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Innovations, Women's Economic Empowerment And Economic Performance: Evidence From Kenya

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Abstract

Innovation is crucial to a country's economic progress. Innovation makes the country more competitive in the international market, increases productivity of both labour and capital, increases demand for skilled labour, increases efficiency of the factors of production, and creates new businesses and products. Increasing women`s empowerment boosts the economic progress of the country through increased women`s participation in the labor market, increased family health and welfare, reduces the gender gap, and decreases poverty. This paper investigated the impact of both innovations and women`s economic empowerment on Kenya`s economic performance over the period 1980-2025. A multiple regression model was used in this study. The findings of the study revealed that innovations and women`s economic empowerment have a positive effect on Kenya`s economic performance. The policy implications are that policymakers and the Kenyan government should implement policies and regulations that boost innovation in the country and promote women's economic empowerment.

Key words: Innovations, Women`s economic empowerment, economic performance, Kenya

JEL Classification: O31 O32 O47, J16, O40, J15 I38 I24

1.0 **Introduction**

1.0.1 Innovation and Economic Growth

Innovation has been recognized as one of the key factors that boost economic growth in various countries (Kasongo &Makamu, 2024; Broughel&Thierer, 2019; Shukla, 2017). Most countries have recognized that innovation is crucial in economic growth and sustainable development. The international organization has also observed that innovations boost economic growth. The United Nations 2030 Agenda for Sustainable

Development has identified that among other factors, innovation is key to driving productivity, employment creation and economic growth of countries (Dempere et al., 2023). UNCTAD has proposed that countries should boost innovations and dissemination of the successful innovations to the economy, especially to the private sector, marginalized areas, and vulnerable communities so as to accelerate economic growth (UNCTAD, 2021; UN 2022). Countries that invest in innovation grow faster than those that do not invest in the creation of new technologies and ideas.

Innovation is defined as a process of generating new ideas, new products, new technology, services, usage of new inputs in the production process and methods that improve and transform the existing systems and practices (Vimlesh, 2019; Taxirovna &Karimovna, 2023). Examples include the development of Automated Teller Machines (ATMs), online transactions, among others. Types of innovations which affect economic growth include incremental, disruptive, architectural and radical innovations. Innovation are very critical in enhancing economic growth by enabling firms and industries to raise their efficiency, reduce cost of production, develop new products, new businesses and markets and boost their production. All these innovations boost economic growth (Ismail and Sidek, 2025). Innovation, productivity, and economic growth are intertwined. Improvements in innovations creates new economic opportunities, improve productivity which leads to economic growth. This shows how innovation drives sustainable development, develops product markets and reshapes industries and firms (OECD, 2023). Through increased growth, the economy creates new employment opportunities, making the country to be more competitive especially in the global market as exports of technology led exports increase and develop new and advanced entrepreneurship activities within the county (Viima , 2019). New industries are created that need skilled labor, and more jobs are created through innovations, especially in Research and Development and engineering. Without innovation the country will stagnate as it will lag behind other countries in terms of technology and new consumer needs. This is done through creative destruction, where, through innovation firms or counties do away with old methods of production or methods of doing things, replacing them with new and advanced methods. Innovation acts as a catalyst for economic transformation of countries as it accelerates countries changing form labor intensive to knowledge based economy.

Kenya has recognized the importance of innovation for the economy`s sustainable development. This has been stated clearly in Kenya`s Vision 2030 (Republic of Kenya,2007), where the government aims at transforming Kenya into a newly industrialized middle-income country by 2030. In the vision, innovation has been recognized as one of the enablers that will enable the country to achieve the aim of the Vision. The government aims at making Kenya a more knowledge-based economy than resource based economy so as to make it more competitive in the global market. Given the importance of innovation, the Kenyan Government has implemented several policy changes and actions in order to boost innovation in the country and enhance economic growth. Kenya`s expenditure on R&D increased from 0.41% in the year 2022 to 0.80 % of GDP in the year 2023, (World Bank, 2025) The government has established the Kenya National Innovation Agency (KeNIA) whose main role is to develop and manage the national innovation system, support the identification, recording, and protection of innovation ideas, work with other stakeholders in innovations in capacity development, print publications, among other roles (Republic of Kenya,2024). Several initiatives have been formed such as the flagship projects: – the Kenya Advanced Institute of Science and Technology, policy changes such as the establishment of innovation centers in all counties, and providing innovation incentives to honor local innovators and protect their knowledge. Several innovations have been observed in the major sectors within the Kenyan economy, such as in the agricultural sector, where there are automated weeding robots, portable motor-driven tea leaf pickers, in the financial sector, there are Automatic Teller Machines (ATMs), AI- powered services, agency banking, mobile apps, and digital banking, Mpesa, and other mobile platforms. In the government, there is the e-citizen, which handles most of the government

