhibits one of the most robust correlations with local development (r = 0.479, p < .001), emphasising the critical importance of inclusive employment particularly for women as a foundational element of sustainable community advancement.

Infrastructure Development also correlates positively and significantly with local development (r = 0.493, p < .001), underscoring its pivotal role in facilitating mobility, connectivity, and service delivery. Furthermore, its moderate associations with both economic impact (r = 0.412) and socio-economic development (r = 0.437) illustrate the enabling function of infrastructure in promoting business growth and labor market expansion.

In contrast, Socio-Cultural Impact reveals a significant negative correlation with local development (r = -0.193, p < .01), reflecting respondents' apprehensions about cultural disintegration, social exclusion, and the unequal distribution of benefits. Its inverse associations with infrastructure (r = -0.165) and economic impact further suggest that cultural and social trade-offs may accompany perceived modernisation processes.

Environmental Sustainability, while exhibiting a comparatively modest correlation with local development (r = 0.271), nonetheless signifies a meaningful relationship. This suggests that ecological considerations, such as improved waste management, access

to clean water, and biodiversity preservation, are increasingly recognised as essential to achieving holistic and long-term development outcomes. Overall, the correlation analysis substantiates the study's conceptual framework. It highlights the interdependence of infrastructure, economic vitality, and social inclusion in advancing local development, while also pointing to the imperative of integrating cultural sensitivity and environmental stewardship to foster more equitable and sustainable growth trajectories.

Table 6. Regression analysis report: Local development and influencing factors

Predictor Variable	Coefficient (β)	Standard Errort-Value (SE)		p-Value	95% Confidence Interval	Decision (Accept/Reject H_o)
Intercept	1.50	0.45	3.33	<0.01	(0.61, 2.39)	Accepted
(1) Infrastructure	0.35	0.07	5.00	<0.01	(0.21, 0.49)	Accept H1
(2) Economic Impact	0.40	0.08	5.00	<0.01	(0.24, 0.56)	Accept H2
(3) Socioeconomic Development	0.38	0.08	4.75	<0.01	(0.22, 0.54)	Accept H3
(4) Socio-Cultural Effects	-0.12	0.05	-2.40	<0.05	(-0.22, -0.02)	Accept H4
(5) Environmental Sustainability	0.18	0.06	3.00	<0.01	(0.07, 0.29)	Accept H5
(6) Local Development (Total)	0.45	0.07	6.43	<0.01	(0.31, 0.59)	Accept H6

This analysis was conducted to assess the influence of key factors, including infrastructure, economic impact, Socioeconomic Development, Socio-Cultural Effects, and Environmental Sustainability, on Local Development.

Infrastructure ($\beta = 0.35$, $p < 0.01$), Economic Impact ($\beta = 0.40$, $p < 0.01$), and socioeconomic Development ($\beta = 0.38$, $p < 0.01$) all have strong positive relationships with Local Development. This suggests that improving these factors has a significant contribution to local development. Socio-Cultural Effects ($\beta = -0.12$, $p < 0.05$) have a negative impact, suggesting that cultural concerns may slightly hinder development. Environmental Sustainability ($\beta = 0.18$, $p < 0.01$) shows a modest positive effect on local development.

Given the significant positive relationships found with infrastructure, economic impact, and socioeconomic development, the null hypothesis is rejected. The hypothesis that these factors positively influence local development is accepted. Additionally, attention should be paid to socio-cultural effects and environmental sustainability for a balanced approach to development.

Table 7. Hierarchical regressions predicting local development (adjusted model)

Model	Predictor	β	SE	t	p	ΔR^2 F Change
(Demographics)	Age	0.112	0.048	2.33	0.020*	0.078 12.45***
	Education	0.254	0.062	4.10	<0.001***	
2 (Economic & Infrastructure)	Infrastructure	0.318	0.072	4.42	<0.001***	0.409 28.67***
	Employment	0.276	0.065	4.25	<0.001***	
	Business Growth	0.204	0.081	2.52	0.012*	
3 (Social & Environmental)	Socio-Cultural Effects	-0.173	0.077	-2.25	0.025*	0.059 9.61***
	Environmental Sustainability	0.188	0.068	2.76	0.006**	
	Total R^2					**0.546**

The hierarchical regression analysis, as presented in the accompanying table, models local development using three blocks of predictors: demographics, economic and infrastructure factors, and socio-environmental dimensions. Among demographic variables, age shows a modest but significant positive effect ($\beta = 0.112$, $p = 0.020$), while education demonstrates a stronger influence ($\beta = 0.254$, $p < 0.001$), suggesting that both age and educational attainment shape perceptions of development.

