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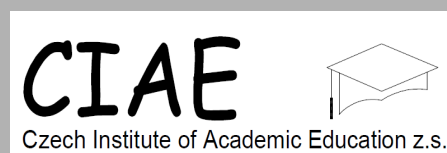
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## Georgian Women Affiliated with European Scientific Circles

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### Abstract

The Georgian woman has always played an active role in intellectual and scholarly pursuits – across politics, culture, education, and science. In Georgia, literary education has been esteemed since ancient times. It was customary to include a copy of *The Knight in the Panther's Skin*, the twelfth-century poem by the poet and thinker Shota Rustaveli, as part of a woman's dowry – an emblem of both literary refinement and cultural prestige. Women often acquired their education within the family circle. In a small country perpetually bracing for foreign assaults, women also assumed the role of educators, a role that, in turn, became vital to the preservation of national identity. It is no coincidence that the term *medicine* is etymologically linked to the name of the Colchian Medea. Medea served as a conduit of Colchian medical knowledge to the Western world. In nineteenth-century Georgia, the earliest primary schools gradually gave way to more formal institutions -academies, gymnasiums, and seminaries – ushering in a new era of educational advancement. The development of literacy reached a higher stage. By the 1870s, Georgian women were already studying at universities in Switzerland, notably in Geneva and Zurich. This aspiration toward Europe never waned. The first Georgian woman to pursue a career in Europe in the field of psychophysiology was Barbare Kipiani, a trailblazer who paved the way westward. By the early 1900s, she was delivering lectures at various European universities. A member of the academic society of a French university, she was the recipient of both gold and silver international medals and the author of numerous foundational works in her field. From Barbare Kipiani to the present day, Georgian women scientists have continued to contribute fruitfully across many European countries. Their achievements in various fields are particularly notable in Germany, the United Kingdom, France, Switzerland, and beyond. Georgian women scientists abroad are attuned to the challenges of the times; they work with distinction at Europe's leading universities and research centers, playing an active role in integrating Georgia's scientific community into broader European frameworks. The contribution of Georgian women to the advancement of science is substantial. A striking testament to this is the fact that, according to a study conducted by the United Kingdom's Intellectual Property Office, Georgia ranked among the top ten countries in the global index of women inventors just a few years ago. Since 2015, February 11 has been designated by United Nations General Assembly resolution as the International Day of Women and Girls in Science. In Georgia, this day is marked annually. The role of women scientists is, without question, vital in shaping the future of society.

**Keywords:** Woman scientist; Education; Literacy; Europe; Scientific community

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## 1. INTRODUCTION

Georgia has always been an integral part of European civilization. At its mythic origins stands the legendary Medea, daughter of Aeetes, king of Colchis, whose name and image have come down to us through the Greek myth of the Argonauts, composed in the first half of the second millennium BCE. From Homeric times through the modern era, the tale of the Argonauts has served as an inexhaustible source for literature and the visual arts. The Georgian woman Medea – founder of European medicine – has remained a muse for writers and artists across the world. She brought Colchian medical knowledge to the West, and thus her name became immortalized in the very word for the healing arts: medicine. Medea was the first Georgian woman to journey toward Europe, passing through Greece as a conduit of ancient wisdom.

The literary and scribal activities of Georgian women trace back to time immemorial. Their contribution to the preservation of national culture is both significant and undeniable – a contribution that has always been closely intertwined with the survival of the Georgian nation itself. In a small country frequently embroiled in war, women played a vital role not only in public life but also within the family structure.

Historically, boys and girls were educated separately, and instruction was predominantly theological and religious in nature. Alongside this, they studied grammar, rhetoric, dialectics, arithmetic, music, geometry, and astronomy. The women characters in *The Knight in the Panther's Skin*, the twelfth-century poem by Shota Rustaveli, are portrayed as highly educated. Indeed, the poem itself was regarded as an instrument of moral and intellectual formation: in some households, it functioned as a kind of domestic school. Families read it aloud, studied its verses, and transmitted its wisdom from one generation to the next (1).

The involvement of Georgian women in cultural and literary life began early, particularly in the monastic centers of the Near East. In ancient Georgia, centers of learning and culture were primarily attached to churches and monasteries. These religious sites also served as hubs for literary and intellectual endeavor.

In the ninth century, a Georgian woman named Euphrosyne was active in Jerusalem. From the eleventh century onward, Georgian women began founding educational and cultural centers in the Holy Land. The women scribes who lived and worked in Georgian nunneries, both in Georgia and abroad, played a crucial role in preserving ancient Georgian manuscripts. Several such centers are known to us, including those at Kappatha, Deltavi, and Derthoufa (2).

By the eleventh century, Georgia had forged close ties with the most powerful empire of the age – Byzantium. At the forefront of these ties stood a Georgian woman: Martha-Mariam Bagrationi, twice Empress of Byzantium, born in Georgia and a figure of great influence and intellect. Renowned for her beauty and education, she was a patron of Georgian churches and monasteries in the Byzantine Empire and a benefactor of the Iviron Monastery on Mount Athos. She also played a pivotal role in the construction of the Georgian Monastery on Mount Zion. Her image appears on Byzantine gold and silver coins and in Georgian religious icons.

Queen Martha-Mariam was the aunt of Georgia's famed monarch, King David the Builder (Also known as Davit IV Aghmashenebeli). She assisted him in implementing church and state reforms. Inspired by her vision, David founded the academies of Ikalto and Gelati. Thanks to her intercession, David would send the brightest graduates of these academies to Byzantium for higher education, thus securing a bridge between Georgian scholarship and the broader intellectual world of the time.

The presence of literate women in medieval Georgia is attested by testamentary inscriptions and marginal notes preserved in historical manuscripts. These inscriptions reveal that, from the earliest times, books were objects of care and reverence for women. Testamentary notes have also recorded the names of numerous women who were not only scribes but also patrons of learning. Among the most distinguished are Queen Ana, consort of King Alexander I of Kakheti (r. 1476–1511), and Queen Mariam of Kartli (17th century).

Their contribution to the transcription of *The Life of Kartli* – a literary and historical treasure of the Georgian people – is of immense significance. Through their efforts, invaluable manuscripts of this national chronicle were preserved. These copies laid the foundation, by the 18th century, for the emergence of history as an autonomous scientific discipline in Georgia. Today, these manuscripts are known as the *Ana Codex* (Georgian: *Anaseuli*, “Queen Ana’s version”) and the *Mariam Codex* (Georgian: *Mariamiseuli*, “Queen Mariam’s version”), bearing the names of their noble patrons (3).

The renowned Italian missionary Arcangelo Lambertini (17th century) made a pointed observation regarding the education of Georgian women: “The Georgian script and reading would have entirely vanished by now, had it not been preserved by women. If one wishes to learn how to read, one must entrust oneself to a woman for instruction” (4).



## 2. MAIN TEXT

### 2.1. *The problem of female education and the first female schools*

In the 1820s–1840s, there were 18 private schools in Tbilisi, primarily organized as boarding schools for boys and girls. The first formal educational institution for women in Tbilisi was established in the 1830s. In 1860, the “Charitable Society” opened the first women’s school in the Avlabari district of Tbilisi. In 1865, Tbilisi saw the founding of its first vocational (real) school, and in the same year, the city’s first first-level women’s school was inaugurated (5).

In Georgia, women have long held a distinct place in both political and cultural-educational life. They founded schools, opened private boarding institutions, and established charitable societies, as well as organizations devoted to music, tourism, and photography.

“From the mid – 19th century onward, not only private and state-run boarding schools and gymnasiums for women were established in Georgia, but also institutions of diverse academic and vocational profiles, including the Transcaucasian Institute for Women. In Tbilisi, women’s parish schools, diocesan schools, medical colleges, teacher training institutes, craft and music schools, and professional workshops emerged – offering instruction in various practical arts. Advanced courses were also introduced, whose scope and academic rigor were equivalent to that of higher education” (6).

The great Georgian writer and thinker Ilia Chavchavadze gave particular attention to the issue of women’s education, asserting that women are capable of engaging in public work and producing cultural value. Under his leadership, the *Society for the Spreading of Literacy among Georgians* was founded. From as early as 1880, women began to play an active role in the governance of the society. They were deeply involved in establishing regional branches and reading rooms, developing textbooks, and training teachers – dedicating themselves to the mission of making education accessible to boys and girls of all social backgrounds.

In 19th century Georgia, under the constraints of Russian colonial rule, schools played a vital role in preserving Georgian cultural and spiritual heritage, both in the East and the West. Educational institutions and libraries came to be regarded as cultural strongholds. Women, no longer confined to the domestic sphere, increasingly participated in public and political life.

On May 14, 1847, the *first women’s educational institution* was established in Kutaisi. The founding of the city’s traditional holiday – *Gviriloba* (Daisy Day), is also associated with the Kutaisi Girls’ Gymnasium. As part of this charitable initiative, students would sell daisies to raise funds for the care of tuberculosis patients.

A particularly high number of girls’ schools were founded in the 1880s and 1890s in towns such as Signaghi and Telavi. The cultural and educational development of women was actively supported by the Women’s Society of Telavi. Its chairwoman, Babilina Sulkhaniashvili, published a statement in the newspaper “Iveria” in November 1895 outlining the goals and objectives of the society.

Among the women’s educational institutions in the Kakheti region, the *St. Nino School of Telavi* held a prominent place. Founded in 1865, its establishment was spearheaded by **Anna Bagration-Chavchavadze** (1828–1905) – a distinguished public figure and philanthropist, daughter-in-law of the poet and cultural luminary Alexander Chavchavadze, and wife of Prince David Chavchavadze. A great-granddaughter of King Erekle II of Kartli-Kakheti, Anna was also known for hosting one of the earliest literary salons in Georgia.

Graduates of the St. Nino School went on to become notable figures – patriotic women whose contributions shaped not only the social life of Telavi and the Kakheti region, but Georgian cultural and spiritual life more broadly. Among them was Sopio Vakhvakhishvili, mother of the eminent historian Ivane Javakhishvili.

The late 19th century also saw the emergence of women writers who published essays and articles on women’s issues. One of the most remarkable among them was **Barbare Eristavi-Jorjadze**, a pioneering Georgian thinker of the 19th century. She was among the first to publicly address women’s rights, education, and the idea of gender equality. Jorjadze even devised her own literacy method and authored the first Georgian cookbook. One may say that she opened a window onto Europe, introducing Georgian society to elements of European culinary culture. Her 1874 publication, *Complete Cookery*, remains a culturally significant work and is often regarded as one of Georgia’s enduring cultural emblems.

### 2.2. *The 19th Century and the Educational Movement in Georgia*

From the 1870s onward, educational movements gained momentum in both Europe and Georgia. A number of Georgian women traveled to Switzerland to pursue higher education. These pioneering students came to be known as the “**Zurich Girls**”. The *University of Zurich* was among the first in Europe to admit female students, including

foreigners. In 1872, Pelagia Natsvlishvili and Barbara Nadezhdina began their medical studies there. In 1873, Ekaterine Melikishvili attended the university's medical faculty for one semester. Later, between 1897 and 1903, Olga Sutyagina enrolled as a medical student from Tbilisi. She was the only Georgian woman of that generation to complete her studies and obtain a formal degree (7).

The Georgian press also mentions another European university where a Georgian woman received an academic degree in medicine. This is the *University of Paris*. Mariam Bakradze graduated from the Faculty of Medicine in Paris in 1897 and wrote a dissertation. The newspapers *Iveria* and *Tsnobis Pirtseli* wrote about her in 1898. (8).

Among the first Georgian women to seek higher education in Europe were the sisters of noted public and political figure Niko Nikoladze – Ekaterine and Olympiada. Niko's future wife, Olga Guramishvili, also traveled to Zurich for her education and transferred to Geneva in 1873.

Olga played an active role in founding the society *Ugheli* ("The Yoke"), an organization created in 1873 in Zurich by Georgian students studying abroad. *Ugheli* developed plans for composing textbooks for Georgian schools and organized a translation circle. It played a pivotal role in fostering creative dialogue between Georgian culture and both Russian and European civilization.

Olga Guramishvili was one of the first professionally trained female educators not only in Georgia but in the entire Russian Empire to have received a European education. Thanks to her tireless efforts, a *girls' school* was established in Didi Jikhaishi, and in 1894, a *women's gymnasium* was founded with a curriculum oriented toward agricultural sciences.

The rise of women's rights – both within the family and in the public sphere – was further catalyzed by the development of capitalism. By the late 19th and early 20th centuries, women's access to broad scientific education and their participation in public life had become increasingly visible.

At the dawn of the 20th century, the first institution of higher education for women in the Caucasus was established: *the Tbilisi Women's Higher Courses*. The institution comprised two departments: Historical-Philological and Natural Sciences.

This period in Georgian history was marked by a constellation of distinguished, educated women. One of the most remarkable figures of the late 19th century was **Dominika Eristavi** (1864–1924), often referred to as the "*Recluse*" and the "*Georgian George Sand*". She spoke openly about the constraints on women's freedom and was a vocal advocate for gender equality. Dominika Eristavi was also the founder of the *Society of Georgian Women*.

**Mariam Jambakur-Orbeliani** (1852–1941), a public figure and educator, led the Society of Women Teachers for over three decades. The organization aimed to promote employment opportunities for women in educational institutions and to defend the rights of female teachers. With funds personally collected by Jambakur-Orbeliani, the *first Georgian-language school for girls* was opened in 1906.