services, such as itax, passport, driving licenses, business registration, and land searches. In international trade, customs processes are increasingly digitized, including the implementation of electronic certificates of origin and smart border technologies. The World Intellectual Property Organization (WIPO, 2025) ranked Kenya 102nd out of 139 countries in the 2025 Global Innovation Index, with a score of 21.4. In Sub-Saharan Africa, it ranked 9th and 17th among the lower and middle-income countries. The figure below shows the trend of Kenya`s Global Innovation Index (GII) over the years, as prepared by WIPO (WIPO2025).

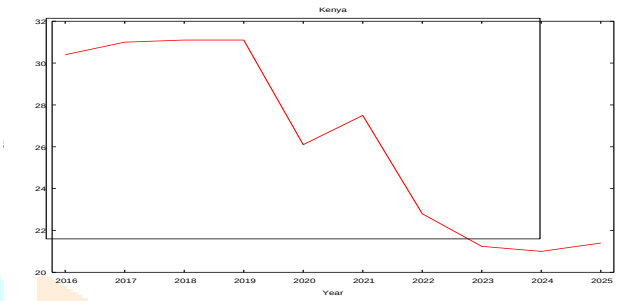

Figure 1.0, Kenya`s Global Innovation Index

Source of data: World Intellectual Property Organization, various years

The graph shows that Kenya`s GII as from the year 2019 has been trending downwards. There is a drop of 31% on the innovation index between the year 2019 and 2025.The country`s innovation agency KeNia is working hard to improve the position of Kenya in terms of the GII by training more personnel, improving innovation infrastructure and strengthening research and development (Republic of Kenya, 2025a).

Despite numerous innovations in the country, there is a scarcity of studies on the impact of innovations on Kenya's economic growth. This paper aims to fill this gap.

Many economic theories support the positive role of innovation on economic growth. Schumpeter (1934), argues that innovation affects economic development through creative destruction. In this case, firms, through innovation, come up with new technologies and new products and services that replace the old ones. Romer (1990) developed endogenous growth theory, which argue that countries experience economic development through investment in human capital, knowledge and research and development. Several innovations in sectors like ICT, and energy positively impact the economic development of the country. Neoclassical growth theory by Solow (1956), argue that innovation complements capital and labor, especially at the point of their diminishing returns. Without innovation, capital and labor their respective productivity will diminish with time and will contribute less to economic development. Solow`s (1956) theory argue that economic development is determined by capital accumulation and labor force. According Solow`s theory investment in human capital in terms of education and training stimulates innovation which at the end raises economic performance of the country. The new growth theory argues that countries can grow indefinitely by creating new ideas, knowledge and skills. Countries which are more knowledge based grow faster than those that depend on only capital accumulation and human capital.

