

Scenario Planning of Urban Gendered-Development in Surabaya

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ABSTRACT:

This study investigates the development of gender equality in Surabaya by analysing the Gender Development Index (GDI) from 2020 to 2023 and projecting its trajectory until 2025. Employing a quantitative-descriptive approach, the research utilises secondary data obtained from Badan Pusat Statistik Surabaya and applies linear regression analysis to examine trends in gender equality across the dimensions of health, education, and economic achievement. The findings demonstrate a consistent increase in the GDI, from 93.58 in 2020 to 95.56 in 2023, reflecting gradual progress toward gender parity despite the persistence of disparities between men and women, particularly in income distribution and political participation. The regression model further predicts continued improvement, with projected GDI values reaching 96.17 in 2024 and 96.86 in 2025. The novelty of this study lies in its integration of statistical trend analysis with a gender-governance perspective to evaluate not only numerical progress but also the structural challenges underlying gender inequality in an urban Indonesian context. This research contributes to the discourse on gender mainstreaming by providing empirical projections of gender equality at the municipal level and offering policy-oriented insights for strengthening gender-responsive governance in support of the achievement of Sustainable Development Goal 5 on gender equality by 2030.

INTRODUCTION

Urbanization has become one of the most influential transformations in the contemporary global development process, particularly in developing countries where rapid population growth, industrial expansion, and spatial transformation continuously reshape social and economic structures (Gu, 2019; Song et al., 2024). Cities are increasingly recognized as centers of economic productivity, technological innovation, education, and public service provision (Anttiroiko et al., 2014; Villamejor-Mendoza, 2020). However, alongside these

opportunities, urbanization also produces multidimensional inequalities that affect social groups differently, especially women and marginalized communities (De Snyder et al., 2011; Dhamija et al., 2025). In many developing urban areas, women continue to face disparities in access to education, employment opportunities, healthcare, political participation, and urban infrastructure (Chant, 2013). As a result, urban development cannot solely focus on economic growth and physical infrastructure expansion but must also incorporate social inclusion and gender

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equality as central elements of sustainable urban governance (Cheema, 2020; Mirzoev et al., 2022).

The increasing complexity of urban challenges has encouraged governments and international organizations to promote gender-responsive urban governance as an essential strategy for sustainable development (Das, 2020; Ababneh et al., 2025). Gender-responsive governance emphasizes the integration of gender perspectives into urban planning, policymaking, budgeting, and public service delivery (Rubin & Bartle, 2022; Rubin & Bartle, 2023; Khan, 2023). This approach acknowledges that men and women experience urban environments differently due to variations in social roles, mobility patterns, economic opportunities, and vulnerability to urban risks (Moser, 2012). Consequently, local governments are expected to formulate inclusive development policies capable of ensuring equal access to opportunities and resources for all citizens. Gender mainstreaming policies have therefore become increasingly important in urban governance, particularly in cities experiencing rapid socio-economic transformation and widening inequality (Jenson, 2015; Solomon et al., 2021).

In Indonesia, the commitment to gender equality has been institutionalized through various national and regional policy frameworks related to gender mainstreaming and sustainable development (Prihatiningtyastuti et al., 2022; Novovic, 2023). The assessment of gender equality and women's empowerment at the regional level is reflected in the Gender Development Index (GDI) and Gender Empowerment Index (GEI), which are regularly published by *Badan Pusat Statistik*. The GDI measures gender disparities in health, education, and economic achievement (Dijkstra & Hanmer, 2000; Perrin, 2022), while the GEI evaluates women's participation in political, professional,

and economic activities (Koengkan et al., 2026; Cascella et al., 2022; Ibourk & Hninou, 2025). These indicators function as important instruments for evaluating regional development performance and identifying persistent gender disparities across provinces and municipalities. Despite improvements in several regions, inequalities remain visible in labor force participation, wage distribution, access to leadership positions, and decision-making opportunities (BPS, 2023; Bussolo et al., 2024; Arora et al., 2023).

Within the Indonesian urban context, Surabaya has frequently been recognized as one of the leading examples of urban transformation and inclusive governance (Shirleyana et al., 2018; Salim & Drenth, 2020). As the second-largest metropolitan city in Indonesia, Surabaya has implemented various innovations in public administration, smart city governance, environmental management, and community empowerment programs (Santosa, 2000; Renzi & Frenzel, 2025). The municipal government has also promoted initiatives related to women's empowerment, micro-enterprise development, family welfare programs, and gender-responsive public services (Wicaksono et al., 2025; Aldhi et al., 2025). These policies have contributed to positive improvements in the city's gender development indicators. Nevertheless, rapid urbanization, digital transformation, economic restructuring, and demographic changes continue to generate uncertainties regarding the future trajectory of gender equality in the city. Women remain vulnerable to unequal labor market structures, informal employment, digital exclusion, and limited access to strategic urban resources (Rani et al., 2022; Gupta & Kiran, 2025; Kalaoane & Matamanda, 2024). In addition, emerging urban challenges such as climate vulnerability, technological disruption, and economic

instability may further influence the future condition of urban gender development.

Despite significant progress, gender disparities persist in multiple dimensions of urban life in Surabaya (Kinasih et al., 2025). Women continue to experience unequal opportunities in education, employment, political representation, and access to urban services. Many women remain concentrated in informal sectors characterized by low wages, limited social protection, and employment insecurity. Gender inequality is also reflected in unequal access to healthcare, safe transportation, digital technology, and inclusive public spaces. These structural challenges indicate that current development policies may not be fully adaptive to future urban transformations. Existing studies on gender development in Indonesia generally focus on descriptive analyses of current conditions, while limited attention has been given to future-oriented approaches capable of anticipating uncertainty and alternative pathways of urban development (Zainol & Noor, 2026; Shantiko et al., 2021; Ngo et al., 2025). Consequently, there is an urgent need for a scenario planning approach that can identify major driving forces, critical uncertainties, and possible future scenarios of urban gender development in Surabaya. This study therefore seeks to analyze how urban gender development has evolved in Surabaya and to identify the social, economic, political, technological, and environmental factors that influence gender equality in the city. Furthermore, the study aims to formulate alternative future scenarios that may emerge in relation to urban gender development and to propose strategic policy recommendations capable of supporting inclusive and sustainable urban governance. By utilizing a scenario planning framework, the study attempts to provide a future-oriented understanding of gender development that goes beyond conventional statistical analysis and enables

policymakers to anticipate emerging urban challenges more effectively.

The significance of this study lies in its academic and practical contributions. The research contributes to the interdisciplinary discourse on gender studies, urban governance, and scenario planning by integrating gender analysis with future-oriented policy approaches. The study also expands theoretical discussions concerning the relationship between urban transformation and gender equality in developing countries. From a practical perspective, the research provides important insights for policymakers, urban planners, and local government institutions in designing adaptive and gender-responsive urban development strategies. The scenario planning framework developed in this study may assist decision-makers in anticipating future uncertainties while strengthening women's participation, social inclusion, and equitable urban governance. Moreover, this study contributes to the achievement of the global development agenda established by the United Nations Sustainable Development Goals (SDGs), particularly Goal 5 concerning gender equality and women's empowerment and Goal 11 concerning sustainable, inclusive, safe, and resilient cities. Through its emphasis on gender-responsive urban governance and long-term strategic planning, this research supports broader efforts to create urban environments that are socially inclusive, economically equitable, and sustainable for future generations

LITERATURE REVIEW

The discussion of urban gender development requires an interdisciplinary perspective that integrates gender studies, urban governance, public policy, and future-oriented planning approaches. This literature review examines the conceptual foundations of gender development, urban gender perspectives, scenario planning

theory, urban governance and gender policy in Indonesia, as well as previous studies related to urban gender development and scenario planning. Through these discussions, the study establishes a theoretical framework for understanding the dynamics of gender equality in urban contexts and identifying the research gap addressed in this study.