**Ekaterine Gabashvili** (1851–1938), a writer and prominent public activist, began her pedagogical career in 1868. She established parish schools and worked tirelessly to keep pace with her era through self-education. In 1897, she founded the *Women's Workshop School*. A passionate advocate for women's education, she also offered free literacy and handicraft lessons to underprivileged girls in her own home, located in central Tbilisi. From the late 19th century, her house-school became the first professional institution for women in Georgia.

Many of Gabashvili's literary works are devoted to the struggle for women's freedom and rights.

A majority of educated Georgian women of the time were fluent in multiple European languages, and translation work became a widespread and respected practice among them.

### 2.3. The Family of Dimitri Kipiani and the First Georgian Female Scientist in Europe

**Elene Kipiani**, the daughter of the prominent 19th-century Georgian public figure, writer, translator, and publicist Dimitri Kipiani (1855–1890), co-founded the so-called "*Women's Small Circle*" alongside **Anastasia Tumanishvili**, editor of the journal *Jejili*. The primary mission of this circle was to translate works of fiction from European languages into Georgian. Through Elene's initiative, a collection was published in 1874, which included her first translations – such as *The Parisian Boy* by Victor Hugo and *The Last Years* by Rossel, among others. Notably, she translated directly from French, focusing on stories centered on patriotism and the moral education of future generations.

Thanks to her tireless dedication, the journal *Georgian Library* (Kartuli Biblioteka) was published, producing eleven issues in just one year. It was unique in that it featured only works authored by women.

The Kipiani family also gave Georgia its first woman scientist: **Barbare Kipiani** (1879-1965).

A scholar, educator, philanthropist, and public figure, Barbare Kipiani was the *first Georgian woman psychophysiologist* – and the first among Georgian women to open a path to Europe. She delivered lectures at various European universities, became a member of the *French University Academy*, received international gold and

silver medals, and authored numerous foundational scientific works. Her research focused on methods for classifying types of human memory, the psychological foundations of education, tropism, ambidexterity in schoolchildren, and the theory of mental disposition (*Stimmungstheorie*).

Barbare's grandfather, **Dimitri Kipiani**, was a leading figure in Georgia's national-liberation movement. He ultimately became a victim of Russian colonial policy. In 1886, following the assassination of the rector of the Tbilisi Theological Seminary, Chudetsky, the Exarch of Georgia, Pavel (Lebedev), publicly cursed the Georgian people. Kipiani demanded his resignation and expulsion from the country. As a result, he was dismissed from office and exiled to Stavropol, where he was assassinated by agents of the Tsarist regime. On April 26, 2007, the Georgian Orthodox Church canonized Dimitri Kipiani.

Barbare (Varia) Kipiani was born on February 4, 1879, in Kutaisi, into a family of distinguished public service and cultural refinement. Her father, **Nikoloz Kipiani**, the eldest son of Dimitri Kipiani, was himself a scholar, publisher, and an influential figure of the era. Her mother, **Anastasia (Taso) Eristavi**, was a direct descendant of King Solomon I of Imereti.

Following her parents' divorce, Barbare and her two sisters, **Elisabed (Veta) and Nino**, were raised in the cultured environment of the Kipiani household under the care of their grandparents, Dimitri Kipiani and his wife, Nino Chilashvili. This nurturing and intellectually rich upbringing laid the foundation for Barbare's future scientific and cultural achievements.

Barbare Kipiani received her early education at the *St. Nino School* in Tbilisi. After completing her studies there, she traveled to Belgium with her sister, Nino, to pursue higher education. In 1902, Barbare enrolled in the Faculty of *Medicine*, while Nino entered the *Faculty of Law*.

"Our family archive preserves letters and postcards written by Barbare during her student years", recounts her descendant, Tamar Mikadze. "In them, she notes that the course of study is long – seven years – but she promises to bring honor to her homeland. She fulfilled this promise with utmost integrity".

During her time as a student, Barbare distinguished herself academically. As a fourth-year medical student, she participated in an international congress in Brussels, where, according to renowned physiologist Ivane Tarkhnishvili, her speech was met with extended applause. She played a significant role in collecting, preserving, and promoting Georgian cultural artifacts abroad. Notably, she took guardianship of the property belonging to Salome Dadiani and the Murats, later entrusting these cultural items to Mikheil Tamarashvili for safekeeping.

In 1910, under Barbare Kipiani's initiative, a *Georgian Section of History and Ethnography* was established at the *International Museum of Brussels*. This marked a milestone in the effort to represent Georgian spiritual and cultural heritage abroad. In a letter calling for public support, Kipiani wrote: "This is the first opportunity for Georgia to show Europe the achievements of the Georgian people in science and technology. I appeal for your assistance through donations of books, artworks, and other items" (9).

A key figure in Barbare's scientific development was **Professor Jóteyko**, a Polish woman who taught at the university. She invited Barbare to work in her laboratory, and with the earnings from this position, Barbare was able to pay her tuition and continue her studies at the University of Brussels.

"We believe that further research into this relationship would be of great interest, – Tamar Mikadze writes in an article dedicated to Barbare Kipiani, – Uncovering more about this remarkable woman – Jóteyko – would not only illuminate her role as a generous mentor but also shed light on many lesser – known aspects of Barbare's own scientific path. What we do know is that Jóteyko headed the *Solvay Energy Laboratory* affiliated with the University of Brussels, where Barbare Kipiani worked following her graduation. Jóteyko also served as editor of the journal *Psychological Review*, where Kipiani held the role of secretary" (10).

Upon returning to Georgia, Barbare continued her fruitful work as both an educator and a public figure. She taught French at the Georgian Nobility Gymnasium in Tbilisi. In 1918, she delivered a stirring address at the inauguration ceremony of Tbilisi State University.

She later served as assistant to Akaki Shanidze, head of the university's library, and was an active member of both the *Union of Artists* and the *Military Union*.

In 1921, following the occupation of Georgia by Bolshevik Russia and under intense political repression, Barbare Kipiani, persecuted by the authorities, was forced to return to Brussels, where she eventually passed away. Her burial site remains unknown.

Barbare's sister, **Nino (Nutsa) Kipiani** (1877–1921), was the first woman from the Russian Empire to earn a law degree, having graduated from the Faculty of Law in Brussels. A renowned political figure and one of the first women politicians in the South Caucasus, she was actively involved in the national liberation movement at the beginning of the 20th century. Her political activities led to multiple arrests, and in 1907, by special decree of the Governor – General of Tbilisi, she was expelled from the country.

Nino lived in Belgium and later in Italy, where she worked at the Belgian Embassy. While living in Rome in 1919, she had planned to compile both Georgian–Italian and Italian–Georgian dictionaries and to translate Georgian literary works into foreign languages. Unfortunately, these ambitions remained unfulfilled.

After Georgia regained independence, Nino returned to her homeland. Suffering from tuberculosis, she spent her final days at the family estate in Kvishkheta and was buried in the courtyard of the local church in Kvishkheta.

The unique archive of the Kipiani sisters – containing manuscripts, correspondence, postcards, and personal items – is preserved within the family and currently held by their descendant, **Tamar Mikadze**, a writer and Doctor of Philological Sciences. A sixth-generation descendant of Dimitri Kipiani, Mikadze has served for many years as a senior researcher at the *Shota Rustaveli Institute of Literature* and later at the *Ilia Chavchavadze Research Center*. She currently leads the *Spirituality and Culture Center* affiliated with the Church of Saint Dimitri and is a founding member of the literary collective of the journal *Aneuli*.

In June 2025, members of the Kipiani family retraced the footsteps of their ancestors in Belgium, visiting the places where **Nikoloz, Nino, and Barbare Kipiani** – the “first swallows” not only in Belgium but in Europe – had lived and worked.

The path to the first Georgian woman scientist working in Europe was long and arduous. Georgian women have played an extraordinary role in shaping the nation’s cultural, educational, and public life. As this historical overview and the legacy of their endeavors attest, the intellectual journey undertaken by Georgian women since ancient times laid the groundwork for future scientific inquiry – an achievement that the 21st century has fully affirmed.

#### 2.4. Nino Salia – founding editor of the magazine “*Bedi Kartlisa*” (*The Destiny of Kartli*)

One such emblematic figure is **Nino Salia**, historian, philologist, physician, philanthropist, and co-founder and editor of the internationally renowned Georgian journal *Bedi Kartlisa*. Born in 1898, she initially studied medicine in St. Petersburg and worked as a wartime nurse during World War I. After the war, she pursued higher studies in history in Warsaw, Poland.

Following the Soviet occupation, **Nino Kurtsikashvili** (her maiden name) emigrated to France in 1926. At the time, Paris was home to a large and vibrant Georgian émigré community with various cultural organizations. There, she began her active scholarly career, conducting extensive research into Georgian history and culture. In Paris, she met and later married the eminent historian and Kartvelologist **Kalistrate (Kale) Salia**.

Following the Second World War, Georgian-language press ceased to exist in Europe. In response, Nino Salia, together with her husband, founded the historical-literary journal *Bedi Kartlisa (The Destiny of Kartli)* in Paris in 1948, using their own resources and with the support of France’s National Center for Scientific Research (CNRS). The journal endured for 35 years and became one of the most authoritative international platforms for Kartvelological scholarship.

Initially, *Bedi Kartlisa* was published exclusively in the Georgian language and was accessible only to Georgian-speaking readers. Foreign scholars had no access to its content. From 1957 onward, however, the journal began appearing in French, significantly expanding its reach. Its format also grew, with annual volumes reaching 360 pages. The journal attracted leading Georgian and international scholars in the field of Kartvelology. Among the members of its distinguished editorial board were: Julius Asphalg, Georges Dumézil, René Lafon, David Lang, Irène Mélikoff, Charles Mercier, Bernard Outtier, Hans Vogt, Lajos Tardy, Mikheil Tsereteli, and others (11).

The journal adopted a new title: *Bedi Kartlisa – Revue de Kartvelologie*. In addition to French, it also published articles in English and German. It regularly featured scholarly contributions by Georgian, Azerbaijani, and North Caucasian academics, including researchers from the Soviet Union.

**Nino Salia served as the journal’s editor, overseeing all editorial, administrative, technical, and financial operations.** She was also a prolific contributor, publishing numerous studies. Among her most significant works are: “*The Martyrdom of Queen Ketevan of Georgia*”, “*In the Service of Georgian Culture*”, “*The 800th Anniversary of Shota Rustaveli*”, “*The Knight in the Panther’s Skin and Its Literary and Scientific Significance*”, and “*The Amiran – Prometheus Problem*”, among others (12).

In 1980, the Salias donated their personal library – comprising several thousand volumes – and other materials to the *National Centre of Manuscripts* in Tbilisi. This donation laid the foundation for the establishment of the *Salia Reading Room and Archive*, which today houses rare Kartvelological and Orientalist literature, encyclopedias, dictionaries, and editions considered bibliographical treasures worldwide.

Nino Salia passed away in Paris in 1993. Her ashes were later repatriated to Georgia and interred beside her husband in the *Didube Pantheon* in Tbilisi (13).

## 2.5. Renowned scientist Nino Porakishvili and the large "University family"

Another distinguished representative of Georgia's intellectual tradition is **Nino Porakishvili** –biologist, scientist, educator, and professor at both *Tbilisi State University* and the *University of Westminster* in the United Kingdom. She was raised in what she describes as a "university family", as all her ancestors were closely connected to academic institutions.

Her grandfather, Erekle Porakishvili, a graduate of the University of Montpellier, was among the many Georgian intellectuals who perished during the years of political repression. Her mother, Viktoria Bekshanova-Porakishvili, was a senior lecturer at the university, and her father, Professor Zurab Porakishvili, served first as Deputy Minister of Education and later as Vice-Rector of Tbilisi State University (14).

Her great-grandfather, Adam Porakishvili, together with his sister Ekaterine Porakishvili and her husband David Sarajishvili, was among the patrons who helped finance the founding of *Tbilisi State University*.

Raised in a family steeped in academic tradition, Nino Porakishvili had already charted her professional path by the age of fifteen: she would become a biologist – specifically, an immunologist. Upon reading her first book on immunology, she discovered that it was a new and dynamic field, filled with unfamiliar and fascinating phenomena.

Fulfilling her childhood aspiration came naturally. After graduating from the Faculty of Biology at Tbilisi State University (TSU), she went on to build a distinguished career that has become a source of pride for Georgia's scientific community.

Nino Porakishvili graduated from secondary school with a gold medal in 1975. In 1980, she completed her studies with honors at the *Ivane Javakhishvili Tbilisi State University*, Faculty of Biology. In 1985, following postgraduate studies at *Lomonosov Moscow State University*, she defended her Candidate of Sciences dissertation on the topic: "*Age-Related Changes in the Immune System*".

She was the founder and head of the *TSU Research Laboratory of Immunology*. Through her efforts, the laboratory was first established, and in 1992, the *Department of Immunology* was founded at TSU. This was the first such department not only in Georgia and at TSU, but across the entire South Caucasus.

Thanks to her active scientific work and extensive international collaborations, the Department of Immunology at TSU evolved into a leading *scientific center of the South Caucasus*.

In 1992, Nino Porakishvili defended her doctoral dissertation at TSU, becoming the *youngest woman in Georgia to earn a Doctor of Science degree*. Since 1993, she has served as Professor of Immunology and Microbiology at the Faculty of Exact and Natural Sciences. In 1994, she was awarded the academic title of Professor in Immunology and Allergology. She was later invited as a senior researcher at the *Department of Immunology, University of London*.

The establishment of the department proved to be a pivotal moment: the majority of its graduates today work in world-renowned scientific research institutions.