Recently many researchers and policy makers have put more attention on examining the role of innovation on economic growth (Bae &Yoo,2015, Dempere et al ,2023, Mohamed et al 2021. Kasongo&Makamu(2024),investigated the relationship between innovations and economic growth of 32 African countries using time series data for 2006 -2017. The study estimated the linear panel Corrected Standard Errors model. The study found evidence of a positive association between the innovation index and economic growth of the African countries. Dempere et al (2023) examined the impact of innovation on GDP, self-employment and foreign direct investment. The study findings indicated that innovation positively influences GDP, domestic institutional framework, local infrastructure, local knowledge and technology and creative outputs. In a study done using Kenyan data over the period 1981-2018, Kiiru et al (2023), investigated how innovations affect enterprise performance using the animal feeds manufacturing SMEs in Kenya. The study findings support that innovations have positive and significant effect on enterprise performance. Mohammed (2021), investigated the relationship between innovations and economic growth in Kenya. Regression results from ARDL model showed that there is both a short-run and long-run positive relationship between the two variables. The Granger causality tests showed a bidirectional causality between innovations and economic progress. Hammad et al (2023) investigated the relationship between financial innovation and economic growth. The research findings found a significant relationship between financial innovation and economic growth. Nguyen and Luu (2020) in their study found that in Vietnam Foreign direct investment in electronics facilitated technology transfer and export diversification, which led to industrial growth in the country. Afzal &Gauhar (2020) investigated the relationship between financial innovation and economic growth of 164 countries. The results revealed the existence of a strong negative relationship between financial innovation and economic growth. Similarly, Maradana (2017), examined the relationship between innovations and economic growth using data over the period 1989-2014 for 19 European countries. The study findings provide evidence of the existence of a long-run relationship between innovations and economic growth. Further, using the Granger causality test, the study revealed both bidirectional and unidirectional causality between innovations and economic growth. Gonzales (2023), investigated the implications of Artificial Intelligence (AI) on economic growth using panel data over the 1970-2019.The study applied fixed effects and generalized method of moments. AI is argued to boost production, marketing and obtaining new customers for businesses. The study findings revealed that AI and economic growth are positively correlated. These results were found to be more robust in advanced countries and in later years of the study period.

Despite many studies, there is no consensus on the study findings. Some research findings reveal that improvements on innovation reduce economic growth, while other studies confirm the positive effect of innovation on economic performance. The findings are contradictory. There is scarcity of studies done in Kenya on the impact of innovation on Kenya`s economic growth.

1.0.2 Women's economic empowerment and economic development

Empowering women is taken as one way of reducing gender inequality. UNDP (2024) defines women's economic empowerment as the ability to participate in markets, control factors of production, and access to decent work. Additionally, it involves women`s increased voice such as participation in parliament and meaningful involvement economic decisions making at all levels. Women's economic empowerment contributes positively to economic development by increasing their productivity, reducing poverty, increasing economic diversification, improving household welfare, such as education of the children and eating healthy food and increasing labor participation. All these impact on economic growth both in the short-run and long run. The importance of women's economic empowerment on sustainable development was recognized around mid to late 20th century, since then it has played a big role in economic development (Jaquett, 2017). The first international conference on women economic empowerment that took place in 1975

in Mexico City. The presentations on this conference made countries all over the world to recognize the importance of empowering women for economic growth, poverty reduction and other dimensions of socioeconomic development (Fraser & Tinker, 2004).

Globally, women population is around 50%. Several global instruments have been set to promote gender equality, that includes Convention on the Elimination of All Forms of Discrimination against Women, the Beijing Declaration and Platform for Action and the Sustainable Development Goals (UNDP 2024). However, several gender disparities still exist worldwide, for example, 40% of women are unable to access financial services, 20 % are less likely to have bank accounts and 17% less likely to access formal loans, and on average, women`s income is only 77%of what men earn (UNDP, 2024).

Empowering women and promoting gender equality are among the Millennium Development Goalss of 2000. Women's empowerment includes equal access to education, financial resources, and leadership dimensions such as political positions. This means getting rid of discrimination of any form, such as in employment, education, and resource ownership, among others.

Female labor force participation rate was 40.2 percent in the whole world in the 2024, while Kenya recorded 47.3 percent in the year 2024 (World Bank 2025). This still shows that there are gender disparities both in advanced and developing counties. 60% of the women are concentrated in the informal sector. In terms of industry, they are more concentrated in the agricultural sector. Some of the factors that disproportionately affect women include unequal access to resources such as assets, credit, child care responsibilities, and cultural barriers.