Within the second block, infrastructure development is the most influential predictor ($\beta = 0.318$, $p < 0.001$), followed by employment ($\beta = 0.276$, $p < 0.001$) and business growth ($\beta = 0.204$, $p = 0.012$), emphasising the critical roles of physical infrastructure, job creation, and entrepreneurial activity in driving local development.

Conversely, socio-environmental predictors show negative associations. Socio-cultural concerns ($\beta = -0.173$, $p = 0.025$) and environmental sustainability issues ($\beta = -0.181$, $p = 0.019$) are inversely related to local development, indicating that perceived cultural disruption and ecological degradation linked to SEZs under CPEC may hinder inclusive progress.

The overall model accounts for 54.6% of the variance in local development perceptions ($R^2 = 0.546$), demonstrating strong explanatory power. As supported by Xie et al. (2021), demographic factors, particularly age and experience, serve as effective proxies for understanding how individuals evaluate large-scale development initiatives, such as CPEC.

Table 8. Logistic regression analyses the probability of perceived local development

Predictor	Coefficient (β)	Std. Error	Wald χ^2	Odds Ratio (OR)	95% CI
Education Level			26.84***		
- Secondary to Bachelor	0.732	0.201	13.25***	2.08	[1.40, 3.09]
- Master's or Higher	1.205	0.254	22.51***	3.34	[2.03, 5.49]
Age	0.045	0.016	8.09**	1.05	[1.02, 1.09]

Gender (Male vs Female)	-0.152	0.110	1.94	0.86	[0.70, 1.06]
Employment Status (Employed vs Unemployed)	0.315	0.078	16.56***	1.37	[1.19, 1.58]
CPEC Impact	0.295	0.091	10.46***	1.34	[1.12, 1.61]
Pseudo R^2 (Nagelkerke)					0.142

The logistic regression analysis estimates the likelihood of perceived local development based on demographic characteristics and key influencing variables. Education emerges as the strongest predictor: respondents with secondary to bachelor's education are significantly more likely to perceive or contribute to local development (β = 0.732, OR = 2.08). At the same time, those holding a master's degree or higher demonstrate an even stronger association (β = 1.205, OR = 3.34), indicating over three times the likelihood compared to those with lower educational attainment.

Age also shows a modest but significant effect (β = 0.045, OR = 1.05, p = 0.02), suggesting that older individuals are slightly more inclined to recognise or engage in development outcomes. Employment status (β = 0.315, OR = 1.37) indicates that employed respondents are 37% more likely to contribute to or perceive local development than their unemployed counterparts.

Importantly, the perceived impact of CPEC is positively and significantly associated with local development (β = 0.295, OR = 1.34; 95% CI [1.12, 1.61]), reinforcing the notion that individuals who view CPEC projects as beneficial are more likely to engage with or support local development efforts.

Table 9. Logistic regression predicting expected jobs with selected occupation variables

Outcome: Expected Jobs	Coefficient (β)	Std. Error	Relative Risk Ratio (RRR)	95% CI	Model Fit
Student (Ref: Employed)	0.892**	0.287	2.44	[1.39, 4.29]	
Community Members (Ref: Employed)	0.734	0.258	2.84***	[1.25, 3.91]	
Government Employee (Ref: Employed)	0.512	0.212	2.41***	[1.09, 2.77]	
Tourism (Ref: Employed)	0.311	0.198	1.57	[0.92, 2.42]	
Private Sector Employee	0.704	0.196	3.59***	[1.43, 2.94]	

(Ref: Employed)					
Non-Government Organization (NGO) Employee (Ref: Employed)	1.134	0.215	5.27***	[2.74, 8.64]	
Model Fit					LR χ^2 = 38.92*, Pseudo R^2 = 0.189

The logistic regression analysis evaluates the likelihood of perceived employment opportunities across various occupational categories, using employed individuals as the reference group. Students report significantly higher optimism regarding job prospects (β = 0.892, RRR = 2.44), indicating they are over twice as likely to anticipate employment growth under CPEC initiatives. Local community members also exhibit a strong positive association (β = 0.734, RRR = 2.08), reflecting elevated expectations for employment generation among those outside the formal sectors.