From 2002 to 2006, Nino Porakishvili held the position of Honorary Senior Research Fellow at the Department of Immunology and Molecular Pathology, University College London (UCL). Since 2006, she has led the Immunology and Microbiology Program.

From 1996 to 2005, she served as project coordinator for the EU's INTAS scientific program, and since 1996 she has continuously coordinated educational projects under the European Union's TEMPUS framework.

In the spring of 2024, Professor Porakishvili stepped down from her position at TSU and was appointed Director of the Institute of Molecular Biology at the University of Georgia.

She is currently Principal Lecturer in the Department of Biomedical Sciences at the *University of Westminster*, United Kingdom, within the Faculty of Science and Technology, and is the author of numerous scientific publications.

**Nino Porakishvili:** "Winning TEMPUS funding in 1995, in partnership with one of London's leading universities, was a tremendous advantage for us. TEMPUS played a crucial role in helping us establish laboratories and launch scientific projects. At the time, TEMPUS supported not only our institution, but higher education across all of Eastern Europe.

Later, we became part of a large consortium that included top universities and scientists from the UK, France, Spain, Italy, and Slovenia. I must emphasize that for two decades, we continuously secured TEMPUS funding – this was the result of highly effective collaboration. When TEMPUS marked its 20th anniversary, our project – "Development of Immunology, Hematology, and Molecular Medicine" – was recognized as its most successful initiative. We were invited to Brussels to present our results.

Today, Tbilisi State University ranks as the number one university in the Caucasus region and even surpasses many institutions in Western Europe. This is why we were entrusted with the role of project coordinators, and the university is now considered a regional center for the development of these fields.

I would also like to recall that in 2012, the general coordinator of the project – the University of Westminster – was awarded the prestigious Times Higher Education Award for Best International Project in the United Kingdom. As a project partner, we were invited to the ceremony and featured in a special segment about our university”.

In 2008, Nino Porakishvili was invited as a research fellow to the laboratory of Professor Nicholas Chiorazzi at the Feinstein Institute for Medical Research in New York.

A recognized expert in oncohematology, immunology, molecular genetics, and molecular therapy, Porakishvili stands out for her high-level scientific publications and academic textbooks. She is known for her innovative application of blended learning methodologies, including digital and virtual instructional resources. She serves as the lead instructor of the joint TSU–BSU–AMU course in Medical Molecular Biology.

From 1995 to 2005, she served as deputy coordinator to **Professor Lydyard** for the TEMPUS and INTAS programs and was the lead coordinator for the TEMPUS project 158627 UK-JPCR-2010.

Between 2012 and 2014, Nino Porakishvili collaborated with the Lexicography Center on the development of a **biological lexicon**.

“We could not have completed the English – Georgian Biological Dictionary without Professor Nino Porakishvili at our side”, – reads the foreword of the Lexicography Center’s publication, – “An outstanding scientist, currently active in the United Kingdom and still a professor at TSU, she also continues to lead her department in Georgia. Nino Porakishvili is the founder of the first Department of Immunology in the entire Caucasus region and is now an internationally recognized scholar of great authority” (15).

The English – Georgian Biological Dictionary contains **23,000 terms**, organized by sub-discipline. Each entry is accompanied by appropriate field-specific classifications. The covered domains include anatomy, botany, zoology, biotechnology, genetics, immunology, physiology, and others.

Nino Porakishvili is the author of two academic textbooks: “*Case Studies in Infectious Disease*” and “*Instant Notes in Immunology*” (the latter scheduled for release in autumn 2025). The first textbook has already been published twice – in 2009 and again in 2024 – with Porakishvili serving as a co-author within an international team. The second textbook is a newly developed work.

## 2.6. Neno Gabelia – Doctor of Political Sciences in Rome

**Neno Gabelia**, a researcher and academic, has lived in Rome, Italy, for 15 years. She arrived in 2011 to pursue studies at *Sapienza University of Rome*, enrolling in the Faculty of Political Science. After completing both her master’s and doctoral degrees, she earned a PhD in Political Science in 2017 at the age of 27. She currently serves as the director of the *Italian Hospitality School*, a professional institution specializing in tourism, and is also head of the “Roots” *Sunday School* associated with the *Parish of Saint Andrew the First-Called in Rome*.

Neno Gabelia was only three years old when, during the war provoked by Russia, Abkhazia was lost. Her family fled from Gali and resettled in Tbilisi. She completed her schooling in Tbilisi and enrolled in the *Faculty of Law at Tbilisi State University*. Upon earning her bachelor’s degree, she received a scholarship to pursue a master’s degree at Sapienza University. After arriving in Rome in 2011, she successfully completed both her master’s and doctoral studies.

She was honored by Sapienza University as one of its most outstanding doctoral graduates. The competition included nearly 700 candidates who had earned PhDs across various disciplines from 2017 onward. Out of these, only 30 were recognized, and Gabelia was the sole recipient of the award from the Faculty of Political Science.

A native of Gali and displaced by conflict, Neno Gabelia focused her doctoral research on the conflicts of the South Caucasus, with particular emphasis on the Abkhazia conflict. One of her co-authored studies – developed in collaboration with an Italian colleague – explored models of federalism. The work was published as a book by Cambridge University Press and received significant international attention.

For one year, Neno Gabelia served as *Georgia’s Youth Ambassador to Italy*, a role she fulfilled with deep responsibility and distinction. In 2019, she won the Ministry of Foreign Affairs’ competitive grant program “Be Your Country’s Young Ambassador”. As a Young Ambassador, she organized a wide array of cultural and academic initiatives designed to promote Georgian heritage, traditions, and history within Italian society.

Among her notable projects was a wine-promotion event held in Rome, where twelve Georgian winemakers presented their wines to an audience of forty professional sommeliers. Another remarkable event was an international scientific conference hosted at Sapienza University – dedicated entirely to Georgia and Georgian fashion. The conference drew a large audience from the fashion industry, including Georgian and Italian designers, academics, museum professionals, and university representatives.

Neno Gabelia has also organized a number of solo exhibitions and Georgian culinary evenings, further expanding cultural ties between Georgia and Italy.

“All of us who live abroad are, in essence, ambassadors of our country – even without any formal programs or initiatives. During my university years, I introduced many people to Georgia and shared stories about our homeland. Still, programs like this help you grow internally, refine you as a person. I strive to do everything I can to make Georgia and its rich culture and history more familiar to Italians. I try to create bridges between our traditions. When Italians perceive these connections, they find them more accessible and meaningful”, – says Gabelia.

According to a statement released by the *Embassy of Georgia in Italy*:

“Thanks to Neno’s boundless energy and tireless efforts, the circle of Georgia’s friends in Italy has significantly expanded. Though her one-year mandate as Young Ambassador has ended, we are confident that Neno will continue actively representing Georgia in the best possible light in Italy”.

A PhD in Political Science and an expert in conflict studies, Gabelia lectures in Rome, focusing primarily on Georgia, its history, and regional conflicts.

“Georgia is a country with a deep and fascinating history. Europe values that richness. Europe is about values – you learn independence, develop personal capacities, and gain a deeper understanding of your country’s past”, – she observes.

One of her most notable cultural contributions was her rediscovery of the **grave of Giorgi Apkhazi**, the first Georgian diplomat and painter active in the Italian Republic. Following this, a catalogue of Apkhazi’s works was published – compiled in collaboration with Professor **Neno Gabelia** of *Sapienza University of Rome* and **Alessandra Malusardi**, *head of the archives of the Rome Opera House*. The publication was the culmination of extensive scholarly research led by Professor Gabelia.

The Embassy of Georgia in Italy provided vital support for this cultural endeavor, ensuring the installation of a proper memorial plaque on Giorgi Apkhazi’s previously neglected grave in Rome. Later, the embassy hosted the official presentation of the newly released album. Until that moment, Apkhazi’s theatrical sketches had never been made accessible to the broader public.

**Giorgi Kalandia**, Director of the Palace of Art of Georgia, emphasized the importance of this event during the successful European Days of Georgian Culture. With support from Georgia’s Ministry of Culture, the Palace of Art published a trilingual catalogue dedicated to Giorgi Apkhazi’s creative legacy: In cooperation with the Rome Opera, the Palace of Art has, for the first time, published a full-color trilingual catalogue dedicated to Giorgi Apkhazi – the great Georgian scenographer who worked in Italy.

The catalogue marks the first publication dedicated to a major Georgian artist working in Italy. Starting in the 1930s, Giorgi Apkhazi actively collaborated with theaters in Rome and Milan. In 1946, he designed the production of Donizetti’s *L’elisird’amore* at La Scala in Milan.

“As one of the co-authors of the book, it brought me immense joy to witness a hall filled with guests – Italians deeply moved and inspired by Apkhazi’s art. The catalogue was met with enthusiastic acclaim, and that, too, is a victory for Georgian culture. I am grateful to the creative team of the Palace of Art, who undertook a tremendous amount of work in preparing the publication”, – wrote Giorgi Kalandia (16).

Equally noteworthy is the creation of the *animated film “Giorgi Apkhazi”*. The film, presented in both Georgian and Italian, narrates not only the life of the artist Giorgi Apkhazi but also conveys key elements of Georgia’s history.

Neno Gabelia is currently engaged in *Erasmus project development*. Having once arrived in Italy herself as an Erasmus student, she later won the Erasmus Mundus competition following her undergraduate studies and received a scholarship to pursue a master’s degree at Sapienza University of Rome.

Today, she prepares grant applications on behalf of the institute where she works, enabling Georgian students to travel abroad for internships or academic study across various European countries.

Thanks to these programs and Gabelia’s tireless efforts, a growing number of Georgian students have been able to study in Europe – an initiative that continues to strengthen international educational ties and expand opportunities for Georgia’s youth.

## 2.7. Mari-Luisa Konjaria – Georgian analyst scientist in Germany

**Mari-Luisa Konjaria** is a Georgian analytical chemist and Doctor of Chemistry currently working in Germany. Born in 1994, she demonstrated exceptional talent and an early passion for science. She graduated with top honors from Public School No. 15 in Poti, earning the distinction of Best Graduate. From 2012 to 2018, she studied at the Faculty of Chemistry at *Ivane Javakhishvili Tbilisi State University*, where she was actively involved in various scientific projects.



In parallel with her academic work in Georgia, Konjaria also conducted research in **France** and **Italy**, focusing on chiral sulfoxides and the development of separation methods using liquid chromatography. Her first scientific publication, dedicated to this research, appeared in a leading international journal in 2017.

In 2019, she began her doctoral studies at *Friedrich Schiller University Jena* in Germany, where she also worked as a scientific researcher. Her doctoral research focused on peptides and their chiral separation using capillary electrophoresis techniques.

During her PhD studies (2019–2022), she published several scientific articles and co-authored Chapter 8, titled “Cyclodextrins” (pages 273–323), in the reference book *Chiral Separations and Stereochemical Elucidation: Fundamentals, Methods, and Applications* (2023).

In 2020, Konjaria was nominated for the **Tsinandali Prize** in the field of science. In 2022, she was named to the *Forbes 30 Under 30* list and was later awarded the Tsinandali Prize in recognition of her scientific achievements. That same year, she obtained her doctoral degree.

Since 2022, Mari-Luisa Konjaria has worked as an analytical scientist at Europe’s largest soft-gel capsule pharmaceutical manufacturing company, located in **Eberbach**, Germany. In 2023, she was promoted to group leader, now heading a team of analytical scientists in the analytical services division.

## 2.8. Sopho Patariaia – Georgian physicist at the European Space Agency (ESA)

**Sopho Patariaia** is a Georgian physicist working at **the European Space Agency (ESA)**. Born in 1982, she earned her undergraduate degree in Physics and Informatics from Tbilisi State University in 2005, and subsequently continued her studies in Germany. From 2006 to 2009, she pursued a joint doctoral program at the *Technical University of Munich* and the *Max Planck Institute*.

From 2006 to 2019, Sopho Patariaia worked at **CERN**, participating in the **ATLAS experiment**. Over this period, she contributed to more than 30 scientific publications. She was involved in every stage of the experiment – from design and execution to data collection and analysis.

Patariaia’s research interests have included the Standard Model, supersymmetry, and the **search for dark matter**. In 2019, following a temporary suspension of the experiment, she transitioned to ESA, where she began working as a microwave engineer. Her current research involves the design and development of atomic clocks, and she independently conducts experiments in this field. She is also engaged in research related to optical and laser-based timekeeping technologies, bridging multiple areas of physics.

Sopho Patariaia believes that foundational education in **mathematics** and **natural sciences** is especially critical in today’s world and expresses hope that increasing numbers of students in Georgia will have access to such educational opportunities.

## 3. CONCLUSION

The role of women in Georgian history has been profoundly significant. In the past, the cultural and educational mission of female scribes was closely tied to the preservation of the native language and the safeguarding of national identity. Through their intellectual and public engagement, these women made exceptional contributions to the country’s history – playing key roles in addressing complex challenges, advancing education and literacy, and influencing diverse spheres of national life, including politics, diplomacy, the arts, and religious affairs.

According to UNESCO data, women currently comprise no more than 30% of the global scientific and research workforce. Both globally and in Georgia, the number of female students pursuing STEM fields – Science, Technology, Engineering, and Mathematics – remains low. Yet the 21st century presents new opportunities for women to participate actively across scientific disciplines. Many of the most significant recent discoveries are credited to women scientists.

For years now, Georgian women have successfully established themselves abroad, working in leading scientific centers and universities around the world. Their international achievements bring recognition to Georgia on the global stage, while maintaining strong ties with their homeland. They actively share their knowledge and experience with the younger generation in Georgia.