Kenya women population is almost 50% of the total population. According to the World Bank (2025), Kenya's female population was 28.4 million in the year 2024, which is about 50.3% of the total population. This percentage has remained almost constant from the year 2020 as the records show that the female population was 50.3, 50.3 and 50.2 % in the years 2023, 2022, and 2020.Kenya has improved a lot in women empowerment which is driven by Kenya`s 2010 Constitution which states that by the year 2025 Kenya should achieve women's empowerment of around 40.6 percent .Some of the key noted improvements in Kenya`s women empowerment include near parity in primary education, around 82% financial inclusion, and increased representation in parliament. Through the 2/3 gender rule, women in leadership has increased, for example, in the Judiciary there are 54% magistrates and 31% in the senate. By the year 2022, 40.6% of Kenya`s women were considered empowered, up from 29% in the year 2020. This improvement was due to an improvement in school enrolment for women and urban living. However, there are several disparities between the urban and rural areas. In the urban areas, 59.3% are more empowered as compared to 27.6% for the rural areas (Republic of Kenya, 2025). The government has set up targeted economic funds such as Women Enterprise Fund, the Uwezo Fund, National government Affirmative Action Fund and the Hustler fund to improve women`s empowerment. To continue improving women economic empowerment, the government has set policies and legal frameworks to achieve this, these include National policy on women economic empowerment, and a draft National Care policy to deal with women`s unpaid work.

There are several theories that explain the role of women empowerment on economic growth. Human capital theory by Becker (1964) argue that investing in education, skills, health, and training enable the woman to raise her productivity and personal income and this will impact positively to income of the country. With increased individual income, women are assumed to spend more on the education and health of the children, which in the long run contributes to sustainable economic development (klasen & Lamanna,2009; Nabimanya, 2025). The endogenous growth theory by Romer (1990) argues that knowledge, innovations, and human capital enhance long-run economic growth. If women are empowered, through their economic

activities such as labor force participation and entrepreneurship, their activities will boost the economic growth of the country. Sen (1999), came up with the capability approach which argue that development of the country is a result of individual`s freedom and capabilities. Women`s empowerment increase their participation in the labor market, own assets, and join leadership positions. In the long-run women`s empowerment contributes positively to the economic development of the country.

Several studies have been done on the role of women's empowerment on economic growth and have revealed that women's empowerment enhances economic growth. Alemu et al (2022), in their study on how women`s participation on income generating activities affected poverty reduction in Ethiopia, found that this involvement improved poverty reduction, which eventually positively affected economic growth through improvement in living standards of Ethiopia. Saqib (2016), examined the relationship between women`s empowerment and economic growth for Saudi Arabia. The study used time series over the period 1999-2014. The findings of the study presented a significant long-run positive relationship between women's empowerment and economic growth of the country. In a study using Indonesian data (Firmansyah &Sihaloho, 2021) over the period 2014-2018, on the impact of increased women's participation on the economy. The panel data regression found that women's empowerment significantly affected economic growth of the various regions included in the study, women` life expectancy enhanced economic growth and lastly, women population affects the country`s economic growth positively. In later study for the same economy, Wicaksana & Rahmawati (2023), investigated the effect of women`s empowerment in Indonesia economy using data for the period 2017-2021. The study used the following proxies for women's empowerment: number of women representation in parliament, number of women professionals, women`s expenditure, women`s life expectancy, and percentage of women in the population. Panel regression analysis and fixed effects regression showed that both women`s life expectancy and the percentage of women`s population have a significant negative impact on the economy`s progress. Kandie et al (2023), surveyed the effect of skill developments, table banking, market connections, networking, and mentorship programs on poverty reduction in Marigat Ward in Baringo county, Kenya. The study found strong positive associations between women`s skill development programs, market connections, and mentorship and poverty alleviation in Marigat ward. Table banking had a mild positive relationship with poverty reduction.