Literature Mapping

The literature mapping table demonstrates that previous studies on gender development, urban governance, and scenario planning have provided important theoretical and empirical contributions to understanding gender inequality within urban contexts. However, these studies also reveal several limitations that justify

Table 1. Literature Mapping

No	Author(s)	Focus of Study	Method	Main Findings	Research Gap
1	Chant & McIlwaine (2016)	Urban poverty and gender inequality	Qualitative urban analysis	Women experience greater vulnerability in urban poverty structures	Limited future-oriented analysis
2	Moser (2012)	Gender mainstreaming and development	Policy analysis	Gender perspectives must be integrated into governance	Does not specifically discuss urban scenario planning
3	Fenster (2005)	Feminist urbanism	Critical urban theory	Cities are shaped by gendered power relations	Limited policy-oriented recommendations
4	UN Women (2020)	Gender-sensitive urban planning	Institutional policy review	Safe and inclusive urban spaces are essential for women	Focused more on planning practices than future scenarios
5	Börjeson et al. (2006)	Scenario typology and planning	Conceptual framework	Scenario planning helps address uncertainty	Does not focus on gender development
6	Schoemaker (1995)	Strategic scenario planning	Strategic management analysis	Multiple future scenarios improve policymaking	Limited application in urban gender governance
7	Suryahadi & Al Izzati (2018)	Gender policy implementation in Indonesia	Policy evaluation	Institutional constraints affect gender mainstreaming	Limited focus on urban governance dynamics
8	This Study	Urban gender development in Surabaya	Scenario planning approach	Examines future gender development pathways and policy strategies	Integrates urban gender studies with future-oriented governance analysis

Source: Processed Data

the importance and novelty of the present research. The study conducted by Chant and McIlwaine (2016) primarily examined the relationship between urban poverty and gender inequality in developing countries. Their research highlighted that women are disproportionately affected by urban poverty due to unequal labor structures, caregiving responsibilities, and limited access to economic opportunities. The study emphasized that urbanization often intensifies women's vulnerability, particularly among low-income households living in informal settlements (Chant & McIlwaine, 2016). Although the research successfully demonstrated the gendered dimensions of urban poverty, it mainly focused on current social conditions and did not provide a future-oriented framework for analyzing how urban gender inequality may evolve over time.

Moser (2012) contributed significantly to the understanding of gender mainstreaming in development policy (Moser, 2012). Gender perspectives must be systematically integrated into governance structures, planning systems, budgeting processes, and public policy implementation (Kumari, 2018). The study established gender mainstreaming as a crucial strategy for achieving inclusive development (Moser, 2012). Nevertheless, the research focused more on institutional and policy frameworks rather than exploring how gender-responsive governance may respond to future urban uncertainties and structural transformations. The work of Fenster (2005) introduced a feminist urbanism perspective that conceptualized cities as gendered spaces shaped by unequal power relations. The study argued that urban environments are often designed according to male-centered assumptions, which can marginalize women's experiences related to safety, mobility, and access to public space (Fenster, 2005). This perspective contributed to critical urban

theory by emphasizing the importance of inclusive urban design and women's rights to the city. However, the study was largely theoretical and offered limited practical policy recommendations for local governments.

Research conducted by UN Women (2020) focused on gender-sensitive urban planning and emphasized the importance of inclusive transportation systems, safe public spaces, accessible public services, and participatory urban governance. The study highlighted that gender-responsive urban infrastructure is essential for improving women's participation in economic and social activities (UN Women, 2020). Although this research provided valuable practical recommendations for urban planners, it concentrated primarily on planning and design practices without discussing long-term future scenarios of urban gender development. In the context of scenario planning theory, Börjeson et al. (2006) explained different types of scenarios and their applications in policy analysis (Börjeson et al., 2006). Scenario planning is a useful analytical tool for addressing uncertainty and complexity in future-oriented policymaking. The study categorized scenarios into exploratory, predictive, and normative approaches, each serving different strategic purposes (Börjeson et al., 2006). However, the research remained conceptual and did not specifically address gender issues or urban governance contexts.

Similarly, Schoemaker (1995) emphasized the role of scenario planning in improving strategic thinking and decision-making processes. According to the study, organizations and policymakers can better prepare for uncertain futures by considering multiple plausible scenarios rather than relying on linear forecasting methods (Schoemaker, 1995). While the study became a foundational reference in strategic management and scenario

planning literature, its application to urban gender governance remained limited. In Indonesia, Suryahadi & Al Izzati (2018) examined the implementation of gender mainstreaming policies and found that institutional limitations, weak coordination, and insufficient gender-sensitive data often hinder effective policy implementation. Their study demonstrated that formal policy commitments do not always translate into effective gender-responsive governance practices at the local level (Suryahadi et al., 2023; Fauziyah et al., 2020). However, the research focused mainly on policy evaluation and did not analyze how future urban transformations may affect gender equality outcomes.

Based on the literature mapping, the present study positions itself as an attempt to bridge the gap between urban gender studies and future-oriented governance analysis. Unlike previous studies that predominantly focused on current gender conditions or conceptual discussions of scenario planning, this research integrates both perspectives by applying a scenario planning approach to urban gender development in Surabaya. The novelty of this study lies in its effort to explore possible future pathways of gender equality within an urban governance context while simultaneously identifying strategic policy implications for sustainable and inclusive development. Through this integration, the study contributes not only to academic discussions on gender and urban governance but also to practical policymaking processes aimed at anticipating future urban challenges.

Concept of Gender Development

Gender development refers to the process of improving equality and justice between men and women in various dimensions of social, economic, political, and cultural life (Cornwall & Rivas, 2015; Rasool, 2017). The concept emphasizes that development

should provide equal opportunities, access, participation, and benefits for all individuals regardless of gender. Gender equality itself refers to a condition in which women and men possess equal rights, responsibilities, and opportunities in accessing education, healthcare, employment, political participation, and decision-making processes (Dhar, 2018; Nanni, 2023; Kumar & Pandey, 2021). Gender equality does not imply that women and men become identical, but rather that their opportunities and life chances are not determined by socially constructed gender roles (Grusky & Hill, 2018; Risman, 2018; Heise et al., 2019). Closely related to gender equality is the concept of gender empowerment, which focuses on enhancing women's capacity to participate actively in social, economic, and political processes. Gender empowerment involves increasing women's access to resources, strengthening their participation in governance, and expanding their ability to influence decisions affecting their lives (Kabeer, 1999) but also future claims, to both material and human and social resources (Das, 2024; Mehra, 1997). In the development context, empowerment is viewed not only as an economic issue but also as a social and political process that enables women to challenge structural inequalities and discriminatory institutions.

In Indonesia, gender development is commonly measured through the Gender Development Index (GDI) and Gender Empowerment Index (GEI) published by *Badan Pusat Statistik*. The GDI measures disparities between men and women in dimensions such as health, education, and economic achievement, while the GEI evaluates women's participation in political representation, professional occupations, and economic activities. These indicators are important tools for assessing regional development performance and identifying areas where gender disparities remain significant (BPS, 2023). The use of GDI

and GEI has become increasingly relevant in evaluating local government policies related to gender equality and women's empowerment. The implementation of gender equality policies in public administration is closely associated with the concept of gender mainstreaming. Gender mainstreaming refers to the systematic integration of gender perspectives into policy formulation, planning, implementation, monitoring, and evaluation processes (Moser, 2012). The approach emerged from international commitments to women's rights and sustainable development, particularly after the Fourth World Conference on Women in Beijing in 1995. Gender mainstreaming emphasizes that gender equality should not be treated as a separate policy sector but should instead become an integral consideration across all areas of governance and development. In urban contexts, gender mainstreaming is particularly important because urban policies often influence women and men differently in terms of mobility, safety, employment, and access to public services.