This dual engagement – working abroad while remaining connected to the country – serves two important purposes: on the one hand, it enables the realization of Georgia’s scientific potential and helps forge closer ties with the European research community and the broader European Area of Science, Innovation, and Technology; on the other hand, it offers Georgian scientists greater freedom and access to high-level international research platforms where cutting-edge scientific work can thrive.

## References

- [1] Kapiashvili, I. (1994). Ancient Georgian Women Scribes. Tbilisi: Lomisi Publishing House. (p. 9).
- [2] Kapiashvili, I. (1994). Ancient Georgian Women Scribes. Tbilisi: Lomisi Publishing House. (p. 46).
- [3] Khazaradze, N. (2002). Women and Literacy in Ancient Georgia. In Gender Issues in Georgia. International Center for Women's Education and Information. Retrieved from <https://www.nplg.gov.ge/greenstone3/library/collection/civil2/document/HASH01a5255f8b868ee2d1335bd0;jsessionid=10325B9301F2A87089E91AFECE215073>
- [4] Lamberti, A. (1938). Description of Samegrelo. with foreword and commentary by L. Asatiani. Tbilisi. (p. 164).
- [5] Tbilisi First-Rank School for Women. Georgian Encyclopedia. Main Scientific Editorial Board named after I. Abashidze. Retrieved from <https://georgianencyclopedia.ge/ka/form/19361>
- [6] Shovnaze, T. (2023). Educational Institutions and Their Architecture in Tbilisi in the Late 19th and Early 20th Centuries. Tbilisi. (p. 22).
- [7] Melashvili, T. (2015). The Zurich Girls: In the Footsteps of 19th-Century Georgian Students. Retrieved from <https://feminism-boell.org/ka/2015/06/03/ciurixeli-gogoebi-me-19-saukunis-kartveli-studentebis-kvaldakval>
- [8] Bakanidze, A. (2022). Women in Medicine. (According to Georgian periodicals of the XIX-XX centuries). p.12. <https://ge.boell.org/ka/2022/03/24/women-medicine>
- [9] Barbare Kipiani – Scientist (Belgium). Retrieved from <https://speech.ge/istoriuli-emigratsia/barbare-qhiphiani-metsnieri-belgia>
- [10] Mikadze, T. (2021). I am coming to you, as a Georgian. Journal Anueli, 1, 8-11.
- [11] Sharadze, G. (1991). Under Foreign Skies, Vol. 1. Tbilisi: Merani Publishing. (p. 451).
- [12] Turnava, S. (1978). Kartvelology Abroad. Tbilisi: Soviet Georgia Publishing. (p. 77).
- [13] Daushvili, R. (2024). Georgian Women in Emigration. Edited by K. Javakhishvili. Supported by TBC. Tbilisi. (pp. 132 –139).
- [14] Toradze, M. (2010). The path paved In the labyrinths of immunology. Newspaper Tbilisi University, 11, 8-9.
- [15] English-Georgian Biological Dictionary <https://margaliti.com/25/post4.htm>
- [16] (2023). Giorgi Kalandia: "There is a real celebration of Georgian culture in Europe". Media Holding "Kvira", <https://kvira.ge/832283>

# The Predictive Power of Monetary Variables on Domestic Investment in Nigeria

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## Abstract

This study examines the predictive power of monetary variables on domestic investment in Nigeria using time series data from 1981 to 2023—a period marked by declining investment, particularly in the non-oil sector. The Autoregressive Distributed Lag (ARDL) cointegration technique was employed, following stationarity tests using the Phillips-Perron (PP) method, to evaluate the long- and short-run relationships between monetary variables and investment. The analysis reveals that money supply, interest rate, and inflation significantly influence domestic investment, while the exchange rate has a negligible effect. Additionally, past GDP growth was found to strongly influence current investment levels, consistent with the accelerator theory. The study recommends that the Central Bank of Nigeria adopt an accommodative and well-targeted monetary policy to channel increased money supply into productive sectors through efficient credit mechanisms. Interest rates should also be managed to maintain investment-friendly borrowing conditions, particularly for high-growth sectors.

**Keywords:** Monetary variables, Domestic Investment, ARDL

## 1. INTRODUCTION

Nigeria being one of developing nations is confronted with a lot of economic problems such as high rate of unemployment, low level of investment, high rate of poverty etc. Nigerian economy is characterized by the dominant of a single commodity since 1960. Between 1960s and 1970s, Nigerian economy was dominated by agricultural commodity before the situation changed towards the end of 1970s when crude oil became the major source of finance to Nigerian government. Nigerian manufacturing sector and other non-oil sectors of the economy have witnessed stagnation or decline since 1983. Douglas and Jike (2005) described several factors hampering the performance of non-oil sector, which include slow pace of diversifying the non-oil export base, low investment, capacity underutilization etc.

Structural Adjustment Programme (SAP) was launched in 1986, which was intended to reverse the deterioration in the economy. Prior to 1986, inappropriate domestic policies coupled with external shock led to a severe deterioration in economic and financial performance. Large fiscal deficits, borrowing from the domestic banking system, gave rise to high rates of inflation and over-valued exchange rate. Heavy government intervention in the economy with little private participation, as well as massive expansion of the public sector through the establishment of a large number of state enterprises, all these worsened the distortions in the economy and destroyed any incentives to produce, save and invest. In view of the above economic problems, Nigeria declared state of economic emergency in 1985.

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Investment is a critical engine of economic growth, especially in developing economies like Nigeria, where capital accumulation is essential for job creation, infrastructure development, and industrialization. Domestic investment, in particular, serves as a key indicator of economic health and a driver of sustainable development. Among the various determinants of domestic investment, monetary variables such as interest rates, money supply, and inflation rate have been widely recognized as influential factors (Greene & Villanueva, 1991; Jhingan, 2016).

Viewing aggregate domestic investment, it was clear that the collapse of investment, which began in the early 1970s, was broad-based. Aggregate income level was between N128.6 to N 297.8 million in the early 1970s, it fell to as low as -N404.1 and -N334.7million in the early 1980. Although in 1987, the levels of investment in Nigeria rose to as high as N2452.8 million, this encouraging signs increase consistently, and persisted till 2004. The highest income of 258,388.6 million was recorded in 2004. But the situation change since 2004, when domestic investment in Nigeria witnessed a continuous decline, which fell below any other level of loss ever, recorded. In 2005, it was - N1921.2 and was low as N114484.4 in 2008, the level of domestic investment in the Nigeria economy has fallen with over 145 percent below its position in 2004 (CBN 2007).

Between 2005 and 2023, domestic investment in Nigeria experienced notable fluctuations due to economic reforms, global dynamics, and internal challenges. Investment as a share of GDP declined from 22.4% in 2005 to a low of 14.9 % in 2013, before rebounding to 36.1% by 2023. While Foreign Direct Investment (FDI) fell sharply—from \$1.25 billion in 2015 to \$377.77 million in 2023—domestic investors increasingly filled the gap, especially in the capital market where they accounted for 90% of equity transactions in early 2023. Key sectors like oil and gas and manufacturing saw increased local participation, with firms like Seplat and Dangote Group making significant investments. Policy reforms in 2023, such as fuel subsidy removal and exchange rate unification, also played a role in boosting investor confidence and domestic capital inflows (CBN 2024).

SAP and all other reforms programme introduced recorded success. The government has pursued programme of financial and structural reforms that have been hailed by international community. Despite the improvements in economic performance, Nigerian economy still continues to be confronted with a number of constraints, such constraints include levels of savings and investment that are too low to allow self-sustained growth. If investment remains at the current low levels, it will slow down potential growth and reduce long-run levels of per capital consumption and income, this hamper the sustainability of economic growth and any hopes of meaningful poverty alleviation (Iyoha, 1995).

Monetary policy significantly influences the economy by affecting macroeconomic conditions through monetary variables, which in turn impact investment decisions. According to neoclassical theory, higher interest rates raise borrowing costs and discourage investment, while Keynesian models highlight interest rate expectations and liquidity preference. Empirical studies confirm that changes in monetary variables affect investment in both the short and long term. (Keynes, 1936 Ahmed, 2023; Olayemi & Afolabi, 2021).

The Central Bank of Nigeria uses monetary policy to regulate the economy by managing money supply and interest rates. Its main goals are to maintain price stability, support economic growth, and ensure financial system stability. Over the years, the Bank has adopted various policy measures, shifting between tight and loose monetary policies in response to inflation, exchange rate pressures, and external shocks, all of which influence investment levels in the country (CBN, 2023).

World Bank (1993) opined that, the level of domestic savings and investment is inadequate to fuel the growth needed to raise living standards and generate sufficient productive employment. This shows that investment plays a crucial role in accelerating economic growth. Investment is recognized by many scholars as important key to economic growth. According to Donwa and Agbontaen (2010), investment is an essential component of aggregate demand and fluctuation in investment has considerable impact on economic activities and long term economic growth. In view of this, the study aiming at analyzing the predictive power of monetary variables on domestic investment in Nigeria between 1981 and 2023.

## **2. LITERATURE REVIEW**

The theories of investment date back to Keynes (1936), who first called attention to the existence of an independent investment function in the economy. A central feature to the Keynesian analysis is the observation that although savings and investment must be identical ex-post savings and investment decisions are taken by different decision makers and there is no reason why ex-ante savings should equal ex-ante investment.

The evolution of investment theory gave rise to the accelerator theory which makes investment a linear proportion of changes in output. In accelerator model, expectations, profitability and capital costs play no role. Keynesians have traditionally favoured the accelerator theory of investment while disregarding the role of factor costs. A more general

form of the accelerator model is the flexible accelerator model. The basic notion behind this model is that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment (Asante, 2000). This gives rise to a net investment equation  $[I = \delta(k^* - k_{t-1})]$  (where  $I$  = net investment,  $k^*$  = desired capital stock,  $k_{t-1}$  last period's capital stock, and  $\delta$  = partial adjustment coefficient). Within flexible accelerator model, outputs, internal funds, cost of external finance and other variables may be included as determinants of desired capital stock.

Jorgensen (1971) and others formulated the neoclassical approach, which is a version of the flexible accelerator model. In the approach, the desired or optimal capital stock is proportional to output and the user cost of capital which in turn depends on the price of capital goods, the rate of interest, the rate of depreciation and the tax structure.

Tobin (1969) presented 'q' theory of investment which is also in the neoclassical framework. The 'q' theory of investment states that  $q$  is a sufficient statistics for summarizing all the information relevant to a firm's investment decision. Thus,  $q$  variable is usually defined as the ratio of market value of the firm to replacement cost of its capital. From macro-economic point of view, Tobin's  $q$  is presented as the ratio of firm's stock of market capitalization to the replacement cost of their physical capital as follows.

$q = V/P_k$  Where  $V$  is the stock of market capitalization of firm and  $P_k$  is the replacement cost of their physical capital. Hence, the core Tobin's  $q$  investment model is specified as  $(1/k)_{it} = \alpha_{0i} + \beta_1 q_{it} + \beta_2 (1/k)_{it-1} + \Sigma_{it}$

Where  $1/k$  is the rate of capital accumulation and the lag refers to the investment process lags,  $q$  is Tobin's  $q$ , and  $\alpha_{0i}$ , the intercept.

Galbis (1977), introduced another approach termed 'neoliberal'; this emphasized the importance of financial deepening and high interest rates in stimulating growth. The core argument of this theory rests on the claim that developing countries suffer from financial repression (which is generally equated with controls on interest rates in downward direction) and that if these countries were liberated from their repressive conditions, this would induce savings, investment and growth. In the neoliberal view, investment is positively related to the real rate of interest in contrast with the neoclassical theory. The reason for this is that a rise in interest rates increases the volume of financial savings through financial intermediaries and thereby raises investible funds. While it may be true that demand for investment decline with the rise in the real rate of interest, realized investment actually increases because of the greater availability of funds.

Aysan and Pang (2006), formed their investment model by extending the neoclassical accelerator model and takes various constraints faced by the investors in developing countries into account. This model contains the following variables: Accelerator, Real interest rate, structural reforms, macroeconomic stability, external stability, Macroeconomic volatility and physical infrastructure.

Neo-classical investment theory suggests that growth rate of real GDP influenced investment in a positive manner (Wai & Wong 1982, Fielding 1997). This is also known as the "accelerator effect". However, to reduce the risks on simultaneous basis, the GDP variable, either in levels or in percentage form, is specified with a one-period lag (Goldsborough, Covery, Disks-Mireaux, Herrat, Kochtiar, Mecagui, Offerdal & Zhou, 1996). A rapidly growing economy would be expected to boost expectations and hence investment (Duncan, Cuthbertsan, & Bosworth, 1999).

Neo-classical theory also suggests that, high interest rates discourage investment by raising user cost of capital, investment is negatively related to interest rate. Since the real interest has become positive only recently, mainly because of finance sector reforms, the interest rate, in accordance with Mckinnon-Shaw (1973) hypothesis, can have a negative effect only on investment through the saving channel. Low or negative real interest rates discourage savings which would reduce the amount of savings for investment.

Stock and Watson (2001) underscore the value of predictive models in macroeconomic forecasting, emphasizing that the forward-looking capacity of monetary indicators can enhance policy effectiveness, particularly in promoting investment-led growth. Similarly, Iyoha and Oriakhi (2002) identify exchange rate volatility—often influenced by monetary variables such as foreign reserves and interest rate differentials—as a deterrent to investment due to heightened uncertainty and increased costs of imported capital goods.