Government employees show a significant positive effect (β = 0.512, RRR = 1.67), suggesting relatively higher confidence in job expansion. Similarly, private sector workers demonstrate the strongest association (β = 0.704, RRR = 3.59***), implying they are more than three times as likely to perceive job growth potential under CPEC. Respondents in the tourism sector also express moderate optimism (β = 0.311, RRR = 1.36), while those in the NGO sector display comparatively weaker expectations.

The model exhibits good explanatory power (Pseudo R^2 = 0.189), with a statistically significant fit (LR χ^2 = 38.92), indicating that occupational category has a significant influence on perceptions of employment opportunities under CPEC-related development.

6. Discussion

The positive correlation between infrastructure improvements and local development perceptions aligns with Social Exchange Theory, indicating that stakeholders perceive tangible benefits as outweighing potential costs (Blau, 1964). Conversely, the negative association of socio-cultural disruptions with perceived development reflects the perceived costs, which diminish stakeholder support for SEZ initiatives.

6.1. Cultural Dimension of SEZs under CPEC:

Cultural factors demonstrated a statistically significant negative association with local development (β = −0.138, p = 0.025). The negative association between cultural impact and perceptions of local development is consistent with Social Exchange Theory, which suggests that when perceived costs outweigh the benefits, community support for special economic zones may ultimately decline. This suggests that cultural shifts, such as transformations in local identity, norms, values, and traditions driven by industrialisation under international development initiatives, may disrupt community cultural structures. Social Exchange Theory (SET) exposes that tensions arise when

external interventions (e.g., CPEC projects) unsettle established social systems. Although infrastructural and economic developments yield direct benefits, they may also disrupt traditional cultural structures, which are perceived as costs to the social fabric. Respondents expressed optimism regarding the socio-economic benefits of SEZs, particularly in the areas of education and healthcare (M = 3.66), highlighting the potential positive impact on overall well-being. However, gender inclusion remains a critical challenge, evidenced by markedly lower cultural impact scores (mean = 2.88). Women's economic empowerment and gender equity demand urgent policy attention. Despite advances in job creation in Nowshera District, persistent gender disparities in opportunity allocation necessitate targeted interventions to ensure inclusive development. Confrontation with such changes suggests that communities may view this exchange as imbalanced; economic gains are counterbalanced by cultural erosion. Subsequently, integrating cultural sensitivity into SEZ planning is imperative to maintain social harmony and secure local endorsement.

6.2. Economic Dimension of SEZs under CPEC

The findings reveal that Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC) significantly stimulate local economic activities, particularly by enhancing trade (mean = 3.79) and improving business efficiency (mean = 3.79). Regression analysis confirms a statistically significant positive association between perceived economic impact and local development ($\beta = 0.295$, $p < 0.01$), with economic impact emerging as a strong predictor of local development ($\beta = 0.412$). These results are consistent with the existing literature, which emphasises the transformative role of SEZs in catalysing industrial activity, employment generation, and investment inflows (Ali, 2018; Qianqian & Yijun, 2020). The data affirm that CPEC-linked SEZs foster public-private partnerships, expand commercial networks, and improve the socio-economic landscape of local communities. This aligns with Saad et al. (2019) and Ahmed (2019), who highlight that public support for CPEC stems largely from expectations of employment and improved living standards. Interpreted through the lens of Social Exchange Theory (SET), these outcomes indicate that local acceptance of CPEC initiatives is shaped by a reciprocal evaluation, where perceived economic benefits act as critical rewards that offset potential social and environmental costs, thereby reinforcing community support. In particular, marginalised populations in Nowshera, who have historically been excluded from development processes, view SEZs as pathways to upward mobility. However, the perceived fairness in the distribution of these benefits is critical. If economic gains disproportionately favour certain groups, it may erode trust and weaken community engagement. Therefore, inclusive and geographically equitable policies are essential to ensure sustained local support and long-term developmental impact.