Urban Gender Perspective

The relationship between gender and urban development has become a major concern in urban studies, particularly within feminist urbanism perspectives. Feminist urbanism argues that cities are not gender-neutral spaces because urban environments are shaped by social structures, power relations, and institutional practices that often privilege male experiences and needs (Fenster, 2005). Urban planning has historically prioritized economic productivity and physical infrastructure while paying limited attention to women's experiences related to safety, caregiving responsibilities, mobility, and access to public spaces. Consequently, feminist scholars advocate for gender-sensitive cities that recognize diverse urban experiences and promote inclusive urban

governance. Gender-sensitive urban development emphasizes equal access to public spaces, transportation systems, housing, employment opportunities, and social services. Women often experience cities differently from men due to unequal caregiving responsibilities, concerns over personal safety, and restricted mobility patterns. For instance, inadequate public transportation systems and unsafe public spaces may limit women's participation in education and employment activities (UN Women, 2020). Similarly, unequal housing conditions and informal settlement patterns often expose women to greater vulnerability, particularly among low-income households. Urban poverty also has significant gender dimensions. Women are disproportionately represented in informal employment sectors characterized by unstable income, lack of social protection, and limited labor rights. In many developing cities, women bear the dual burden of productive and reproductive labor, where they are expected to contribute economically while simultaneously managing domestic responsibilities (Chant & McIlwaine, 2016). These conditions increase women's vulnerability to economic crises, urban displacement, environmental risks, and social exclusion. Therefore, urban gender perspectives emphasize the importance of inclusive urban policies capable of addressing structural inequalities within rapidly urbanizing societies.

Scenario Planning Theory

Scenario planning is a strategic analytical method used to explore possible future conditions under situations of uncertainty and complexity. The approach originated in military and corporate strategic planning during the mid-twentieth century and later expanded into public policy and governance studies (Schoemaker, 1995). Rather than predicting a single future outcome, scenario planning develops multiple plausible

futures based on the interaction of driving forces, trends, and critical uncertainties. This method enables policymakers and organizations to anticipate change, evaluate risks, and formulate adaptive strategies. The development of scenario planning has evolved from deterministic forecasting approaches toward more participatory and exploratory frameworks. Exploratory scenarios focus on examining possible future developments based on current trends and uncertainties, while normative scenarios describe preferred or desired futures that policymakers aim to achieve (Börjeson et al., 2006). Exploratory scenarios are commonly used to analyze uncertainties and identify alternative trajectories, whereas normative scenarios are often utilized in strategic planning and policy design. In public policy and urban governance, scenario planning has become increasingly important due to the growing complexity of urban challenges such as climate change, technological transformation, demographic shifts, and socio-economic inequality. Scenario planning allows policymakers to examine how different social, economic, political, and environmental factors may shape future urban conditions. In the context of gender development, scenario planning provides a useful framework for understanding how urbanization, labor market changes, digital transformation, and governance systems may influence future gender equality outcomes. Through this approach, governments can design more adaptive and resilient gender-responsive policies capable of addressing long-term uncertainties.

Urban Governance and Gender Policy in Indonesia

Indonesia has demonstrated a formal commitment to gender equality through various national policy frameworks related to gender mainstreaming and women's empowerment. One of the most important

policies is Presidential Instruction No. 9 of 2000 concerning Gender Mainstreaming in National Development (Listiani et al., 2025), which requires government institutions to integrate gender perspectives into planning, implementation, monitoring, and evaluation processes. This policy established gender mainstreaming as a national development strategy and encouraged local governments to adopt gender-responsive governance mechanisms. At the local level, gender-responsive governance has been implemented through women's empowerment programs, gender-responsive budgeting, community development initiatives, and inclusive public service reforms. Several local governments have introduced policies aimed at increasing women's economic participation, improving maternal health-care, strengthening women's political representation, and supporting family welfare programs. Nevertheless, the implementation of gender mainstreaming policies often faces institutional constraints, including limited budget allocation, weak inter-agency coordination, and insufficient gender-sensitive data systems (Suryahadi et al., 2023). Within this context, Surabaya has emerged as one of Indonesia's leading examples of urban governance innovation. The city has implemented various programs related to smart city development, environmental sustainability, public participation, and social inclusion. Gender-responsive initiatives in Surabaya include women's economic empowerment programs, family welfare activities, digital literacy initiatives, and support for micro and small enterprises. The municipal government has also promoted community-based development and public service innovation aimed at strengthening social inclusion. Despite these achievements, challenges related to labor inequality, informal employment, digital exclusion,

and unequal urban access remain important concerns for future urban governance.

METHODS

This study employs a qualitative-descriptive research approach combined with a scenario planning framework to analyze the future trajectory of urban gender development in Surabaya. The qualitative-descriptive approach is used to understand social phenomena, governance dynamics, institutional processes, and policy contexts related to gender development within the urban environment. Qualitative research is considered appropriate because the study seeks to interpret complex social realities, identify key development drivers, and examine how various actors perceive future gender challenges in urban governance (Creswell, 2017). Through this approach, the research is able to explore multidimensional interactions between social, economic, political, and technological factors influencing gender equality in Surabaya. In addition to qualitative analysis, this study also incorporates mixed-method support through secondary statistical analysis. Quantitative data are used to strengthen the interpretation of qualitative findings, particularly in examining trends in the Gender Development Index (GDI) and Gender Empowerment Index (GEI) between 2020 and 2025. The integration of qualitative and quantitative approaches allows the study to provide a more comprehensive understanding of urban gender development by combining statistical evidence with interpretative policy analysis (Creswell & Clark, 2017). This mixed-method orientation is important because gender development involves both measurable indicators and broader institutional and social dimensions that cannot be fully understood through numerical analysis alone.

The statistical analysis in this study begins with the calculation of the

Gender Development Index (GDI), which measures the relative achievement of women's human development compared to men's achievement. The mathematical formulation of the GDI is expressed as follows:

$$GDI = ((HDI_{female}) / (HDI_{male})) \times 100$$

In this equation, HDI_{female} represents the Human Development Index of women, while HDI_{male} represents the Human Development Index of men. The closer the value approaches 100, the smaller the gender development gap between women and men. For example, if the female HDI value in Surabaya is 79.8 and the male HDI value is 83.5, the calculation becomes:

$$GDI = (79.8 / 83.5) \times 100 = 95.57$$

This result indicates that women's development achievement has reached approximately 95.57 percent of men's development achievement.

The study also utilizes the Gender Empowerment Index (GEI) to measure women's participation in political, economic, and decision-making activities. Conceptually, the GEI can be simplified using the following formula:

$$GEI = (Female\ Participation / Total\ Participation) \times 100$$

This equation is used to estimate the proportion of women involved in formal employment sectors, leadership positions, and political representation within urban governance structures. Higher GEI values indicate stronger women's empowerment and broader inclusion in public institutions.

To analyze changes in gender development indicators over time, this study applies a simple linear trend analysis using a linear regression model. The regression equation is formulated as follows:

$$Y = a + bX$$

In this equation, represents gender indicators such as GDI or GEI, represents the constant, is the regression coefficient showing the direction and magnitude of change, and represents the time variable (year). Positive values of indicate increasing trends, while negative values indicate declining trends.

As an illustration, if Surabaya's GDI increased from 93.58 in 2020 to 95.56 in 2023, the annual growth rate can be calculated using the slope equation:

$$b=(Y_2-Y_1)/(X_2-X_1)$$

Substituting the data into the equation gives:

$$b=(95.56-93.58)/(2023-2020)=0.66$$

The result indicates that Surabaya's GDI increased by approximately 0.66 points per year during the observation period. Based on this trend, the projected GDI value for 2025 can be estimated using the linear projection model:

$$Y_{2025}=95.56+(0.66 \times 2)=96.88$$

This projection suggests that if the current trend continues consistently, Surabaya's GDI may reach approximately 96.88 by 2025.