Obamuyi and Olorunfemi (2011), using co-integration and error correction models, find that money supply and interest rate are key determinants of private investment in Nigeria, though monetary policy transmission is often constrained by structural and institutional inefficiencies. Bakare (2011), through a Vector Autoregressive (VAR) analysis, reveals significant lagged effects of monetary policy on investment, highlighting the importance of forward-looking policy design.

Adeniran, Matthew, Olopade and Adegboye (2017) show that high interest rates significantly deter domestic investment, reinforcing the Keynesian argument that expansionary monetary policy can stimulate investment by reducing borrowing costs. Despite these contributions, much of the literature focuses on causality or correlation rather than the predictive power of monetary variables. This gap is especially relevant in Nigeria, where policy responses tend to be reactive rather than anticipatory, underscoring the need for predictive analysis in investment planning.

Therefore, this study fills an important gap by investigating the predictive power of key monetary variables—interest rate, money supply, and exchange rate—on domestic investment in Nigeria using time series models. The findings aim to contribute to more anticipatory and data-driven policy formulation.

### 3. METHODOLOGY

#### 3.1. Model of the Study

Based on the relevance of Aysan and Pang (2006) model to the developing countries (Nigeria inclusive) which was an extension of neoclassical work, the model for this work is hereby specified as:

$$INV_t = \alpha_0 + \alpha_1 ACC_t + \alpha_2 MS_t + \alpha_3 INTR_t + \alpha_4 INF_t + \alpha_5 EXR_t + \alpha_6 TOP_t + \alpha_7 FD_t + \alpha_8 EXD_t + \varepsilon_t$$

Where

INV – Investment

ACC – Accelerator (proxy by one lag period of the GDP growth rate)

MS – Money Supply

INTR – Real Interest Rate

INFR – Inflation rate

EXR – Exchange rate

TOP – Trade openness

FD – Financial deepening

EXD – External debt

$\varepsilon$  – Error term

Trade openness, financial deepening and external debt served as control variables.

A Priori - Expectation

$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 < 0, \alpha_4 < 0, \alpha_5 > 0, \alpha_6 > 0, \alpha_7 > 0, \alpha_8 < 0$

#### 3.2. Estimation Technique

The method used in this study is the Autoregressive Distributed Lag (ARDL) approach to co-integration to evaluate the relationship between variables of interest.

#### 3.3. Sources of Data

This study employed secondary data sourced from statistical Bulletin of the Central Bank of Nigeria (CBN), National bureau of statistics (NBS) and World Bank data base. Only trade openness was computed.

### 4. RESULT PRESENTATION

#### 4.1. Testing the Normality in the Distribution of the Data Set in the Study.

Table 1: Descriptive Statistics.

|           | INV      | ACC      | MS       | INTR     | INFR     | EXR      | TOP       | FD       | EXD      |
|-----------|----------|----------|----------|----------|----------|----------|-----------|----------|----------|
| Mean      | 11032.11 | 40513.66 | 10353.70 | 17.11605 | 20.95366 | 128.0540 | 291.4066  | 15.89023 | 3528.219 |
| Median    | 3078.780 | 8234.490 | 1505.960 | 17.26000 | 11.11892 | 118.5700 | 304.9185  | 13.02000 | 689.8400 |
| Maximum   | 82889.22 | 202365.0 | 63512.40 | 29.80000 | 219.0028 | 645.1900 | 550.2128  | 27.09000 | 38219.85 |
| Minimum   | 87.14000 | 134.9700 | 14.47000 | 7.750000 | 0.686099 | 0.610000 | 75.22695  | 8.460000 | 2.330000 |
| Std. Dev. | 18618.60 | 55620.57 | 15527.13 | 4.617034 | 33.94017 | 142.7429 | 111.5707  | 5.662396 | 6872.584 |
| Skewness  | 2.452636 | 1.369050 | 1.658725 | 0.346408 | 4.870144 | 1.546399 | -0.061626 | 0.479408 | 3.513921 |

|              |          |          |          |          |          |          |          |          |          |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Kurtosis     | 8.474297 | 3.796454 | 5.128548 | 3.497205 | 28.45741 | 5.553288 | 2.442673 | 1.599445 | 16.77727 |
| Jarque-Bera  | 96.80307 | 14.56899 | 27.83567 | 1.302910 | 1331.124 | 28.81837 | 0.583732 | 5.161577 | 428.5733 |
| Probability  | 0.000000 | 0.000686 | 0.000001 | 0.521287 | 0.000000 | 0.000001 | 0.746869 | 0.075714 | 0.000000 |
| Sum          | 474380.7 | 1742087. | 445209.0 | 735.9900 | 901.0074 | 5506.320 | 12530.48 | 683.2800 | 151713.4 |
| Sum Sq. Dev. | 1.46E+10 | 1.30E+11 | 1.01E+10 | 895.3140 | 48381.29 | 855772.8 | 522816.9 | 1346.635 | 1.98E+09 |
| Observations | 43       | 43       | 43       | 43       | 43       | 43       | 43       | 43       | 43       |

Source: Authors' Computation (2025)

Table 1 shows that only interest rate (INTR) that is symmetrical while other selected variables are asymmetrical in their distribution. In terms of skewness, all the except trade openness (TOP) are positively skewed, indicating a long right tail. Only trade openness (TOP) shows skewness close to zero, and a slightly negative value. As indicated by Jarque-Bera test statistics, interest rate (INTR), trade openness (TOP), and financial deepening (FD) are normally distributed. While investment (INV), accelerator (ACC), money supply (MS), inflation rate (INFR), exchange rate (EXR), and external debt (EXD), exhibit significant departures from normality. Kurtosis values further support non-normality for many variables. INFR and EXD are notably leptokurtic, while INV, MS, and EXR are mesokurtic. In contrast, TOP and FD are more platykurtic.

#### 4.2. Time Series Properties of the Variable.

Table 2. Unit Root Test.

| Variables | Level          |                   | First Difference |                   | Order of Integration |
|-----------|----------------|-------------------|------------------|-------------------|----------------------|
|           | P.P Statistics | 5% critical Value | P.P Statistics   | 5% critical Value |                      |
| INV       | -2.2532        | -3.5208           | -4.2427          | -3.5236           | I(1)                 |
| ACC       | -0.9582        | -3.5208           | -3.6018          | -3.5236           | I(1)                 |
| MS        | -0.9924        | -3.5208           | -4.2273          | -3.5236           | I(1)                 |
| INTR      | -3.3467        | -3.5208           | -10.4670         | -3.5236           | I(1)                 |
| INFR      | -11.1738       | -3.5208           | -----            | -----             | I(0)                 |
| EXR       | 3.0309         | -3.5208           | -2.3536          | -3.5236           | I(1)                 |
| TOP       | -2.1732        | -3.5208           | -8.9495          | -3.5236           | I(1)                 |
| FD        | -2.5187        | -3.5208           | -6.7107          | -3.5236           | I(1)                 |
| EXD       | -2.5137        | -3.5208           | -4.7798          | -3.5236           | I(1)                 |

Source: Authors' Computation (2025)

The unit root test results in table 2 using Phillip Peron (PP) revealed that all the variables are made stationary at their first difference except inflation rate that is stationary at its level. Since all the variables are not of the same order of integration implies that Johansen cointegration criteria cannot be met. Therefore, this study employed Autoregressive Distributed Lag (ARDL) cointegration procedure as suggested by Pesaran, Shin and Smith (2001), and Ogunsakin and Awe (2020).



#### 4.3. Selection of Appropriate Lag Length

Table 3. Selection Criteria

| Lag | LogL      | LR        | FPE       | AIC       | SC        | HQ        |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
| 0   | -529.4377 | NA        | 2.063585  | 26.26525  | 26.64140  | 26.40222  |
| 1   | -94.43898 | 657.8029* | 7.15e-08* | 8.997024  | 12.75852* | 10.36675* |
| 2   | -10.32907 | 90.26429  | 1.12e-07  | 8.845321* | 15.99217  | 11.44781  |

Source: Authors' Computation (2025)

The result in table 3 shows that all the criteria suggest one lag for the model with exception of Akaike information criteria. Therefore, one lag variable was selected for this study.

#### 4.4. Testing the Long-run relationship Among the Series

Table 4: Co-integration Bound Test for INV

| F-Statistic 7.786437  |            |            |
|-----------------------|------------|------------|
| Level of Significance | I(0) Bound | I(1) Bound |
| 10%                   | 1.85       | 2.85       |
| 5%                    | 2.11       | 3.15       |
| 2.5%                  | 2.33       | 3.42       |
| 1%                    | 2.62       | 3.77       |

Source: Authors' Computation, (2025)

Table 4 revealed that the result established that long-run relationship. Given that the estimated F statistic value of 10.1703 exceeds the upper bound's critical values even at a 1% significant level. It affirms the existence of long-run relationship among the variables. Therefore, both short run and long run dynamism shall be estimated through ARDL.

#### 4.5. The Long-run Dynamic Relationship among the Series

Table 5: Long Run Analysis Result

Dependent Variable: INV

| Variable           | Coefficient | Std. Error | t-Statistic | Prob.  |
|--------------------|-------------|------------|-------------|--------|
| C                  | 1.511355    | 1.255369   | 1.203913    | 0.2375 |
| INV(-1)            | 0.736226    | 0.133166   | 5.528635    | 0.0000 |
| ACC(-1)            | 0.091753    | 0.022541   | 4.070494    | 0.0436 |
| MS(-1)             | 0.073881    | 0.014197   | 5.203987    | 0.0142 |
| INTR(-1)           | -0.006801   | 0.006464   | -1.052178   | 0.3006 |
| INFR(-1)           | -0.012795   | 0.002664   | -4.802928   | 0.0330 |
| EXR(-1)            | 0.000416    | 0.000718   | 0.579042    | 0.5666 |
| TOP(-1)            | 0.038496    | 0.084465   | 0.455760    | 0.6516 |
| FD(-1)             | 0.101185    | 0.027164   | 3.724904    | 0.0008 |
| EXD(-1)            | -0.195021   | 0.280969   | -0.694102   | 0.4926 |
| R-squared          | 0.997745    |            |             |        |
| Adjusted R-squared | 0.997111    |            |             |        |
| F-statistic        | 1573.050    |            |             |        |
| Prob(F-statistic)  | 0.000000    |            |             |        |
| Durbin-Watson stat | 1.874886    |            |             |        |

Source: Authors' Computation, (2025)

The result in Table 5 indicates that Accelerator, money supply, inflation rate and financial deepening have significant effect on Nigeria's domestic investment in the long run. It implies that Accelerator, money supply, and financial deepening have a positive influence on Nigeria's domestic investment while inflation rate has negative

influence on domestic investment of Nigeria. Interest rate, exchange rate, trade openness and external debt have insignificantly impacted on Nigeria's domestic investment growth in the long run.  $R^2$  value of 0.998 affirms that approximately 99.8% of the variation in the dependent variable was explained by the selected explanatory variables. Therefore, Accelerator, money supply, inflation rate and financial deepening significantly influence Nigeria's domestic investment growth in the long run.

#### 4.6. The Short-run Dynamic Relationship among the Series

Table 6: Error Correction Model (ECM) result

| Variable           | Coefficient | Std. Error | t-Statistic | Prob.  |
|--------------------|-------------|------------|-------------|--------|
| C                  | -0.040717   | 0.048311   | -0.842797   | 0.4060 |
| D(INV(-1))         | 0.908823    | 0.208218   | 4.364760    | 0.0001 |
| D(ACC(-1))         | -0.106568   | 0.221504   | -0.481111   | 0.6339 |
| D(MS(-1))          | 0.172451    | 0.045774   | 3.767444    | 0.0110 |
| D(INTR(-1))        | -0.034708   | 0.013915   | -2.494287   | 0.0256 |
| D(INFR(-1))        | 0.089134    | 0.032099   | 2.776847    | 0.0180 |
| D(EXR(-1))         | -0.000208   | 0.001058   | -0.196478   | 0.8456 |
| D(TOP(-1))         | -0.004183   | 0.068188   | -0.061345   | 0.9515 |
| D(FD(-1))          | 0.027307    | 0.252714   | 0.108054    | 0.9147 |
| D(EXD(-1))         | 0.121634    | 0.046838   | 2.596888    | 0.0244 |
| ECM(-1)            | -1.140642   | 0.256579   | -4.445585   | 0.0001 |
| R-squared          | 0.616464    |            |             |        |
| Adjusted R-squared | 0.488618    |            |             |        |
| F-statistic        | 4.821944    |            |             |        |
| Prob(F-statistic)  | 0.000376    |            |             |        |
| Durbin-Watson stat | 1.997641    |            |             |        |

Source: Authors' Computation, (2025)

The results of table 6 revealed that money supply, interest rate, inflation rate and external debt have significant effect on Nigeria's domestic investment in the short run. Accelerator, exchange rate, trade openness, and financial deepening does not significantly impact Nigeria's domestic investment growth in the short run. The ECM coefficient is significant and negative as shown in table 6. The significance of the ECM affirmed that long-run equilibrium exit relationship between capabilities and Nigeria's economic growth. The value of  $R^2$  (0.62) confirms that the selected independent variables explained about 62% differential of the dependent variable. Hence, money supply, interest rate, inflation rate and external debt significantly influences domestic investment growth in Nigeria at short run.