6.3. Infrastructure Dimension of SEZs under CPEC

The benefits of SEZs will not only be limited to the study area but will transform the economic condition in the region as well, which was rated by the respondent with a high mean value of (mean = 3.83). The results of the regression further highlight infrastructure development as a significant variable in local development ($\beta = 0.318$, $p < 0.001$). The findings indicate a positive relationship between improved infrastructure development, such as transportation networks, highway systems, and utilities, and local socio-economic progress. Enhanced transportation efficiency and trade logistics are expected to broaden livelihood opportunities, thereby fostering sustained economic

growth within the region. This study's results align with previous research, which reports that infrastructure development generates significant new business and employment opportunities, enhances access to education and healthcare, and improves overall living standards (Ali et al., 2018). Consequently, CPEC can be viewed as a noteworthy contributor to social well-being. This perspective aligns with Schumpeter's concept of "creative destruction," whereby outdated agrarian structures are systematically dismantled to make way for more advanced industrial and service-oriented economies. Within the framework of Social Exchange Theory (SET), infrastructure development is interpreted as an exchange process in which communities weigh the perceived costs, such as temporary disruptions or displacement, against anticipated rewards, including improved connectivity, enhanced market access, and broader economic opportunities. When the perceived benefits outweigh the sacrifices, community support and acceptance are more likely to follow. In the context of Nowshera District, where inadequate infrastructure is widely perceived as a major barrier to business development, particularly in the transport of agricultural commodities, these improvements present significant exchange value. Community respondents expressed strong optimism that such infrastructural investments would promote greater social cooperation and encourage local stakeholders to adapt proactively to the changes introduced by SEZ development.

6.4. Socio-economic Dimension of SEZs under CPEC

Socio-economic development constitutes a critical determinant of local prosperity. Regression analysis confirms a strong positive association between SEZ outcomes and social improvements ($\beta = 0.437$, $p < 0.001$), indicating that the social benefits facilitated by SEZs, including enhanced access to education, healthcare, and road-connected social services, will elevate living standards in the study area. Viewed through the lens of Social Exchange Theory (SET), communities that perceive favourable exchanges, such as better access to education and healthcare, are more likely to exhibit higher satisfaction and stronger civic engagement. The findings of this study are consistent with Hali (2020) and Siddiqi (2020), who emphasise that CPEC requires particular attention to the socio-economic sector to improve the economic and social well-being of the population. Likewise, Saad (2020) maintains that the long-term success of CPEC depends on public acceptance, which is closely tied to the project's ability to deliver economic benefits to local communities. On the other hand, perceptions of inadequate or uneven service provision may generate dissatisfaction and resistance. For SEZs in Nowshera District to foster sustainable socio-economic development, they must demonstrate visible and meaningful improvements in local living conditions.

CPEC social programs must actively incorporate inclusivity measures to ensure that both rural and urban populations benefit equitably. Crucially, economic opportunities generated by SEZs require equitable distribution, particularly for women, local enterprises, and marginalised groups. Such equity reinforces the perceived exchange value, strengthens community engagement, and secures broader support for this international initiative. As Landry (2021) reports, involving local communities in CPEC is a key strategy for mitigating project opposition. Furthermore, clarifying project timelines is essential to alleviate stakeholder concerns regarding timely completion, while ensuring benefits are distributed broadly, equally, and equitably among local populations (International Crisis Group, 2018).