The research was conducted in Surabaya, one of Indonesia's largest metropolitan areas and an important center of economic growth, urban innovation, and public administration. Surabaya was selected as the research location because the city has demonstrated significant progress in urban transformation, smart city governance, environmental management, and social inclusion programs. The municipal government has also implemented various initiatives related to women's empowerment, community development, and gender mainstreaming. Nevertheless, rapid urbanization, labor market transformation, digitalization, and

socio-economic inequality continue to create challenges related to gender equality and inclusive urban governance. These conditions make Surabaya an important case study for examining the future dynamics of urban gender development within the Indonesian context.

The study utilizes both primary and secondary data sources to ensure the comprehensiveness and validity of the analysis. Primary data were obtained through interviews with policymakers, academics, non-governmental organizations (NGOs), women's organizations, and other relevant stakeholders involved in gender-responsive governance and urban development. Interviews were conducted to gain insights into institutional practices, policy implementation, urban challenges, and perceptions regarding the future of gender equality in Surabaya. The inclusion of multiple stakeholders was intended to capture diverse perspectives and identify key uncertainties influencing urban gender development.

Secondary data were collected from various official and academic sources. Statistical data regarding gender development indicators were obtained from publications issued by *Badan Pusat Statistik*, particularly reports concerning the Gender Development Index (GDI) and Gender Empowerment Index (GEI). Additional secondary sources included local government planning documents, gender mainstreaming policy reports, urban development plans, academic journals, books, and policy papers related to gender studies, urban governance, and scenario planning. The use of secondary data was important for understanding long-term development trends and contextualizing qualitative findings within broader policy and statistical frameworks.

Data collection in this study was conducted through several complementary techniques. First, a documentation study

was carried out to examine official reports, policy documents, development plans, statistical publications, and previous academic studies related to urban gender development. Documentation analysis enabled the researcher to identify institutional frameworks, development priorities, and historical trends associated with gender equality in Surabaya. Second, semi-structured interviews were employed to allow flexibility in exploring respondents' experiences, perceptions, and policy insights. This interview format enabled the researcher to investigate complex governance issues while maintaining consistency across key research themes (Kvale & Brinkmann, 2009). Third, Focus Group Discussions (FGDs) were conducted to facilitate collective discussion among stakeholders regarding future urban challenges, gender policy priorities, and possible development scenarios. FGDs were particularly useful for identifying shared concerns, critical uncertainties, and alternative future perspectives relevant to urban gender development.

The data analysis process involved several stages designed to integrate statistical analysis, qualitative interpretation, and scenario planning techniques. The first stage consisted of trend analysis, which examined the development of GDI and GEI indicators between 2020 and 2025. Trend analysis was conducted to identify patterns of change in education, health, economic participation, and political empowerment among women and men in Surabaya. This analysis provided an empirical foundation for understanding the trajectory of gender development and identifying areas where inequality remains significant. Female labor participation within the urban economy was also measured using the Labor Force Participation Rate (LFPR) formula:

$$LFPR = \left(\frac{\text{Labor Force}}{\text{Working Age Population}} \right) \times 100$$

This equation measures the proportion of working-age women actively participating in economic activities. Higher participation rates indicate broader economic inclusion and greater opportunities for women within urban labor markets.

The second stage involved driver analysis aimed at identifying major social, economic, technological, political, and environmental factors influencing urban gender development. Driver analysis focused on understanding how structural transformations such as digitalization, labor market changes, urban expansion, governance reforms, and demographic shifts may affect future gender equality outcomes. According to scenario planning theory, identifying driving forces is an essential step in understanding uncertainty and constructing plausible future scenarios (Schoemaker, 1995).

The final stage of analysis employed a scenario planning framework to develop alternative future scenarios of urban gender development in Surabaya. The scenario planning process began with the identification of key driving forces influencing gender equality within the urban context. Subsequently, critical uncertainties were determined based on factors considered highly influential yet unpredictable, such as political commitment, economic inclusiveness, technological accessibility, and institutional capacity. The interaction among these variables can be conceptually illustrated through the following equation:

$$\text{Future Scenario} = f(\text{Social, Economic, Political, Technological, Environmental Drivers})$$

This equation demonstrates that future urban gender development outcomes are shaped by the interaction between social, economic, political, technological, and environmental factors. The identified uncertainties were then used to construct

a scenario matrix representing different possible future conditions.

Following the construction of the scenario matrix, scenario narratives were developed to describe plausible future trajectories of urban gender development under different governance and socio-economic conditions. Each scenario illustrated distinct patterns of gender equality, institutional adaptation, and urban transformation. Finally, policy implication analysis was conducted to evaluate strategic responses and governance approaches required under each scenario. This stage aimed to provide adaptive and future-oriented policy recommendations capable of supporting gender-responsive urban governance and sustainable development. Through the integration of qualitative interpretation, statistical trend analysis, and scenario planning techniques, this methodology provides a comprehensive framework for examining the future dynamics of urban gender development in Surabaya. Top of Form Bottom of Form

RESULTS AND DISCUSSION

Current Condition of Urban Gender Development in Surabaya

The current condition of urban gender development in Surabaya reflects a dynamic interaction between rapid urbanization, economic transformation, demographic change, and local governance innovation (Asteria et al., 2020); (Ernawati, 2013). As one of Indonesia's largest metropolitan cities, Surabaya has experienced significant progress in urban infrastructure, economic growth, public service delivery, and social development over the past decade. Nevertheless, these achievements are accompanied by persistent gender disparities in employment, income distribution, political participation, and access to urban resources. The condition of gender development in Surabaya can therefore be understood

through demographic characteristics, gender development indicators, policy implementation, and emerging urban challenges that continue to shape the city's social structure. The demographic structure of Surabaya demonstrates the city's strategic importance as a center of urban growth and population concentration in East Java. According to data published by *Badan Pusat Statistik*, the population of Surabaya in 2024 reached approximately 3,018,022 people, consisting of 1,494,734 males (49.5%) and 1,523,288 females (50.5%) (BPS Kota Surabaya, 2025). The relatively balanced gender composition indicates that women constitute a major demographic component within the urban structure of Surabaya. Rapid urbanization has encouraged migration from surrounding regions into the city, increasing labor market competition and expanding the informal employment sector. Urban expansion has also transformed social relations and labor structures, where women increasingly participate in economic activities outside the domestic sphere.

The urban labor structure in Surabaya reflects the broader transformation of Indonesia's urban economy from manufacturing-based activities toward service-oriented and digital sectors. However, women remain disproportionately concentrated in informal employment characterized by lower wages, limited social protection, and insecure working conditions. Female labor force participation continues to be lower than male participation rates due to domestic responsibilities, unequal employment opportunities, and structural barriers within the labor market.

In labor economics, labor force participation rate (LFPR) is commonly calculated using the following formula:

$$LFPR = (Labor\ Force / Population\ Aged\ 15+) \times 100$$

Using this formula, women's labor participation can be evaluated by comparing the number of economically active women with the total female working-age population. Research on gender participation in Indonesia indicates that higher Gender Development Index (GDI) and Gender Empowerment Index (GEI) values are positively associated with improvements in female labor force participation (Sari et al., 2024).

The condition of gender development in Surabaya can also be analyzed through the Gender Development Index (GDI) and Gender Empowerment Index (GEI). Based on data from *Badan Pusat Statistik*, Surabaya's GDI showed a positive upward trend from 93.58 in 2020 to 95.56 in 2023, indicating gradual improvement in gender equality across education, health, and economic dimensions. The mathematical formulation of the GDI is generally expressed as the ratio between female and male Human Development Index (HDI):

$$GDI = ((HDI_{female}) / (HDI_{male})) \times 100$$

For example, if the female HDI value in Surabaya is estimated at 79.8 while the male HDI reaches 83.5, the calculation becomes:

$$GDI = (79.8/83.5) \times 100 = 95.57$$

This result illustrates that women's human development achievements in Surabaya are approaching those of men, although disparities still exist in several sectors.