#### 4.7. Testing for Structural Stability

This study employed cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of squares were used to test for the stability of the model. The plots are shown in figures 1 and 2 below:

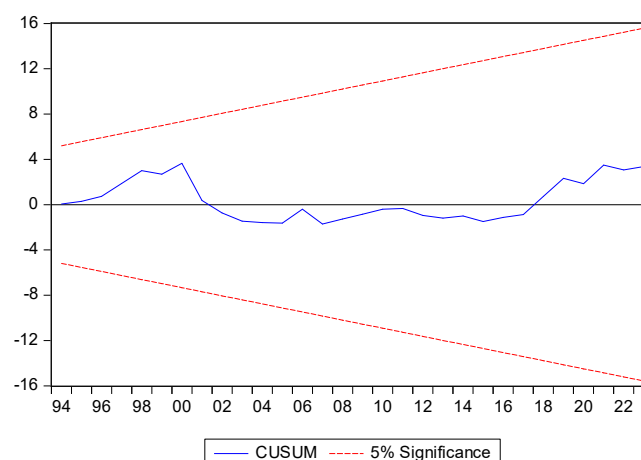


Fig. 1: CUSUM Test for Structural Stability of the Parameters

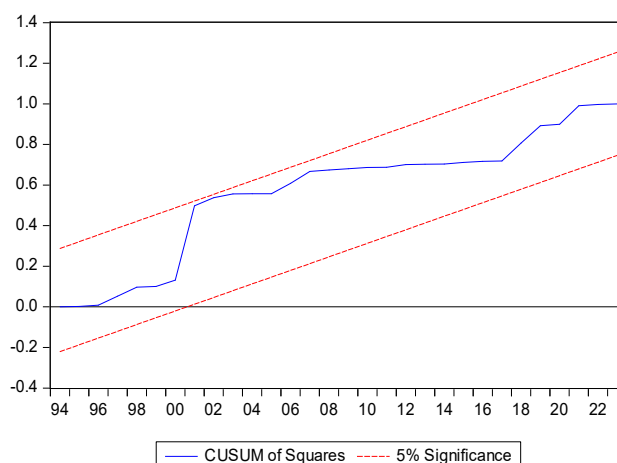


Fig. 2: CUSUM of Squares Test for Structural Stability of the Parameters

Both results in fig 1 and fig.2 show coefficient stability since the plots are within the 5% critical bound. The existence of coefficient stability for the estimated parameters were confirmed for both the short run dynamics and the long run of function economic growth over the periods under review. Also, the results affirm tendency of further coefficients stability.

## 5. DISCUSSION

The study shows that accelerator has significant positive impact on domestic investment growth in Nigeria but only at long run. The implication is that anticipation of economic growth induce more investment. This shows that previous growth rate of real GDP in Nigeria strongly influence the desire of investors to invest in Nigeria as suggested by Neo-classical investment theory. The outcome is in line with the view of Aysan and Pang (2006).

Money supply has positive significant impact on Nigerian domestic investment growth, both at short run and long run. The positive impact of money supply on domestic investment reflects the effectiveness of bank intermediation within Nigeria's financial system. This finding aligns with Kwode (2024), who revealed that domestic private investment in Nigeria depends on the broad money supply—indicating that increased money injection into the economy enhances the level of domestic investment. But contrary to the study of Owuzo, Egbon, and Ezi (2024) that discovered adverse effect of money supply on domestic private investment and inefficient role of bank intermediation in the financial system of the their selected countries.

Interest rate has an insignificant negative impact at long run significant negative impact but short run on Nigerian domestic investment growth. This consistent with the user cost theory of investment. The negative relationship is understandable, as higher interest rates tend to reduce the level of investment. The result is in agreement with Owuzo, Egbon, and Ezi (2024), and Kwode (2024), showing that interest rate is negatively influencing domestic investment growth. While Agwu (2015) & Okorie (2014) found that real rate of return on bank deposits has a statistically significant positive effect on investment behavior in Nigeria and affirming that reasonable level of interest rise saving and hence investment.

Inflation rate has significant effect on domestic investment growth in Nigeria but at short and long run. Inflation rate is a key macroeconomic indicator that significantly influences domestic private investment decisions, as it affects the real value of returns on investment, cost of capital, and overall economic stability. This result is tandem with the works of Nwankwo and Allison (2021) who affirm that inflation rate is significant because the yields on fixed-income securities might not keep up with inflation, causing a net loss for the investor.

Exchange rate does not have significant impact on domestic investment growth in Nigeria. This suggests that currency depreciation in Nigeria does not serve as a catalyst for stimulating domestic investment, possibly due to increased import costs, heightened inflationary pressures, and reduced investor confidence associated with exchange rate instability. Finding of this study is contrary to Abbas, Aidi, & Tijjani (2022) who their study showed that exchange rate do have significant impact on domestic investment growth.

Trade openness does not have significant impact on domestic investment growth at both long and short run. Trade openness is generally anticipated to promote domestic investment by fostering greater competition, providing access to broader international markets, and facilitating the transfer of advanced technologies and innovative practices, all of which can enhance productivity and investment opportunities within the domestic economy but this contrary to Nigeria situation. Finding of this study is contrary to the study of Nyinawumuntu, Makala, and Han (2022) who found out empirically that trade openness impact on domestic investment in Africa.

Financial deepening is directly and significantly related to domestic investment growth in Nigeria during long run. Financial deepening is the capacity of financial institutions to efficiently allocate funds for investment within the economy through investment (Ekiran, Awe and Omoniyi, 2024). The finding is in agreement with Obafemi, Oburota, and Amoke (2016) and Keho (2023) affirmed that financial deepening has a statistically significant positive impact on domestic investment in the long run but an insignificant effect in the short run.

External debt is inversely and significantly related to domestic investment growth in Nigeria only on short run. High levels of external debt can result in higher interest payments, which may divert resources away from domestic investment. Also, heavy debt burdens can increase a country's vulnerability to external shocks, further constraining investment opportunities. Finding of this study is contrary to the study of Oji and Odi (2024) who found out reveal that domestic debt and external debt have positive and significant relationship with Nigerian Gross Level of investment

Finally, the study also found that a strong long-term equilibrium relationship exists between domestic investment and monetary variables employed in the study. This clearly shows that whenever there is an imbalance from the short-term equilibrium level, there will be convergence to the long-term equilibrium. However, the study finds that money supply, interest rate and inflation rate have predictive power to determine domestic investment in Nigeria during the under review.

## 6. CONCLUSION

This research empirically analyzed the predictive power of monetary variables on domestic investment in Nigeria. The findings of the study indicated that Nigeria's domestic investment during the study period was driven by money supply, interest rate and inflation rate. Therefore, the study concludes that monetary variables possess significant predictive power over domestic investment growth in Nigeria. Therefore, the government, through the Central Bank of Nigeria, should implement an accommodative and well-targeted monetary policy that ensures increased money supply flows into productive sectors via effective credit channels. Additionally, the Central Bank should manage interest rates to support investment-friendly borrowing costs, particularly for high-growth sectors. It is also essential to enhance the transparency, credibility, and consistency of monetary policy to align investor expectations with long-term economic stability and growth.

## References

- [1] Abbas, S. I., Aidi, H. O. S. M., & Tijjani, B. A. (2022). Exchange Rate Volatility and Domestic Investment: Evidence from Nigeria. *International Journal of Economics & Development Policy (IJEDP)*, 5(1). 13 – 22.
- [2] Adeniran, O. S., Matthew, O. A., Olopade, B. C., & Adegboye, F. B. (2017). Monetary policy shocks and inclusive growth in Nigeria: A VAR approach. *The International Journal of Humanities & Social Studies*, 5(2), 1–14.
- [3] Ahmed, A. V. (2023). The effects of monetary policy on the contributions of banks' lending to economic performance in Nigeria. *East African Scholars Journal of Economics, Business and Management*, 6(4), 123–130.
- [4] Aysan, A. & Pang, G (2006). How to Boost Private Investment in the MENA Countries: Role of Economic Reforms.
- [5] Bakare A.S (2011). The Consequences of Foreign Exchange Rate Reforms on the Performances of Private Domestic Investment in Nigeria. *International Journal of Economics and Management Sciences*, 1(1), 25-31.
- [6] Bakari, S. & Sofien, T. (2019). The Impact of Trade Openness, Foreign Direct Investment and Domestic Investment on Economic Growth: New Evidence from Asian Developing Countries, MPRA Paper 94453, University Library of Munich, Germany.
- [7] CBN (2023) Central Bank of Nigerian Statistical Bulletin, Central Bank of Nigeria Publication.
- [8] Donwa P. & Agbantaen, O.O. (2010). The Trends and Dynamics of the Determinants of Investment in Nigeria. *International Review of Business Research Papers*, 6 (6). 253-163.
- [9] Douglas, G.V. & V.T. Jike (2005): Policy reforms and Manufactured exports in Nigeria -Selected Paper for the 2005 Annual Conference.
- [10] Duncan, R., S. Cuthbertsan, & M. Bosworth (1999). Pursuing Economic Reform in the Pacific, Pacific Studies Series NO 18. Asian Development Bank, Mandan.
- [11] Ekiran, J. O., Awe, I. T., & Omoniyi, O. B. (2024). Human Capital Development Capabilities and Economic Growth in Nigeria. *Journal of Liaoning Technical University (Natural Science Edition)*, 18 (3), 43-54.
- [12] Fielding, D. (1997). Adjustment, Trade Policy and Investment Slumps: Evidence from Africa, *Journal of Development Economics*. 52, 121-137.

- [13] Galbis, V. (1977). Financial intermediation and economic growth in less developed countries: A theoretical approach. *Journal of Development Studies*, 13(2), 58–72.
- [14] Goldsborough, D.S., Covery, L. Disks-Mireaux, B. Herrat, K. Kochtiar, M. Mecagui, E. Offerdal & J. Zhour (1993): Reinvigorating Growth in Developing Countries, Occasional Paper N0. 139, International Monetary Fund Washington D.C.
- [15] Greene, J. & D. Villanueva (1991). Private Investment in Developing Countries: An Empirical Analysis, IMF Staff Papers, 38 (1) International Monetary Fund, Washington, D.C.
- [16] Iyoha, M. A., & Oriakhi, D. E. (2002). Explaining African economic growth performance: The case of Nigeria. African Economic Research Consortium (AERC).
- [17] Iyoha, M.A. (1995). Traditional and Contemporary Theories of External trade. In: External Trade and Economic Development in Nigeria. Selected papers for the 1995 Nigeria Economic Society (NES) Annual Conference proceedings.
- [18] Keho, Y. (2023). Impact of financial development on domestic investment: Evidence from West African countries. *African Development Review*, 35 (3) 270 – 281.
- [19] Keynes, J.M. (1936). The General Theory of Employment, Interest and Money, London: Macmillan.
- [20] Kwode, I. E. (2024). Domestic Private Investment and Selected Macroeconomic Indicators in Nigeria: An Econometric Analysis. *Global Journal of Arts, Humanities and Social Sciences*, 12 (8), 1 – 23.
- [21] Mckinnon-Shaw, R. (1973). Money and Capital in Economic Development, Brookings Institution, Washington D.C.
- [22] Nwankwo & Allison (2021) Effect of Macroeconomic Determinants on Private Sector Investments in Nigeria, 1986-2020. *Contemporary Journal of Management*.
- [23] Nyinawumuntu, E., Makala, U.E. and Han, F.L. (2022). Impact of Trade Openness on Domestic Investment in Sub-Saharan Africa. *Open Access Library Journal*, 9, 1-14.
- [24] Obafemi, F. N., Oburota, C. S., & Amoke, C. V. (2016). Financial Deepening and Domestic Investment in Nigeria. *International Journal of Economics and Finance*, 8 (3), 40 – 54.
- [25] Obamuyi, T. M., & Olorunfemi, S. (2011). Financial reforms, interest rate behaviour and economic growth in Nigeria. *Journal of Applied Finance & Banking*, 1(4), 39–55.
- [26] Ogunsakin Sanya, & Awe, I. T. (2020). Macroeconomic Determinants of Stock Market Performance in Nigeria. *Business and Economic Research*, 10 (4), 139 – 158.
- [27] Oji, G. U. & Odi, E. R. (2024). Public Debt and Domestic Investment: Time Series Study from Nigeria. *World Journal of Finance and Investment Research*, 8 (5), 73 – 93.
- [28] Okorie, G. C., (2014). Finance, Investment, and Economic Growth: The Nigerian Experience, *Journal of Empirical Economics Research Academy of Social Science*, 2(2), 63-69.
- [29] Olayemi, T. S., & Afolabi, T. D. (2021). Effectiveness of economic policies in combating inflation in Nigeria. *European Journal of Applied Sciences*, 9(6), 524–534.
- [30] Owuzo, S. Ugbo., Egbon, P. C., & Ezi, C. T. (2024). Evaluating the Impact of Macroeconomic Fundamentals on Domestic Private Investment in Selected Ecowas Countries. *IRJEMS International Research Journal of Economics and Management Studies*, 3 (11), 297 – 308.
- [31] Stock, J. H., & Watson, M. W. (2001). Forecasting output and inflation: The role of asset prices. *NBER Working Paper No. 8180*. National Bureau of Economic Research.
- [32] Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, 1: 15-29.
- [33] Wai, T.V. & C.H. Wang (1982) Determinants of Private Investment in Developing Countries, *Journal of Development Studies*, 9 (1).19-36.
- [34] World Bank (1993): The East Asian miracle: Economic growth and Public Policy Oxford, Oxford University press.