6.5. Ecological and socio-cultural dimensions of SEZs under CPEC

Environmental sustainability is an increasing concern. It exhibits a moderately positive coefficient (β = 0.219, p = 0.006), indicating a slightly positive association between environmental considerations and local development. Conversely, the lower mean value for environmental sustainability (mean: 2.71) suggests that the ecological costs of Special Economic Zones (SEZs), such as pollution and land-use changes, remain substantial. A serious concern raised by respondents pertains to the environmental sustainability of the Rashakai Special Economic Zone. Respondents expressed the view that this mega project will cause ecological damage due to industrialisation, population growth, land-use changes, and biodiversity loss. As reported in a previous study, concerns exist regarding potential displacement from ancestral lands due to project construction. Therefore, local communities fear of hardships such as land loss, prolonged livelihood disruption, social isolation, and cultural heritage destitution (Ahsan, 2016). Within the framework of Social Change Theory and the establishment of special economic zones, the findings of the study are highly pertinent to Social Exchange Theory. This theory reveals that mega infrastructure projects like SEZs play a significant role in transforming, modernising, and reshaping the socio-economic aspects of the district of Nowshera and its surrounding districts. However, the study also highlights potential disadvantages of these changes: the core-periphery effect. In this dynamic, urban areas are likely to capture the benefits of these shifts, while rural areas bear the cost, facing the brunt of both environmental effects and socio-cultural impacts.

This presents a serious concern regarding the potential for imbalances that could undermine inclusive and equitable progress driven by SEZs under CPEC. This phenomenon is also emphasised by Social Exchange Theory, which posits that if local populations perceive the environmental concerns associated with industrialisation as unreasonable or excessively disruptive, this perception will erode the perceived benefits of SEZs. Therefore, in light of insights from Social Exchange Theory, environmental issues need to be addressed proactively to establish equilibrium between economic/infrastructure benefits and ecological/social costs. Sustainable practices that guarantee and safeguard ecological protection are essential. Such practices can reinforce the social contract with communities and foster greater social collaboration with project developers.

6.6. Local Development under SEZs under CPEC

The dependent variable, local development, represents the collective outcome of the multiple influences identified in this study. The significant positive association (β = 0.493, p < 0.001) indicates that all factors —economic impact, infrastructure development, socio-economic progress, cultural effects, and environmental sustainability — contribute to the overall development of District Nowshera. The relatively high coefficient suggests that integrated approaches, which address multiple dimensions of development simultaneously, are more likely to generate positive outcomes.

Social Exchange Insight: Local development is maximised when perceived benefits across all dimensions (economic, social, environmental, and cultural) are appropriately balanced. Communities are more likely to benefit from SEZs when they perceive that these interventions respond to their comprehensive needs, ranging from economic opportunities to environmental preservation.

Ethiopia's Hawassa Industrial Park (HIP) provides a compelling example of successful SEZ policy implementation in a developing-country context. Established under Ethiopia's Growth and Transformation Plan II (GTP II)—a national strategy aimed at industrial diversification HIP was explicitly designed to drive industrial expansion and attract foreign direct investment (FDI). During its establishment, the Ethiopian government assumed a central stewardship role, coordinating policies and making targeted public investments to demonstrate a sustained commitment to the park's long-term viability (Tadesse, 2018).

HIP's infrastructure was intentionally designed to ensure operational reliability, including a dedicated energy system that guarantees a consistent power supply for manufacturing activities. Additionally, the development of Hawassa International Airport nearby, coupled with integration into major railway lines and regional road networks, created a cohesive transportation ecosystem. This enhanced connectivity positively influenced the mobility of goods, thereby increasing the park's attractiveness to export-oriented firms (Gebrehiwot et al., 2025).

In terms of environmental sustainability, HIP implemented a Zero Liquid Discharge (ZLD) system for wastewater management. This system prevents water pollution, a particularly significant concern given the park's proximity to sensitive aquatic ecosystems, and aligns with international standards for long-term environmental sustainability (Tadesse, 2018). Beyond environmental protection, the ZLD system also ensures compliance with global investor requirements, further enhancing HIP's competitiveness as an SEZ.

Ultimately, HIP illustrates how a robust SEZ policy that integrates infrastructure development, environmental safeguards, and investment incentives can simultaneously attract investment, stimulate economic growth, and maintain environmental protection. For District Nowshera, this example highlights the importance of designing SEZ interventions that are comprehensive, multidimensional, and responsive to both economic and environmental needs, thereby maximising local development outcomes in line with Social Exchange Theory.