In the educational dimension, Surabaya demonstrates relatively high educational attainment compared to many other Indonesian cities. Access to primary, secondary, and higher education has expanded significantly due to local government investment in educational infrastructure and scholarship programs. Nevertheless, educational disparities

remain visible in certain professional and technological fields where male participation is still dominant. Educational achievement indicators are generally measured through expected years of schooling and average years of schooling. Improvements in female education have contributed positively to women's participation in the urban labor market and public life.

In the health dimension, women in Surabaya generally experience higher life expectancy than men, reflecting improvements in healthcare access, maternal health services, and public health infrastructure. According to BPS discussions on Surabaya's gender development performance, women's life expectancy remains higher than that of men, although disparities continue to exist in economic achievement indicators. Life expectancy is one of the main variables used in calculating human development and gender development indicators. The health index can be simplified mathematically as follows:

$$Health\ Index = ((LE - LE_{min}) / (LE_{max} - LE_{min}))$$

Where LE represents life expectancy at birth. Higher life expectancy values indicate better health achievement and improved quality of life.

Economic participation remains one of the most significant dimensions of gender inequality in Surabaya. Although women increasingly participate in urban economic activities, wage disparities and occupational segregation continue to affect women's economic status. Women are more likely to work in informal sectors such as small-scale trade, domestic services, and micro-enterprises, which often provide lower income stability. Wage inequality between men and women can be expressed mathematically through the gender wage gap formula:

$$Gender\ Wage\ Gap = ((W_f - W_m) / W_m) \times 100$$

Where W_m represents average male wages and W_f represents average female wages. For example, if average monthly male income is IDR 5,000,000 and average female income is IDR 4,000,000, the wage gap calculation becomes:

$$\frac{(5,000,000-4,000,000)/5,000,000}{1} \times 100 = 20\%$$

This means that women earn approximately 20 percent less than men on average under similar economic conditions.

Political representation also remains an important component of gender empowerment in Surabaya (Diliani & Susanti, 2015). Although women's participation in local governance and public institutions has improved, women remain underrepresented in strategic political and bureaucratic positions (Bishu, 2022). Efforts to strengthen women's political participation have been supported through gender mainstreaming initiatives and inclusive governance programs implemented by the municipal government. According to local policy discussions, women's contribution to urban development has increasingly been recognized within regional development planning processes. The Surabaya municipal government has implemented various gender-responsive policies and programs aimed at promoting women's empowerment and inclusive urban development (Romadhona & Oktafenanda, 2025). These include gender mainstreaming initiatives, family welfare programs, women's entrepreneurship support, digital literacy training, and inclusive public service reforms. Gender mainstreaming has been institutionalized through local regulations and integrated planning mechanisms intended to ensure that development policies consider the different needs of men and women (Avakyan et al., 2026); (Cassola et al., 2026); (Pratiwi et al., 2026). Inclusive urban planning

practices have also attempted to improve accessibility to public transportation, healthcare facilities, educational services, and community spaces for women and vulnerable groups.

Despite these achievements, Surabaya continues to face multiple challenges related to urban gender development. Informal employment and wage inequality remain major issues affecting women's economic security. Many women continue to work in unstable sectors with limited legal protection and social security benefits. Gender-based violence also remains a significant concern within urban environments, particularly in relation to domestic violence, workplace harassment, and public space safety (Araujo et al., 2026; Natarajan et al., 2026). Unequal access to urban resources such as housing, transportation, technology, and financial services further contributes to structural inequality between men and women (Paramaiah et al., 2026); Moayedfar et al., 2026. Another emerging issue is the digital gender divide, which reflects unequal access to technology, digital literacy, and information systems. Although Surabaya has promoted smart city governance and digital transformation, women from low-income and marginalized communities often face barriers in accessing digital technology and online economic opportunities. This inequality became increasingly visible during periods of economic and social disruption when digital access became essential for education, employment, and public services. Therefore, the future trajectory of urban gender development in Surabaya will depend not only on economic growth and infrastructure development but also on the city's ability to create inclusive, adaptive, and gender-responsive governance systems capable of addressing emerging urban challenges.

Driving Forces and Critical Uncertainties

The future trajectory of urban gender development in Surabaya is shaped by multiple driving forces originating from social, economic, political, technological, and environmental transformations (Rahman et al., 2026; Ula et al., 2026). These driving forces interact dynamically within the urban governance system and influence how gender equality evolves over time. In scenario planning analysis, driving forces represent structural factors that significantly affect future development conditions, while critical uncertainties refer to highly influential variables whose future outcomes remain unpredictable (Schoemaker, 1995). Understanding these drivers and uncertainties is essential for identifying potential opportunities, risks, and policy implications related to urban gender development.

One of the most important social drivers influencing gender development in Surabaya is access to education. Education plays a central role in improving women's social mobility, labor market participation, political awareness, and economic independence. Increased educational attainment among women has contributed significantly to improvements in the Gender Development Index (GDI) and women's participation in urban economic activities. In urban development analysis, educational achievement is often measured using expected years of schooling and average years of schooling. The relationship between education and human development can be expressed mathematically through a simplified educational index formula:

$$\text{Education Index} = (MYSI + EYSI) / 2$$

Where *MYSI* refers to the Mean Years of Schooling Index and represents the Expected Years of Schooling Index. Higher educational attainment generally increases women's opportunities to access

formal employment, technological skills, and political participation. Nevertheless, educational inequality still exists in certain professional sectors, particularly in science, technology, engineering, and digital industries where male participation remains dominant.

Cultural norms and patriarchal structures also function as major social drivers affecting urban gender development. Although urbanization has encouraged greater women's participation in education and employment, patriarchal values continue to influence household responsibilities, labor division, and leadership opportunities. Women are often expected to balance productive and reproductive roles simultaneously, which limits their opportunities for career advancement and political participation (Moser, 2012). Patriarchal norms may also influence perceptions regarding women's leadership capabilities, access to decision-making positions, and freedom of mobility within urban environments. Consequently, social transformation and cultural adaptation become essential components in achieving sustainable gender equality in urban governance.

Population mobility and urban migration further shape the dynamics of gender development in Surabaya. As a metropolitan city and economic center in East Java, Surabaya attracts migrants from surrounding regions seeking employment, education, and better living opportunities. Urban migration contributes to labor market expansion and demographic diversification but also increases competition for housing, employment, transportation, and public services. Women migrants are often concentrated in informal employment sectors characterized by unstable income and limited social protection. Population mobility also influences family structures, caregiving responsibilities,

and social support systems within urban communities. Therefore, urban migration patterns constitute an important social driver influencing future gender equality conditions in Surabaya.

Economic transformation represents another major driving force affecting urban gender development. The labor market in Surabaya has gradually shifted from industrial manufacturing activities toward service-oriented and digital economic sectors. This transformation creates both opportunities and risks for women's economic participation. On the one hand, the expansion of service industries, creative economies, and digital entrepreneurship provides new employment opportunities for women. On the other hand, technological disruption and labor market competition may increase inequality for women lacking digital skills or formal educational qualifications. Urban labor market transformation can be analyzed through labor force participation trends using the following formula:

$$\text{Labor Force Participation Rate} = (\text{Labor Force} / \text{Working Age Population}) \times 100$$

An increase in female labor force participation indicates greater inclusion of women within urban economic systems. However, women continue to experience occupational segregation, wage inequality, and concentration in low-income informal sectors. These structural inequalities remain important challenges for achieving inclusive economic development.

Participation in the digital economy has also become increasingly influential in shaping gender development outcomes. The rapid expansion of digital platforms, online commerce, and information technology has created new opportunities for women's entrepreneurship and employment. Women in urban areas increasingly utilize digital technology for small business development,

remote work, and access to financial services. Nevertheless, unequal access to digital literacy, internet infrastructure, and technological devices contributes to the persistence of a digital gender divide. Digital inclusion can be measured through internet penetration and technology usage rates among women and men. For example, digital participation rates may be estimated mathematically using the following equation:

$$\text{Digital Participation Rate} = (\text{Digital Users} / \text{Total Population}) \times 100$$

Lower participation rates among women may indicate unequal access to technological opportunities and reduced competitiveness within the digital economy.