1.0.3 Innovations, women`s economic empowerment and economic growth of Kenya

Kenya has developed several innovations in most sectors in the economy. The government has also implemented several initiatives to support growth and development of various innovations. These include formation of KeNia, increased investment in R&D, formation of innovation centers in all counties and provision of innovation incentives among others. All these developments aim at enhancing economic growth of Kenya. It is therefore important to understand the role of innovations on Kenya`s economic progress. The study is important to policymakers as the findings will provide more information to policymakers on how to strengthen innovation in the country. The study also adds to the existing knowledge on innovation and economic growth. The study is also valuable to the business people as it gives more information on how to make their products more competitive on the global markets.

The second aim of the paper was to investigate on the role of Kenya’s women `s empowerment on the country`s economic growth. From the above, the government has set up several policies and initiatives aiming at empowering more women with the end results of improving the country`s performance. These include targeted funds, and National policy on Women`s empowerment. It is therefore vital to study on the effects of women`s empowerment on Kenya`s performance. The study provides additional information on the existing knowledge on the relationship between women`s economic empowerment and economic growth using the experience of Kenya. The study is also beneficial to policymakers as they gain more knowledge on

setting policies that promote gender equality. The study also supports the sustainable development Goals which aims at gender equality. The study also provides more information on importance of empowering women as this boost their participation in the labor market, increases their personal income and their increased participation in the country`s sustainable economic growth.

Despite a lot of improvement on Kenya`s innovation status and women`s economic empowerment, Kenya`s economic growth shows an erratic trend. Kenya`s Gross Domestic Product grew by 4.7, 5.7, 4.9, 7.6, -0.3, and 5.9 percent in the years 2024, 2023, 2022, 2021, 2020 and 2019, respectively (World Bank,2025). It was therefore crucial to understand the role of these two variables on Kenya`s economic performance. There is a scarcity of studies in Kenya on the role of women's economic empowerment and innovations on economic growth.

This paper aimed at investigating the impact of innovations and women empowerment on the economic growth of Kenya, using time series data for the period 1980-2025.

1.2 Methodology

The paper used the new growth theory that argues that technology innovation is endogenously determined. Innovation brings new ideas, products, markets, new methods of doing things and makes forms more competitive. This affects output and the economy at large. Following Kasongo&Makamu (2024) this paper used Cobb-Douglas production function as expressed below

The Cobb-Douglas production function was implemented as

$$Y = AK^{\beta_1}L^{\beta_2}HK^{\beta_3} . \quad (1)$$

Where Y represents output, A technology, K capital stock, L labour input and HK represents human capital, β_i represents elasticities of output with respect to capital stock, labour and human capital

Linearing (2) becomes:

$$LnY_t = LnA + \beta_1 LnK_t + \beta_2 LnL_t + \beta_3 LnHK + \mu \quad (2)$$

The empirical model included the key variables of study innovations (INN), women`s economic empowerment (WEE) and other control variables (foreign direct investment inflows, financial development, openness, exchange rate, electricity consumption, carbon dioxide emissions, and urban population. Equation 3, was the empirical model of the study:

$$GDP_t = \beta_0 + \beta_1 LnINN_t + \beta_2 LnWEE_t + \beta_3 LnFIN_t + \beta_4 LnFDI_t + \beta_5 LnOPEN_t + \beta_6 LnGFK_t + \beta_7 LnEXCH_t + \beta_8 LnELEC_t + \beta_9 LnCO_t + \beta_{10} LnUrban_t + \mu_t \quad (3)$$

INN represents innovation which was proxied by Global Innovation Index. Global Innovation Index is published annually by the World Intellectual Property Organization (WIPO). It ranks the innovation capabilities and performance of more than 130 countries worldwide. This is the extent to which a country supports and achieves innovation. The rank has score 0-100, the higher the score the better is the country it terms of development and use of innovation. To obtain the score WIPO looks at various factors of each country that include knowledge creation such as patents; technology and innovation infrastructure, the educational system of the country and the expenditure on R&D. The index measures both innovation inputs (investments, human capital and research and infrastructure for innovation) and outputs (which includes

knowledge and technology, high technology exports, creative outputs such as media and branding). This index is meant to guide the respective country both on policies and investment that will boost innovation. The index has several benefits such as ranking the countries on the status of innovation, tracking innovation trends globally, making it possible to compare less developed and advanced countries on innovation terms, guiding innovation policies and advising the government on innovation matters. The variable INN was expected to have a positive effect on Kenya's economic growth.