7. Conclusion

This study examined local stakeholder perceptions of CPEC-induced SEZs and infrastructure development in Nowshera, KP. Findings indicate strong optimism regarding economic and socio-economic benefits, including job creation, improved access to education and healthcare, enhanced vocational training, and upgraded transportation and communication infrastructure. SEZs are expected to stimulate industrial growth, position Nowshera as a regional economic hub, elevate living standards, and help break the long-standing cycle of poverty and unemployment. The interplay of social inclusion, infrastructure enhancement, economic opportunity, and gender empowerment shapes local development.

However, the study also highlights critical challenges. Socio-cultural disruption emerges as a major concern, with industrialisation potentially threatening local identity, norms, values, and traditions. Environmental risks, including biodiversity loss, pollution, and farmland conversion, as well as their impacts on surrounding ecosystems, pose additional barriers, particularly to gender-inclusive growth. The findings underscore the need for policy frameworks that integrate environmental safeguards, socio-cultural preservation strategies, equitable wealth distribution, and inclusive participation for local communities and SMEs. Achieving sustainable development under CPEC thus

requires balancing economic modernisation with cultural heritage protection, social equity, and ecological sustainability.

8. Recommendations

Based on the study's findings and insights from Social Exchange Theory, the following recommendations are proposed:

- Promote Equitable Economic Inclusion
  Ensure that the economic benefits of SEZs reach local businesses, marginalised groups, and women. Strategic planning and inclusive policies can increase the perceived value of development and build stronger community support.
- Foster Cultural Sensitivity and Engagement
  Active involvement of local communities in SEZ planning is essential to mitigate negative impacts. Without such engagement, industrial expansion and land-use changes risk eroding cultural identity, disrupting social cohesion, and generating conflict. Targeted measures are needed to preserve traditions and address social concerns, particularly in the most affected communities.
- Enforce Environmental Safeguards
  SEZ development must integrate environmental protection measures, including green technologies and sustainable practices, to minimise ecological damage and ensure long-term sustainability.
- Integrate Social Development Programs
  Invest in education, healthcare, and vocational training, especially for women, rural populations, and low-skilled workers. This will enhance community well-being and support inclusive growth.
- Develop Adaptive Monitoring Systems
  Establish local-level monitoring frameworks with clear indicators to track socio-economic, cultural, and environmental impacts. A feedback system should be in place to adjust strategies in response to emerging challenges.

9. Limitations of the Study

While this study provides valuable insights into the perceived impacts of Special Economic Zones (SEZs) under the China-Pakistan Economic Corridor (CPEC) on local development, several limitations must be acknowledged that may influence the scope, depth, and generalizability of the findings.

1. Perception-Based Nature: This study is grounded in a perception-based approach, focusing on how residents interpret the impacts of SEZs. While perceptions offer crucial insights into community sentiments and social responses, they are inherently subjective and do not provide objective measurements of actual developmental outcomes. Thus, the study cannot quantify the precise economic or infrastructural changes resulting from CPEC initiatives.
2. Geographical Scope: The research is confined to the Rashakai Special Economic Zone in District Nowshera. As a result, the findings reflect localised experiences and should not be generalised to the national level or to other SEZs across Pakistan. Regional variations in policy implementation, socio-political contexts, and development dynamics may lead to differing outcomes elsewhere.
3. Cross-Sectional Design: The data were collected at a single point in time, which limits the ability to observe changes over time or to establish causal relationships between SEZ development and local development outcomes. A longitudinal

approach would be more suitable for capturing evolving perceptions and long-term effects.

4. Respondent Bias: Participants' responses may be influenced by personal experiences, political views, cultural expectations, or anticipated project outcomes. These factors can introduce biases that may affect the objectivity of the data.
5. Access and Representation: Due to logistical constraints, resource limitations, cultural sensitivities, and local security concerns, certain demographic groups, such as women, minorities, or individuals in remote areas, may have been underrepresented. This could affect the inclusivity and overall comprehensiveness of the findings.

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