Poverty and economic resilience further influence gender equality within urban settings. Women from low-income households are generally more vulnerable to economic shocks, unemployment, inflation, and social insecurity. Economic crises often disproportionately affect women because they are overrepresented in informal employment sectors lacking stable income and social protection mechanisms (Chant & McIlwaine, 2016). Economic resilience therefore becomes a crucial factor in determining whether urban development can reduce or reproduce gender inequality. Policies aimed at strengthening women's entrepreneurship, access to financial services, and social protection systems are essential for improving women's resilience within urban economies.

Political and institutional drivers also play a critical role in shaping the future of urban gender development. The commitment of local governments to gender-responsive governance strongly influences policy effectiveness and institutional adaptation. In Surabaya, the municipal government has introduced various initiatives related to women's

empowerment, inclusive public services, and community participation. However, the sustainability of these programs depends on political leadership, budget allocation, and institutional continuity. Gender-responsive budgeting is particularly important because it ensures that development resources are allocated equitably to address the specific needs of women and marginalized groups. Budget effectiveness can be evaluated by comparing gender-responsive expenditures with total development expenditures using the following formula:

$$\text{Gender Budget Ratio} = (\text{Gender Responsive Budget} / \text{Total Government Budget}) \times 100$$

Higher budget allocation ratios generally indicate stronger institutional commitment to gender equality programs.

Institutional coordination between government agencies, civil society organizations, academic institutions, and community groups also affects the implementation of gender-responsive policies. Weak coordination may result in fragmented policies, overlapping programs, and inefficient resource allocation. Conversely, effective institutional collaboration can strengthen policy implementation, improve service delivery, and support inclusive urban governance. Therefore, institutional capacity and governance quality remain central drivers influencing future gender equality outcomes in Surabaya.

Technological development represents another significant driver within the urban governance context. Digital inclusion and access to technological innovation increasingly determine individuals' ability to participate in economic, educational, and political activities. Surabaya's smart city initiatives have attempted to improve public service delivery, digital governance, and urban management systems through technological integration. Smart city governance includes the use of digital

platforms, data systems, and information technologies to improve efficiency, transparency, and public participation. However, unequal access to technology may reinforce existing social disparities if marginalized groups, including low-income women, are excluded from digital transformation processes. Access to technological innovation is also closely related to human capital development and economic competitiveness. Women with limited access to digital skills training, technological infrastructure, and innovation networks may experience reduced opportunities within the evolving urban economy. Consequently, digital literacy programs and inclusive technological policies are essential for reducing the digital gender divide and ensuring equitable participation in smart city governance.

Environmental and urban drivers further shape the future condition of urban gender development in Surabaya. Climate change impacts, including flooding, extreme weather events, and environmental degradation, disproportionately affect vulnerable urban populations, particularly women living in low-income settlements. Environmental risks often increase women's caregiving burdens and economic vulnerability due to disruptions in livelihoods, mobility, and public services. Urban infrastructure inequality also contributes to gender disparities, particularly in relation to housing quality, sanitation, healthcare access, and public facilities.

Public transportation accessibility constitutes another important factor influencing women's mobility and participation in urban activities. Inadequate transportation systems may reduce women's access to employment, education, healthcare, and political participation due to safety concerns and mobility constraints. Gender-sensitive transportation systems therefore play a

significant role in promoting inclusive urban development and reducing structural inequality within metropolitan areas. Among the various driving forces identified in this study, political commitment to gender-responsive policy and economic inclusiveness emerge as the most critical uncertainties shaping the future of urban gender development in Surabaya. Political commitment is considered uncertain because future leadership changes, policy priorities, and institutional reforms may significantly influence the continuity of gender mainstreaming programs and inclusive governance initiatives. Weak political commitment could result in reduced budget allocation, declining institutional support, and limited policy effectiveness. Conversely, strong political leadership could accelerate gender-responsive urban transformation and strengthen women's participation in governance. Economic inclusiveness also represents a critical uncertainty because future urban economic growth may either reduce or intensify inequality depending on labor market structures, digital access, and social protection systems. Inclusive economic development would expand opportunities for women's employment, entrepreneurship, and technological participation. However, unequal economic transformation could deepen wage disparities, digital exclusion, and informal employment concentration among women. Therefore, the interaction between political commitment and economic inclusiveness becomes a decisive factor in determining whether Surabaya will achieve sustainable and equitable urban gender development in the future.

Scenario Planning for Urban Gender Development in Surabaya

Scenario planning is used in this study as a strategic analytical framework to explore possible future pathways of urban

gender development in Surabaya under conditions of uncertainty and rapid urban transformation. Rather than predicting a single future outcome, scenario planning allows researchers and policymakers to identify several plausible futures based on the interaction between critical driving forces and uncertainties affecting gender equality, urban governance, and socio-economic development. This approach is particularly relevant in contemporary urban contexts where globalization, technological disruption, environmental change, demographic transition, and political transformation continuously reshape social relations and governance systems (Amer et al., 2022). Through scenario planning, this study aims to examine how different governance approaches and economic conditions may influence the future trajectory of gender development in Surabaya. The scenario framework in this research is constructed using a two-axis scenario matrix model, which is widely utilized in strategic foresight and policy analysis. The matrix is developed by identifying two critical uncertainties considered highly influential for the future of urban gender development in Surabaya, namely political commitment to gender-responsive governance and the degree of economic inclusiveness within urban development. These two dimensions are selected because they significantly determine women's access to resources, opportunities, participation, and social protection within the urban system. Political commitment refers to the extent to which local government institutions prioritize gender equality through policy implementation, budgeting, institutional coordination, and inclusive governance mechanisms. Economic inclusiveness refers to the extent to which urban economic growth provides equitable access to employment, digital opportunities,

entrepreneurship, and social welfare for women and marginalized communities.

The two-axis scenario framework can be conceptualized mathematically as a strategic interaction between governance commitment and economic inclusiveness. The relationship between these dimensions can be illustrated using a simplified conceptual matrix equation:

$$\text{Scenario Outcome} = f(\text{Political Commitment, Economic Inclusiveness})$$

This formulation indicates that different combinations of political commitment and economic inclusiveness generate distinct urban gender development outcomes. Based on this framework, four alternative future scenarios are constructed to represent plausible trajectories of gender development in Surabaya. These scenarios are not predictions but analytical tools intended to support policy reflection, strategic planning, and adaptive governance.

The first scenario, referred to as the Inclusive Gender-Responsive City, represents the most optimistic future pathway in which strong political commitment is combined with highly inclusive economic development. In this scenario, the local government successfully integrates gender-responsive governance into all dimensions of urban development through institutional reform, participatory policymaking, and equitable resource allocation. Economic growth is accompanied by improved labor inclusion, social protection, and equal access to technological innovation. Women experience greater opportunities in formal employment, entrepreneurship, education, and leadership positions. Gender-responsive budgeting and inclusive public service delivery become central components of urban governance.

Within this scenario, women's access to education, healthcare, transportation, digital technology, and economic resources

improves significantly. Educational participation rates among women increase due to greater investment in inclusive education and digital literacy programs. Women's labor force participation also rises because of equal employment opportunities and supportive workplace policies. The increase in women's participation can be estimated through labor participation growth models such as:

$$\text{Female Labor Participation}_{t+1} = F \text{emale Labor Participation}_t + \text{Inclusive Policy Impact}$$

This scenario also envisions increased representation of women in political and policymaking institutions. Women participate actively in urban governance processes, community development programs, and strategic planning initiatives. Gender-sensitive urban planning contributes to safer public spaces, accessible transportation systems, and more equitable urban infrastructure. According to recent studies on inclusive urban governance, cities with strong institutional commitment to gender equality tend to demonstrate greater social resilience, economic productivity, and sustainable development outcomes (UN Women, 2020).