# Comparative Analysis of AI-Based and Expert-Led Program Designs in Medical English Education<sup>1</sup>

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## Abstract

This study aims to compare two instructional programs developed for an undergraduate Medical English course: one designed through artificial intelligence (AI) tools, and the other created by a subject-matter expert guided by pedagogical principles. Employing a qualitative research design, the study uses document analysis to systematically evaluate both programs in terms of structure, learning objectives, instructional strategies, and assessment components. Findings indicate that the AI-generated program produces structurally coherent content aligned with a hierarchy of cognitive learning goals and offers a variety of instructional techniques. However, its pedagogical consistency and contextual sensitivity largely rely on explicitly crafted prompts. In contrast, the expert-designed program demonstrates a deeper awareness of learner needs, integrates cognitive, affective, and ethical dimensions, and provides more flexible, context-responsive instructional decisions. While both programs address the essential requirements identified through the needs analysis, only the expert-led version effectively responds to complex and implicit educational expectations. The study concludes that AI shows strong potential for efficient content generation yet lacks the pedagogical depth and adaptive reasoning inherent to human expertise. These findings underscore the value of AI-human collaboration in instructional program development, highlighting the role of AI as a supportive—not substitutive—tool in educational design.

**Keywords:** Artificial Intelligence, Program Development, Medical English.

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<sup>1</sup> This study is derived from the doctoral dissertation conducted by the first author under the supervision of the second author.

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# Theorizing Power and Ideology for Critical Organization Studies

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## Abstract

This contribution summarizes articles from a research program in the social sciences, specifically critical applied psychology and critical management studies. Aim was to develop dialectic theoretical frameworks on power and ideology from interdisciplinary, psychodynamic, and socio-critical perspectives on society, organizations, and individuals. Drawing on meta-theory of social science paradigms, conflicting approaches to organizations research are outlined, accentuating critical traditions. Extending labor process theory, psychodynamics of power and control in organizations, society, and economy are analyzed. Next, an overview of the literature on ideologies in work organizations is presented. Subsequent sections review dialectic frameworks problematizing organizational flexibility, economism and humanism, and economy and ecology. As a common denominator, socially corrosive logics, discourses, and practices of economic neoliberal ideology are contrasted with ethically responsible, socio-ecologically sustainable humanist alternatives. Conclusions highlights the significance, implications, and applications of presented analyses.

**Keywords:** power, ideology, neoliberalism, humanism, sustainability, critical management, applied psychology, dialectic critique, review

## 1. INTRODUCTION

Along disastrous socio-ecological polycrises, critical paradigms resurge in social science. Presented in this article are development from the emerging field of critical psychology applied to work and organizations [1]. Foundational are alternative methodological approaches and theoretical frameworks orienting research in societal structures and intellectual traditions. Prior to summarizing a collection of articles [2]–[7], the focal paradigm is defined as socio-critical, dialectical, deconstructing, self-reflexive, emancipatory, and humanist [1]. Specifically: a) socio-critical implies pluralist grounding in critical social theory and psychologies, including sociological (unorthodox) Marxism, Frankfurt School Critical Theory, (psycho-)analytical and critical psychology, feminism, postcolonial theory, critical race theory, and critical theories of socio-ecological transformation, such as radical sustainabilities, degrowth, and ecosocialism; b) dialectical means addressing historically evolved conflicts of interest and power imbalances, such as socio-economic inequality, marginalization, polarization, and externalizing social and environmental costs to underprivileged groups; c) deconstructing refers to an ideology-critical perspective, transcending interest-guided accounts, for instance, social responsibility as a “business model” or “unitarist” narratives of converging interests; d) self-reflexive means problematizing, how scientific theories, methods, and results are shaped by epistemological positioning, economic interests, and power structures, for instance, dominance of individualistic, managerialist,

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ethnocentric, patriarchal perspectives; e) emancipatory intention challenges economic goals of performance, efficiency, and growth, prioritizing socio-ecological objectives, for instance, health and personal development, social justice, democracy, environmental protection, as values in themselves; f) humanist emphasizes a focus on human dignity and development, reconfirming the inherent value of human and non-human life, including the natural planetary environment. These six criteria show some parallels with the paradigmatic principles of anti-performativity, denaturalization, and reflexivity, formulated for the field of critical management studies.

## **2. THEORY BUILDING**

### *2.1. Paradigms in organization research*

In the first reviewed article [2], concepts from the philosophy of science are assimilated for a dialectic analysis of academic conflicts grounded in ideological and epistemological heterogeneity in management and organization. Drawing on the meta-theory of social science paradigms shows connections and continuities of contemporary and past controversies, which are useful to delineate, deconstruct, and reappraise current discourses in the pluralistic field of management and organization studies. The classic taxonomy of meta-theory differentiates: a) theories of society emphasizing harmony and regulation from those emphasizing conflict radical change; and b) scientific assumptions postulating objective versus subjective social realities. Based on these dimensions, functionalist, interpretive, radical structuralist, and radical humanist paradigms are delineated. Subsequent conceptual developments have reinterpreted these distinct ontological, epistemological, and axiological configurations into post-positivist (normative, mainstream), interpretive (constructivist, hermeneutic), postmodern (dialogic, poststructuralist), and critical (dialectic, antagonistic) research approaches. Associated meta-theorizing has been applied to academic disputes involving critical management studies as an alternative paradigm emphasizing denaturalization, reflexivity, and non-performativity. Distinguishing degree and location yields four contemporary fundamental and foundational inter- and intra-paradigmatic conflicts: 1) the evidence-debate between critical scholars and mainstream functionalists; 2) the performativity-debate within critical management studies; 3) the managerialism-debate between radical structuralists and poststructuralists; and 4) the ideology-debate representing influences on adjacent fields, exemplified by an emerging critical paradigm in work and organizational psychology. Interdependent dynamics underlying these conflicts have been framed as fermenting and fragmenting forces, driving paradigm delineation, differentiation, disintegration, and dissemination. This meta-theoretical perspective facilitates more self-reflexive scholarship, sense-making, and knowledge-creation by promoting deeper understanding and more proficient navigation of the organizational literature as an ideologically contested terrain of social science. Theorizing on research paradigms has thus proven helpful to make sense of underlying ontological, epistemological, and axiological fault lines in management and organization studies. Trajectories of future developments can only be speculated about, especially with regard to the dialectics between critical management studies and the emerging paradigm of critical work and organizational psychology. The first contribution thus sets the stage and provides the meta-theoretical foundations for the frameworks developed in the articles summarized in the following sections.

### *2.2. Power in organizations and society*

Drawing on critical traditions in several social science disciplines, notably, social, political, and systems theory, sociology, psychology, and management studies, the second reviewed article [3] seeks to explore, assemble, and integrate constitutive components of a socio-psychodynamic perspective on power and control in organizations. At its core is an archetypal taxonomy of formal (economic), real (technocratic), normative (ideological), and formative (biopolitical) modes of power. Associated with these more abstract modes of power are specific forms of managerial control through various means and combinations of commodification (e.g., contracts, compensation, competition), coercion (e.g., commands, constraints, compliance), cooptation (e.g., culture, consent, commitment), and creation (e.g., corrosion, conception, coevolution). Other integral elements of the proposed framework are domains or foci of inquiry, specifically, interests, ideologies, institutions, and identities. These domains are linked to meta-, macro-, meso-, and micro-levels of analysis, resembling the economy, society, organization, and individual. According to the model, processes of behavioral control and psychological governance are reinforced by a pervasive economic system logic, cascading into political, social, and psychodynamic sub-logics. Described taxonomies are integrated with concepts from depth and dynamic psychology and traced across economic (meta-system interests), societal (macro-political ideologies), organizational (meso-social institutions), and individual (micro-psychodynamic identities) levels of analysis, thereby revealing fractalized patterns of self-similarity. It is argued that macro-level

societal subsumption and subjugation reproduce psychodynamic subjectification (submission and sublimation) at the individual level. Associated psychological processes are mediated by the subordinating and socializing forces embodied in meso-level organizational structures and management control systems. The outlined framework has important implications for the dynamics of power and control in contemporary societies, organizations, and individuals. Specifically, it is useful for analyzing and better understanding the historical and ongoing metamorphoses of power and their psychological manifestations under the increasingly hegemonic governance of economistic neoliberal ideology, which will be taken up and further developed in the following sections.

### *2.3. Ideologies in organizations and society*

The next reviewed article [4] identifies, analyses, and integrates conceptual and empirical building blocks of an emerging research agenda on ideology in work organizations. Ideologies are discussed with regard to the domains of interests, institutions, and identities, reflecting societal, organizational, and individual perspectives. Societal perspectives are addressed in the growing interdisciplinary literature on the critique of the political-economic practices and ideology of neoliberalism, psychological system-justification theory, and the sociological analysis of transitions of different ideologies of individualism in response to structural socio-economic strains. On the organizational level, ideologies examined in the context of formal technocratic and normative socio-ideological components of management control systems and associated employee responses to different forms of coercive, remunerative and symbolic forms of power. Downsizing research is drawn on as an example of the socially corrosive effects of managerial ideologies of shareholder value, market efficiency, and employee self-reliance. Individual-level psychological mechanisms and consequences of ideological preformation and control are addressed in theorizing on social character, subjectification and governmentality as well as the “entremployee” concept. Denaturalization, anti-performativity, and reflexivity can be adapted as principles for future research on ideologies, emphasizing hidden meanings, interests, and alternatives. Further research needs include theoretical elaboration, empirical investigations, and practice-oriented applications of knowledge on power and ideologies. Operationalizing anti-performativity, a suggested counter-model of radical humanist ideals positions individuation, solidarity, and emancipation against neoliberal ideologies of individualism, competition, and instrumentality. This initial dialectic taxonomy is elaborated into a more comprehensive theoretical framework the following sections below.

### *2.4. Dialectics of organizational flexibility*

The following article [5] focuses on the application of power to processes of individualization and flexibilization of organizations. These constitute a management strategy in responding to labor market dynamics and competitive pressures, prompting increased workforce segmentation, differentiation, and rationalization. Evaluated in this context are potentials, pitfalls, and prospects of employee-oriented concepts of organizational flexibility. This includes both broad-based programs or interventions and individualized approaches. The focus here is on the latter, specifically, the influential proactive constructs of idiosyncratic deals and job crafting. Idiosyncratic deals are defined as personalized agreements negotiated between individual workers and employer agents, such as direct supervisors or human resource managers, authorizing non-standard employment terms, such as customized work schedules, job tasks, learning opportunities or career support. Related yet distinct, job crafting captures unauthorized modifications employees enact autonomously to improve their job designs and work experiences. In theory, both approaches are assumed to hold the potential for “win-win” situations by increasing the flexibility of organizations to adapt to change as well as their ability to attract, retain, and motivate high performing workforces by aligning jobs with personal needs, preferences and goals. Critical reviews of the literature, however, suggest that insufficient attention has been devoted to prerequisites, boundary conditions, and limitations of mutually beneficial workplace flexibility, especially in the context of the current neoliberal reconfiguration of work organizations. Drawing on a recent debate in organization studies, neoliberal governance can be conceptualized as a matrix of political, social, and “fantasmatic” (sub- or unconscious) logics, infusing individualism, competition, and instrumentality into workplace practices, their academic representation, and their societal evaluation. Reframing, alternative explanations, assessment of side-effects, construction of antagonistic ideal types, and dialectic synthesis provide the analytical tools to differentiate genuine employee-oriented flexibility from ideological counterapplications. The later serve and advance a primarily economic rationalization agenda. Rooted in humanistic management, employee-oriented flexibility reflects principles of individuation, solidarity, and emancipation, counterbalancing neoliberal dogmas and utilization strategies. Associated promises of self-actualization, common welfare, and social transformation are antipodes to neoliberal logics of employee self-reliance, tournaments situations, and economic

rationality. Between these poles, new forms of psychological control emerge as subjectification, that is, internalization and self-imposition of performance demands and flexibility requirements by employees. These call for new strategies to contain and compensate detrimental tendencies to health, wellbeing, and psychological growth. Results of the analysis can be summarized in a taxonomy of flexibility configurations, applicable to increasingly stratified human resource architectures. Suggestions to reorient research on organizational individualization include focusing on learning and development, work design, solidarity and social justice. The presented approach contributes to disentangling and deconstructing different forms of individualization, the confounding of which underlies ideologically distorted theorizing and dysfunctional management practices.

### *2.5. Dialectics of economism and humanism*

Extending theorizing on challenges facing critical applied psychology of work and organizations, the next contribution [6] draws on critique of neoliberal ideology in conjunction with radical humanism and psychoanalytic social psychology. The objective is to (de-)construct antithetical normative foundations of contemporary societies, organizations, and individuals. Developed is a dialectic and dynamic multi-level framework of the ideological undercurrents shaping political-economic, organizational-institutional, and individual-psychodynamic structures and processes. Integrating dialectic antipodes of genuine ideas versus interest-guided ideology with basic tenets of social character theory, neoliberal economic doctrines and counter-directed humanist philosophical concepts are contrasted as antagonistic political, social, and psychological or “fantasmatic” logics. With regard to abstract political logics pervading legal and socio-cultural institutions at the societal (macro-) level, this refers to the antipodes of individualism versus individuation, competition versus solidarity, and instrumentality versus emancipation. On the applied (meso-) level of social logics that are shaping organizational and employment practices in the neoliberal workplace versus humanistic management, discussed antipodes resemble self-reliance versus self-actualization, contests versus community, and rationalization versus transformation. On the individual (micro-) level of fantasmatic logics, based on psychoanalytic theory, corresponding exemplary neoliberal fantasies are derived and positioned against antithetical aspects of humanist consciousness; specifically, success versus evolution, superiority versus equality, and submission versus empowerment. The resulting matrix of the normative fabric of advanced capitalist societies is interpreted with reference to social character theory. Specifically, foci of social relatedness (person-self-identity, people-others-interactions, and power-authorities-institutions) are suggested as criteria for structuring content dimensions and as conceptual bridges to core components of relevant social character tendencies (ego-oriented, marketing, and authoritarian). Additional parallels and communalities between analytical social psychology and psychological theorizing on ideologies can be developed, resulting in an interactive dialectic and dynamic framework for organizing contemporary research and applications on neoliberal ideology and its countertendencies. Stressing the fundamental unity of insights regarding external and internal realities, complementarity of denaturalization and critique of societal ideologies with critical psychological self-reflection and personal development is emphasized. Applications of the dialectical matrix as a framework for social transformation from neoliberal economic ideologies towards ideals of radical humanism on different levels are called for.