Another key variable of interest on this paper was women`s economic empowerment (WEE). The study used women`s business and law index as a proxy for women`s economic empowerment. The index is compiled by World Bank. It evaluates how laws and regulations of the country support women`s participation in the economy. This index takes the simple average of key areas on women that include mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets and pension. Of recent it has been revised to include safety and childcare aspect of women. It measures how laws and regulations affect women women`s economic opportunities on a scale of 0-100. The higher the score the better. A score of 100 indicates equal legal right for women and men in the country. A low score means women have more legal barriers to participate in economic opportunities, own assets, barriers on travel among others. Higher scores of WEE was expected to boost economic growth of Kenya over the study period. B_i are parameters to be estimated and μ is the error term.

The other variables in equation (3), are the control variables: financial development (FIN), exchange rate (EXCH), gross fixed capital formation (GFK), foreign direct investment (FDI), openness (TRADE), electricity consumption(ELEC), carbon dioxide emissions(CO), urban population (URBAN) and human capital (HK). Y represents Kenya's gross domestic product percapita current in US dollars. All the data were sourced form World Bank Development indicators (2025), WIPO and KeNIa (2025) and data were converted to natural logarithms before analysis. The following Table 1, presents the variables that were considered in this study.

Table1: Variables, measurement and source of data

Variable	Measurement	Source of data
GDP Percapita (dependent variable	Current US$	WDI 2025
Innovation	Measured Global innovation index whose values range from 0-100. High innovation levels was expected to positively impact economic growth	World Intellectual property organization(WIPO2025) KeNia
Women economic empowerment	Proxied by the women`s business and law index which takes score of 0-100	WDI2025

	It was expected to positively affect economic performance	
Financial development	Domestic credit to the private sector as a percentage of GDP. It was expected that financial development positively affects economic growth	WDI 2025
Gross fixed capital formation	% of GDP	WDI 2025
Foreign direct investment inflows	Ratio of net FDI inflows to GDP It was expected that FDI was to boosts economic performance	WDI2025
Trade Openness	Measured by the sum of exports and imports as a percentage of GDP. Openness was expected to positively affect economic growth	WDI 2025
Urban	Urban population as a percentage of total population	WDI 2025
Carbon dioxide emissions	In Kt	WDI 2025
Electricity power consumption	Measured in KWh It was expected that electricity consumption boosts economic performance of Kenya	WDI2025
Exchange rate	This is the rate at which US Dollar exchanges with Kenyan Shilling	WDI2025

1.3. Empirical Results

Before regression analysis, unit root tests were done on each variable. The tests both for ADF and Phillips-Perron were done at both trend and slope. The results are shown in Table2.

Table2: Unit root test Results

	ADF		Phillips-Perron		
Variable	Levels	1st difference	Levels	1st difference	Conclusion
Innovation	-2.49	-1.97	-0.014	-7.15	I(1)
Exchange rate	-2.3626	-5.4696	-2.3626	-5.4538	I(1)
Financial Development	-3.3771	-6.6601	-3.40	-7.13	I(1)
FDI	-4.3999	-5.9695	-4.3520	-18.126	I(1)
Electricity Consumption	-1.069	-6.48	-1.06	-6.4	I(1)
Gross capital Formation	-3.0438	-5.5080	-2.9498	-8.8981	I(1)
GDP	-2.8941	-4.4166	-2.6591	-4.2780	I(1)
Trade	-2.7430	-3.4596	-2.9742	-5.8063	I(1)
WSE	-2.3931	-4.3304	-1.9336	-4.2282	I(1)

Source: the author`s calculations

The results indicate that all the variables are stationary at their first differences (I(1).