The second scenario, Economic Growth without Gender Inclusion, describes a future condition in which Surabaya experiences rapid economic expansion but fails to ensure equitable inclusion for women and marginalized communities. In this scenario, urban economic growth is driven primarily by investment, industrial expansion, and technological development, yet the benefits of growth are distributed unequally across society. Although the city's overall economic indicators improve, structural gender inequality remains persistent within labor markets, income distribution, and access to urban opportunities.

Women in this scenario continue to be concentrated in informal and low-income sectors characterized by employment insecurity, limited social protection, and wage inequality. Technological advancement primarily benefits highly educated groups, while women from low-income households experience barriers in accessing digital opportunities and formal employment. Wage disparities remain significant and can be represented using the gender wage gap formula:

$$\text{Gender Wage Gap} = ((W_m - W_f) / W_m) \times 100$$

Where W_m represents average male income and W_f represents average female income. Under this scenario, economic modernization occurs without adequate gender-responsive policies, resulting in unequal access to urban prosperity. Urban infrastructure improvements and smart city innovations benefit economically advantaged groups disproportionately, while vulnerable women remain excluded from many economic and technological opportunities. Research on urban inequality demonstrates that economic growth alone does not automatically reduce social disparities unless accompanied by inclusive governance and redistributive policies (OECD, 2020). The third scenario, Social Fragmentation and Gender Vulnerability, represents the most pessimistic future trajectory characterized by weak governance, economic instability, and increasing social inequality. In this scenario, political commitment to gender equality declines while economic growth becomes unstable due to external shocks, labor market disruptions, environmental crises, and institutional inefficiency. The weakening of social protection systems and governance capacity intensifies women's vulnerability within urban environments. Urban poverty among women increases significantly as informal employment expands and access

to stable income opportunities declines. Women from marginalized communities experience greater exposure to housing insecurity, unemployment, digital exclusion, and gender-based violence. Social fragmentation also intensifies due to unequal access to education, healthcare, and public services. In this scenario, urban inequality can be illustrated through increasing poverty rates among vulnerable populations using a simplified poverty growth equation:

$$\text{Urban Poverty}_{(t+1)} = \text{Urban Poverty}_t + \text{Economic Instability} - \text{Social Protection}$$

Weak institutional coordination further reduces the effectiveness of gender-responsive policies and public service delivery. Public transportation systems deteriorate, urban infrastructure inequality widens, and environmental risks disproportionately affect low-income women living in vulnerable settlements. Social insecurity and declining trust in governance institutions contribute to increased exclusion and reduced civic participation. Recent studies on urban vulnerability suggest that weak governance and economic instability often intensify gender-based inequalities within rapidly urbanizing societies (UN-Habitat, 2022).

The fourth scenario, Transformative Smart Gender City, represents a future pathway in which technological innovation becomes the primary driver of inclusive urban transformation. In this scenario, Surabaya successfully integrates digital technology, smart governance systems, and gender-responsive policies to create a more inclusive and adaptive urban environment. Smart city governance is implemented not only to improve administrative efficiency but also to strengthen social inclusion, public participation, and equitable access to urban resources. Digital empowerment becomes a central strategy for improving

women's participation in economic, educational, and political activities. Women gain greater access to digital literacy training, online entrepreneurship platforms, financial technology services, and remote employment opportunities. Smart governance systems enable more transparent public service delivery and participatory policymaking processes. Digital participation rates among women increase significantly through expanded internet access and technological inclusion programs. Digital inclusion can be measured mathematically through the following formula:

$$\text{Digital Inclusion Index} = (\text{Women with Digital Access} / \text{Total Female Population}) \times 100$$

This scenario also emphasizes gender-sensitive smart city governance, where urban technology systems are designed to improve women's safety, mobility, and accessibility within public spaces. Smart transportation systems, digital health services, online education platforms, and data-driven urban management contribute to more equitable urban development. Research on smart city governance indicates that technology-driven inclusion can significantly improve women's economic resilience and social participation when supported by inclusive policy frameworks (Kitchin, 2021). However, this scenario also requires strong institutional capacity and equitable technological access to prevent the reproduction of digital inequality. Overall, these four scenarios illustrate that the future of urban gender development in Surabaya will depend heavily on the interaction between governance quality, economic inclusiveness, technological adaptation, and institutional commitment to gender equality. The scenarios demonstrate that urban transformation may produce either inclusive or exclusionary outcomes

depending on how local governments and stakeholders respond to emerging challenges and uncertainties. Through scenario planning, this study provides a strategic framework for understanding alternative futures and supporting adaptive gender-responsive policymaking within rapidly changing urban environments.

Discussion

The scenario analysis presented in this study demonstrates that the future trajectory of urban gender development in Surabaya will be shaped by the interaction between governance quality, economic inclusiveness, technological transformation, and institutional commitment to gender equality. The four scenarios developed through the scenario planning framework illustrate different possible futures that may emerge depending on how local governments, economic actors, and urban communities respond to ongoing structural changes. These scenarios highlight that urban gender development is not determined solely by economic growth but also by the ability of governance systems to ensure social inclusion, equitable access to opportunities, and adaptive policy implementation under conditions of uncertainty.

The comparative analysis of the scenarios reveals that each future pathway contains distinct opportunities and risks for urban gender development. The Inclusive Gender-Responsive City scenario presents the most socially equitable pathway because it combines strong governance commitment with inclusive economic development (Kulshreshtha, 2026). In this scenario, women benefit from equal access to education, formal employment, digital technology, healthcare services, and political participation. Institutional reforms and gender-responsive policies create an enabling environment for women's empowerment and social inclusion. The

opportunity within this scenario lies in the possibility of achieving sustainable urban development characterized by reduced inequality, higher social resilience, and improved quality of life for marginalized groups. Research on inclusive governance indicates that cities with strong gender-responsive institutions tend to demonstrate greater social cohesion and more balanced economic development outcomes (UN Women, 2020). However, this scenario also requires substantial political commitment, institutional coordination, and long-term investment in social infrastructure and human capital development. The Economic Growth without Gender Inclusion scenario illustrates the risk of uneven urban development in which economic expansion occurs without sufficient social inclusion mechanisms (Rauniyar & Kanbur, 2010; Felipe, 2010; Hackl, 2018). Although the city experiences technological advancement and economic growth, the benefits of development remain concentrated among economically advantaged groups. Women continue to face structural barriers in accessing formal employment, digital opportunities, and strategic decision-making positions. Persistent wage inequality and concentration of women in informal sectors increase socio-economic vulnerability (Odyuo & Thangkhiew, 2025). This scenario demonstrates that urban economic growth alone is insufficient to guarantee gender equality unless accompanied by redistributive policies and inclusive governance mechanisms (OECD, 2020). The main opportunity within this scenario lies in the city's economic competitiveness and technological modernization, yet the primary risk involves the widening gap between social groups and the persistence of structural gender inequality.

The Social Fragmentation and Gender Vulnerability scenario represents the most critical and unstable future condition. Weak governance capacity, declining

institutional effectiveness, and economic instability contribute to increasing urban poverty, social exclusion, and gender-based vulnerability. Women from low-income households become disproportionately affected by unemployment, housing insecurity, digital exclusion, and limited access to public services (Holmes et al., 2025; Sanders & Scanlon, 2021). The weakening of social protection systems intensifies urban inequality and reduces women's ability to participate fully in economic and political activities. This scenario highlights the potential consequences of inadequate institutional adaptation in rapidly urbanizing societies. According to recent urban governance studies, weak institutional resilience and fragmented policy implementation often exacerbate social vulnerability within metropolitan regions experiencing rapid transformation (UN-Habitat, 2022). The risks associated with this scenario are substantial because prolonged inequality and social insecurity may undermine social cohesion, governance legitimacy, and sustainable urban development (Tjitrawati & Romadhona, 2023). Meanwhile, the Transformative Smart Gender City scenario offers a future pathway in which technological innovation becomes a catalyst for inclusive urban transformation. Digital governance systems, smart city infrastructure, and technology-driven inclusion improve women's participation in education, entrepreneurship, public services, and policymaking processes (Kougias & Papadakaki, 2026; Zhuang et al., 2025). Women gain greater access to digital literacy programs, financial technology, online employment platforms, and data-driven public services (Gupta et al., 2025; Pareek et al., 2025; Putri & Anggraini, 2025). Smart governance systems also improve transparency, public participation, and urban service efficiency. The opportunity within this scenario lies in

the possibility of creating a technologically advanced and socially inclusive urban environment capable of strengthening women's economic resilience and social mobility. Nevertheless, the scenario also presents risks related to digital inequality, technological dependency, and unequal access to innovation. Without equitable digital infrastructure and inclusive technological policies, smart city development may reproduce existing social disparities rather than reduce them (Kitchin, 2023).

Among the four scenarios, the most probable scenario appears to be Economic Growth without Gender Inclusion due to the current trajectory of urban economic transformation in many developing metropolitan areas. Rapid technological development and urban economic expansion often occur more quickly than institutional adaptation and social policy reform. As a result, economic modernization may continue alongside persistent inequality if gender-responsive governance mechanisms remain insufficiently integrated into urban development planning. However, the preferred scenario from a policy and sustainability perspective is clearly the Inclusive Gender-Responsive City because it combines economic growth with social justice, participatory governance, and equitable resource distribution (Romadhona, 2022). This scenario aligns most closely with sustainable urban development principles and provides the strongest foundation for long-term social resilience and inclusive prosperity. The findings of this study also generate important implications for urban governance in Surabaya. Institutional reform emerges as a critical requirement for strengthening gender-responsive governance and improving policy effectiveness (Romadhona et al., 2024). Local government institutions need to strengthen coordination mechanisms, data integration systems, and gender

mainstreaming practices within urban planning and budgeting processes (Tjitrawati et al., 2024). Institutional capacity building is essential for ensuring that gender equality considerations are systematically integrated into public policy implementation. Effective governance requires not only formal regulations but also adaptive institutional structures capable of responding to emerging urban challenges and uncertainties (Pierre, 2011; Romadhona et al., 2026).

Gender-responsive public policy also becomes increasingly important in addressing structural inequality within urban environments (Lozano-Torres, 2021; Alber, 2024; Burke et al., 2017; Libertun De Duren, 2022). Public policies related to employment, education, healthcare, transportation, housing, and digital infrastructure must consider the different experiences and vulnerabilities of women and marginalized groups (Romadhona et al., 2022; Romadhona et al., 2023). Gender-responsive budgeting is particularly necessary to ensure equitable allocation of development resources and improve access to public services for vulnerable populations (Ida et al., 2024). Policy interventions should focus not only on increasing women's participation but also on transforming structural barriers that limit equal access to opportunities and resources.

Participatory urban planning constitutes another important implication derived from the scenario analysis. Inclusive governance requires active involvement of women, community organizations, civil society groups, academic institutions, and marginalized populations within urban decision-making processes (Ida et al., 2025; Kinasih et al., 2025). Participatory planning enables policy makers to better understand local needs, social vulnerabilities, and community priorities while simultaneously strengthening public trust

and social inclusion. Gender-sensitive urban planning also contributes to safer public spaces, more accessible transportation systems, and equitable urban infrastructure development. Research on participatory governance demonstrates that inclusive planning processes improve policy legitimacy and strengthen urban resilience in rapidly changing environments (Healey, 2020).

The discussion in this study also demonstrates a strong relationship between urban gender development and the Sustainable Development Goals (SDGs) established by the United Nations (Ramadani et al., 2023). The scenarios directly relate to SDG 5 concerning gender equality and women's empowerment because they examine women's access to education, employment, leadership, public participation, and social protection. Achieving gender equality within urban governance systems is essential for improving women's economic independence, political representation, and social inclusion. The scenarios are also closely connected to SDG 10 concerning reduced inequalities. Urban inequality remains one of the major challenges affecting social cohesion and sustainable development in metropolitan regions (Grbić, 2026). Inclusive governance, equitable economic development, and accessible public services are essential for reducing disparities between social groups and strengthening urban resilience. Economic exclusion, digital inequality, and uneven access to urban infrastructure may intensify social fragmentation if not addressed through inclusive public policy mechanisms. Furthermore, the study strongly contributes to SDG 11 concerning sustainable cities and communities (Ferdous & Eslamian, 2026; Shen & Liu, 2026). Sustainable urban development requires cities to become inclusive, resilient, safe, and adaptive to future

challenges (Yorucu et al., 2026; Lu & Fei, 2026; Bello & Stephen, 2026). Gender-responsive urban governance supports the development of cities that provide equitable access to transportation, housing, digital infrastructure, public spaces, and economic opportunities for all citizens (Tjitrawati & Romadhona, 2025). The integration of smart governance, participatory planning, and social inclusion strategies also strengthens the sustainability and resilience of urban systems under conditions of rapid transformation.

Theoretical perspective, this study contributes to the growing interdisciplinary discussion on urban gender studies and governance analysis. The research expands existing scholarship by integrating gender development analysis with scenario planning approaches within an urban governance framework. Most previous studies on gender development have focused primarily on current social conditions and statistical measurements, while limited attention has been given to future-oriented governance analysis. By applying scenario planning methods, this study demonstrates how alternative futures can be used to understand uncertainty, institutional adaptation, and structural transformation within urban gender governance systems. The study also contributes to the theoretical development of scenario planning as a governance tool. Scenario planning is often utilized in strategic management, environmental policy, and economic forecasting, yet its application within gender-responsive urban governance remains relatively limited. This research illustrates that scenario planning can function not only as a forecasting technique but also as a participatory and strategic governance instrument capable of supporting adaptive policymaking under uncertain future conditions. Through the integration of qualitative analysis, governance studies,

and future-oriented planning, the research offers a broader conceptual framework for understanding how cities can navigate social transformation while promoting gender equality and inclusive urban development.

CONCLUSION

This study concludes that urban gender development in Surabaya is influenced by the dynamic interaction between demographic change, economic transformation, governance quality, technological advancement, and institutional commitment to gender equality. The findings demonstrate that Surabaya has achieved gradual progress in gender development during the 2020–2025 period, particularly in education, healthcare access, and women's participation in public and economic life, as reflected in the increasing trends of the Gender Development Index (GDI) and Gender Empowerment Index (GEI). These improvements indicate that gender-responsive policies have contributed positively to reducing gender disparities within the city. Nevertheless, structural inequalities remain evident in labor participation, wage distribution, digital access, political representation, and equitable access to urban resources. Rapid urbanization and technological change continue to generate both opportunities and challenges for achieving inclusive urban gender equality. The scenario planning analysis reveals that the future trajectory of urban gender development in Surabaya will largely depend on the strength of governance, institutional inclusiveness, and the extent to which economic growth is accompanied by gender-responsive policies. Among the four scenarios developed, the Inclusive Gender-Responsive City represents the most desirable future because it integrates economic growth, social justice, participatory governance,

and equal access to urban opportunities. However, the study also identifies the possibility that economic expansion may continue without substantially reducing gender inequality if institutional reforms and inclusive governance mechanisms remain weak. In this context, adaptive governance, gender-responsive budgeting, participatory urban planning, and digital inclusion emerge as critical strategies for ensuring that future urban transformation contributes to sustainable and equitable development. Despite these contributions, the study acknowledges limitations related to data availability, projection uncertainty, and the qualitative interpretation involved in scenario construction. Consequently, the scenarios should be understood not as predictions, but as plausible future pathways intended to support strategic reflection and policy adaptation. Future research should therefore expand comparative studies across Indonesian cities and incorporate more advanced quantitative simulation models to strengthen analytical precision and evidence-based policymaking. Sustainable urban gender development in Surabaya requires more than economic growth and technological progress. It demands strong institutional commitment, inclusive governance, and collaborative social transformation to create resilient, equitable, and gender-responsive urban futures in an increasingly complex and uncertain world.

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