Cointegration Test

The variables were also tested for cointegration to find out if there is long-run relationship among the variables. Cointegration was tested by use of Johansen method and the results are displayed in Table3

Table3.: Cointegration Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.** Critical Value
None	0.987356	878.1792	NA	NA
At most 1 *	0.950284	685.8738	334.9837	0.0000
At most 2 *	0.925762	553.8110	285.1425	0.0000
At most 3 *	0.848361	439.3900	239.2354	0.0000
At most 4 *	0.837118	356.3948	197.3709	0.0000
At most 5 *	0.803515	276.5467	159.5297	0.0000
At most 6 *	0.714245	204.9513	125.6154	0.0000
At most 7 *	0.642555	149.8361	95.75366	0.0000
At most 8 *	0.565120	104.5700	69.81889	0.0000
At most 9 *	0.468784	67.93185	47.85613	0.0002
At most 10 *	0.410939	40.09802	29.79707	0.0023
At most 11 *	0.223713	16.81209	15.49471	0.0315
At most 12	0.120902	5.669816	NA	NA

Trace test indicates 13 cointegrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Max-eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.** Critical Value
None	0.987356	192.3053	NA	NA
At most 1 *	0.950284	132.0629	76.57843	0.0000
At most 2 *	0.925762	114.4210	70.53513	0.0000
At most 3 *	0.848361	82.99517	64.50472	0.0004
At most 4 *	0.837118	79.84815	58.43354	0.0001
At most 5 *	0.803515	71.59534	52.36261	0.0002
At most 6 *	0.714245	55.11526	46.23142	0.0044
At most 7 *	0.642555	45.26603	40.07757	0.0119
At most 8 *	0.565120	36.63820	33.87687	0.0228
At most 9 *	0.468784	27.83383	27.58434	0.0465

At most 10 *	0.410939	23.28593	21.13162	0.0245
At most 11	0.223713	11.14228	14.26460	0.1472
At most 12	0.120902	5.669816	NA	NA

Max-eigenvalue test indicates 11 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

According to both trace and max-eigen methods, there are 13 and 11 cointegrating equations. This shows there is long- run relationship among the variables in the model. Use of multiple regression method was justified. With the above cointegration and unit root results equation (3) was estimated and the results are presented in Table4.

Regression Results

Table 4: Regression Results: dependent variable Ln(GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.6	0.87	-9.81	0.0000
Ln(INN)	0.67***	0.129	5.17	0.0000
Ln(WEE)	0.46**	0.200	2.28	0.0285
Ln(CO22)	0.30***	0.071	4.17	0.0002
Ln(Electricity)	0.71**	0.21	3.28	0.0024
Ln(Exchange rate)	-0.58***	0.0583	-10.12	0.0000
Ln(Financial development)	0.006	0.156	0.036	0.9708
Ln(Foreign Direct Investment)	-0.006	0.011	-0.50	0.6200
Ln(Gross fixed capital formation)	-0.2	0.159	-1.26	0.2156
Ln(Trade)	-0.057	0.0748	-0.760	0.4495
Ln(Urban)	2.64***	0.358	7.38	0.0000
Diagnostics	Rsq 0.99 F 381 JB p-value 0.35 Serial Correlation p-value 0.08			

This paper aimed to establish the impact of innovations and women's economic empowerment on Kenya`s economic performance. This paper used Kenya`s global innovation index as a proxy for innovation and the women's socio-economic index in Kenya to stand for Kenya`s women's empowerment. Both coefficients for innovation and women`s economic empowerment are consistent with theoretical expectations. Regression results revealed that Kenya`s innovation significantly boosts the country`s economic growth. A one percent increase in Kenya`s innovation leads to a positive impact on Kenya's economic performance of 0.67 %. This supports the idea that innovation is beneficial to the economic growth of the country. The results obtained in this paper supports the innovation economic theories by Schumpeter (1934); Romer (1990), and Solow(1956)

The same results were obtained by the previous researchers (Firmansyah & Sihaloho, ,2021; Saqib, Aggarwal &Rashid 2016; Uwamahoro, Asimwe and Mwazuna; 2025, Kasongo and Makamu, 2024). Several innovation improvements done in Kenya during the study period such as increase in R&D which increased from 0.41 in the year 2022 to 0.80 % of GDP in the year 2023, establishment of KeNia, and innovation centers in every county supports this positive significant result.

Regression results also showed a significant positive impact of women`s economic empowerment on Kenya's economic growth. If Kenya`s women`s empowerment improves by 1%, Kenya`s economy will grow by 0.46%. This shows that if many women in the country get empowered, holding other factors constant, Kenyan economy will do better. Empirical results obtained in this paper are in line with theoretical arguments by Becker (1964); Romer (1990), and Sen (1999). The same positive results were obtained by previous researchers (Firmansyah & Sihaloho, ,2021; Saqib, Aggarwal &Rashid, 2016; Uwamahoro, Asimwe and Mwazuna, 2025). Compared to innovations, the coefficient of innovation was higher, suggesting that innovations have a greater impact on Kenya`s economic growth compared to women`s economic empowerment, however both were statistically significant. Several improvements in women empowerment in Kenya that include: 82% financial inclusion, formation of women-targeted funds such as Uwezo Fund, Hustler Fund and National Government Affirmative Action Fund; increase in the number of women in parliament and near parity in primary school enrolment may have led to the positive significant effect of WEE on Kenya`s economic performance over the study period.

Control variables which were found to affect Kenya's economic growth include exchange rates, electricity consumption, carbon dioxide emissions and urban population. The diagnostic tests showered that the regression results are robust. The stability test shown in Figure2, shows that the estimated coefficients are stable over the study period.

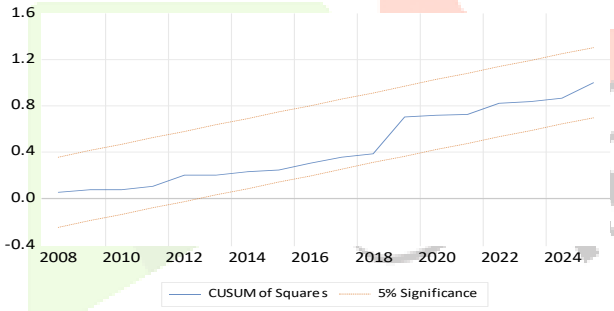

Figure2: CUSUM of Squares stability test

1.4. Conclusions and policy implications

The aim of this paper was to study the role of innovations and women's economic empowerment on economic performance for Kenya. Using data for the period 1980-2025 and multiple regression analysis, the study analyzed the relationship between GDP and Kenya's Global Innovation Index and women's economic empowerments Other control variables included financial development, foreign direct investment inflows, foreign exchange, openness, gross domestic investment, human capital index, and urban.

The study found that innovations are statistically and positively significant in Kenya`s economic performance. The findings of the study also revealed that there a positive and significant relationship between women's economic empowerment and economic growth in Kenya. The two variables are important for the economy`s growth.

The regression results revealed that improvement of women`s economic empowerment boosts economic growth of Kenya over the study period. Improving women`s economic empowerment is good for the country as seen from the results. This includes elimination of discrimination at work place even domestically, equal opportunities in academics, resource ownership and credit access among others.

Policy makers should implement strategies that strengthen Kenya's position on innovations so that it transforms to knowledge based economy. This includes increasing investment in R&D, integrating innovation knowledge in Kenya`s education system from the lower level up to higher levels of education. The policymakers should also implement policies that strengthen intellectual property rights, especially by boosting patent creations, which will encourage individuals and protect the innovation investors. Given that innovations are very expensive, the government can provide funding to support new investors and develop innovation infrastructure that can make innovation to grow faster.

The results on women's economic empowerment provide evidence that empowering women benefits Kenya's economy. Policymakers should therefore strengthen policies and regulations that reduce gender inequality in Kenya in all dimensions. The government should implement initiatives that raise women`s access to education and training, reduce child care burden, increase access to credit, methods that allow women`s voices to be heard, especially to make it easy for women to participate in leadership positions and the domestic gender roles which make women to be inferior or affect their economic progress to be worked on. The government needs to provide enough funds in the existing women targeted funds and make it easier to access so that women can grow in terms of entrepreneurship.

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