### *2.6. Dialectics of economy and ecology*

The last article [7] addresses the dialectic contradiction between economy and ecology and its false reconciliation through constructs of green capitalism and corporate social responsibility. Backdrop of this critique is the current geological period of the Anthropocene, defined by qualitatively new manifestations of negative planetary human impact and environmental crisis. Finally, at least in parts of academia and society, there seems to be an increasing realization that to preserve conditions for life on earth, is essential to contain the self-destructive tendencies of capitalism. Yet, there appears to be little agreement as to how the necessary transition towards sustainability can be accomplished. The narrative review presented in the focal article explores the respective social science literature. Reflecting the meta-theoretical distinction between sociology of regulation and radical change, dialectic analysis contrasts mainstream (functionalist, normative) neoliberal and critical (structuralist, antagonistic) ecosocialist perspectives on aspects of ecological sustainability. The later deconstruct conventional approaches, such as the United Nations Agenda 2030, as ideological projects of capitalist expansion and legitimization. Rejected are claims of green growth, environmental decoupling, and market-based solutions of corporate social responsibility. Instead, paradigms of critical sustainability advocate for radical approaches of economic degrowth, redistribution, decarbonization, decommodification, and democratization, thus challenging the exploitative and inherently unsustainable growth logic of capitalism itself. On the organizational level, structural pathologies of corporate social

responsibility have been deconstructed and contrasted with propositions of democratic socialization. Further, in the critical literature, increasing self-reflexive attention is devoted to sustainability discourses in organizational scholarship. For instance, a seminal contribution has outlined necessary paradigm shifts from managerialist to critical ontologies, from realist to relational epistemologies, from discipline-focused to interdisciplinary approaches, and from value-neutrality to radical scholarly engagement and activism. To conclude, analyzing the sustainability discourse from a critical theoretical perspective presents opportunities to re-appropriate ecological ideas against their assimilation and degeneration into economistic ideology, counterproductive to the objective of saving the planet from profitable destruction. With seriousness and urgency of the situation providing momentum for social transformation, sustainable development goals and related mainstream concepts need to be reconceived in the context of a radical social and ecological critique, transcending system-justifying variations of neoliberal ideology.

### 3. CONCLUSION

This contribution has compiled theoretical models for dialectic analyses of manifestations of power and ideology in society, organizations, and individuals [2]–[7]. Foci include science, the economy, political and social institutions as well as conscious and unconscious psychological processes and character structures. Reviewed articles emanate from the same research program, sharing a socio-critical, dialectical, deconstructionist, self-reflexive, emancipatory, and humanist approach. Core elements are meta-theory of scientific paradigms, labor process analysis, ideology critique, theories of power, and radical humanist ethics. Taken together, these frameworks provide a theoretical foundation for contextualizing empirical research in organization studies from a psychological perspective [1]. Common denominator is that they deconstruct, problematize, and reject the current neoliberal economistic approach of coercive and manipulative power in socially unjust, oppressive, discriminatory, polarizing systems. Mobilized are humanistic alternatives of balancing societal interests, organizing economic institutions, constructing identities, and shaping sustainable interactions with nature. Complementarity in content and methods is attributable to their interdependent development within a theory-driven research program. Although a seamless integration may not be possible, the goal of this contribution was to provide an overview of their breadth, scope, basic assumptions, and inner logic, foreshadowing potentials for empirical studies oriented by these frameworks. The presented research is part of an ongoing process of theoretical integration, elaboration, and deliberation in the context of scholarly collaboration and engagement. Uptake, application, and development of these frameworks, or elements thereof, in different contexts and disciplines could serve advancing and substantiating interconnectedness, communication, and resonance among critical forms of knowledge and scholarly communities. Reinforced is urgently needed resistance against hegemonic ideologies as a precondition for the socio-ecological transformation of science and society.

### References

- [1] Hornung, S. (2025). Critical work and organizational psychology: An emerging paradigm of research in psychology. *Proceedings of the International Conference on Research in Psychology*, 2(1), 1–11.
- [2] Hornung, S., & Höge, T. (2024). Analyzing current debates in management and organization studies: A meta-theoretical review and dialectic interpretation. *Scientia Moralitas International Journal of Multidisciplinary Research*, 9(1), 1–32.
- [3] Hornung, S., & Höge, T. (2021). Analysing power and control in work organizations: Assimilating a critical socio-psychodynamic perspective. *Business & Management Studies: An International Journal*, 9(1), 355–371.
- [4] Hornung, S., Höge, T., & Unterrainer, C. (2021). Ideologies at work in organizations: An emerging critical perspective and reflexive research agenda. In M. H. Bilgin, H. Danis, E. Demir, & S. Vale (Eds.), *Eurasian business perspectives: Proceedings of the 29th EBES Conference* (pp. 165–182). Springer.
- [5] Hornung, S., & Höge, T. (2019). Humanization, rationalization or subjectification of work? Employee-oriented flexibility between i-deals and ideology in the neoliberal era. *Business and Management Studies: An International Journal*, 7(5), 3090–3119.
- [6] Hornung, S., Höge, T., & Unterrainer (2025). Neoliberal ideology versus humanist ideals: Political, social, and fantasmatic logics. *Scientia Moralitas International Journal of Multidisciplinary Research*, 10(1), in press.
- [7] Hornung, S., Unterrainer, C., & Höge, T. (2022). Dialectics of sustainability: Contrasting mainstream neoliberal and critical ecosocialist perspectives on sustainable development. *European Journal of Sustainable Development Research*, 6(1), 1–9.

# Theoretical Construction and Implementation Study of a DX Model for SMEs Utilizing AI-OEP (Artificial Intelligence–Operational Efficiency Platform)

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## Abstract

Promoting digital transformation (DX) in small and medium-sized enterprises (SMEs) has become an urgent and challenging task in Japan, amid structural issues such as a declining birthrate, an aging population, and labor shortages. In particular, constraints such as high implementation costs, reliance on legacy systems, and the lack of dedicated IT personnel have hindered the effective adoption of existing DX packages and enterprise systems. In response to these challenges, this study proposes the concept of a modular platform based on AI technologies, called the AI-OEP (Artificial Intelligence–Operational Efficiency Platform). This platform is characterized by its flexible structure, implementing essential support functions for the initial stages of DX—such as data analysis, business process visualization, and anomaly detection—as small-scale modules that can be combined and deployed incrementally as needed. Each module is also designed to connect via standardized interfaces, making it relatively easy to integrate with existing business operations. Theoretically, the platform is positioned as a framework to support a practical DX implementation process for SMEs, building on past discussions of AIDX (AI × DX) and concerns surrounding the so-called "2025 Digital Cliff." At this stage, the research focuses primarily on the theoretical design of the platform architecture and the functional classification of its modules. Moving forward, the plan is to conduct empirical implementation and usability evaluations in collaboration with companies across various sectors, including manufacturing, logistics, and services. This study aims to enhance the feasibility of AI-driven digital transformation in SMEs by building a support model that enables gradual and flexible adoption. It presents the theoretical framework and reports current findings from the preparation phase for real-world implementation.

**Keywords:** SME Digital Transformation, AI-OEP (Artificial Intelligence–Operational Efficiency Platform), Modular Platform Architecture, Operational Efficiency, Theoretical Framework

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# Relationship between Educational Planning and Socio-economic Factors

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## Abstract

Socioeconomic factors play a decisive role in access to and success in education. Factors such as income level, family structure, regional differences, and gender are among the greatest obstacles to equal opportunity in education. Government policies must be strengthened to overcome these obstacles. Increasing public education investments, expanding scholarship and support programs, closing the digital divide, and examining and implementing successful international models can be important steps in ensuring equal opportunity in education. Eliminating inequality of opportunity is crucial not only for individuals but also for the overall well-being of society. Equal opportunity in education is critical for long-term economic growth, social cohesion, and sustainable development. Achieving this goal will enable societies to achieve a more just and equitable structure and enable individuals to realize their full potential. Ultimately, ensuring equal opportunity in education is not just a matter of education, but it is a societal responsibility. Fulfilling this responsibility is a critical step for the common good of all. In the study the relationship between educational planning and socioeconomic factors has been studied under the light of literature.

**Keywords:** Educational Planning, Educational Management, Socioeconomic factors, Educational Policies

## 1. INTRODUCTION

Socioeconomic factors play a decisive role in access to and success in education. Factors such as income level, family structure, regional differences, and gender are among the greatest obstacles to equal opportunity in education. Government policies must be strengthened to overcome these obstacles. Increasing public education investments, expanding scholarship and support programs, closing the digital divide, and examining and implementing successful international models can be important steps in ensuring equal opportunity in education. Eliminating inequality of opportunity is crucial not only for individuals but also for the overall well-being of society. Equal opportunity in education is critical for long-term economic growth, social cohesion, and sustainable development. Achieving this goal will enable societies to achieve a more just and equitable structure and enable individuals to realize their full potential. Ultimately, ensuring equal opportunity in education is not just a matter of education; it is a societal responsibility. Fulfilling this responsibility is a critical step for the common good of all.

Planning is a vital issue for the effectiveness of educational activities. While some educational practices are planned and programmed, others are unplanned. Therefore, whether in formal or informal education, the effectiveness of the learning-teaching process depends on a well-designed plan and its implementation. The planning process itself is an effort to ensure the effectiveness and efficiency of learning-teaching processes, considering the potential variables of the task and process. Planning is an organized and continuous effort to select the best available alternatives to achieve specific goals.

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In the context of education, planning requires prior decisions about what will be taught, how it will be taught, how long and when it will be taught, who will be taught, how the tools and equipment will be used in the teaching process, and how the target audience will be evaluated. Educational planning has become an increasingly important field of research since the 1960s. This can be attributed to the fact that the structure of the education system and its teaching processes have remained the same despite societal, social, and political economic changes and differences in the student population. Planning, therefore, is not only about the quantitative aspects but also the qualitative aspects of education.

## 2. EDUCATIONAL PLANNING

Educational planning is the process of preparing a series of alternative decisions for future activities aimed at achieving goals with the best effort, taking into account the economic, socio-cultural, and general realities of a country. It is a continuous intellectual process that involves analysis, formulation, evaluation, and decision-making. Decisions made must be internally consistent and systematically related to other decisions, both within the field itself and in other development areas. There is no time limit for any type of activity, and one activity does not necessarily precede or precede another.

Educational planning is the process of reflecting on, analyzing, formulating, evaluating, and making decisions about what can be used to achieve predetermined goals. Educational planning can also be said to be an activity to be carried out in the future to achieve goals in the field of education (Ramadhani et al, 2021).

Planning is a general management function in which the first step in managing any business activity begins with planning. Planning also generally involves establishing a vision, mission, goals, objectives, and strategies, as well as allocating resources in general, and these are generally defined within a basic program structure. What every organization aims to achieve is essentially how to develop and create a plan to achieve goals and action plans that are truly aligned with the vision, mission, goals, objectives, and strategies established by the organization or company.

In the education world, educational planning is also a component of educational management. Educational management conceptually encompasses the planning, implementation, control, and supervision of educational resources such as human resources, learning resources, curriculum, financing, and facilities to effectively and efficiently achieve educational objectives.

There are several important elements in educational planning, including;

- The use of rational and systematic analysis in educational planning, which relates to the planning methodology.
- The process of educational development and progress, that is, the implementation of educational planning within the framework of educational reform.
- The principle of effectiveness and efficiency, that is, the prominence of economic considerations in educational planning, such as in the exploration of educational financing sources, cost allocation, the relationship between education and the workforce, and the relationship between educational development and economic growth.
- The needs and goals of students and society as local, regional, national, and international. This means that educational planning encompasses both the internal and external aspects of the organization of the educational system.
- The country's national development goals will inform decisions within the framework of national education policies.
- Strategic issues include operational policy management that can influence the implementation process of educational planning.

Educational planning in education management aims to help meet the workforce needs, expand educational opportunities, improve the quality of education and equalizing educational opportunities in a political and popular liberation measure.

Meeting the need for a qualified and skilled workforce is a top priority, because without the support of a skilled workforce, development in various sectors will be difficult to achieve, and unemployment rates may continue to rise. Improving the effectiveness and efficiency of educational provision is a prerequisite for meeting workforce needs and expanding educational opportunities.

There are at least three alternative approaches to educational planning:

- *Social Needs Approach*: This approach is a traditional approach to educational development by providing institutions and facilities to meet enrolment pressures and allowing students and their parents to freely pursue their aspirations.



- *Employment Needs Approach:* This approach emphasizes the importance of educational programs in various development sectors in meeting employment needs. Estimated labor needs can be expressed in terms of education and training needs, which can then be compared with projections of the education/training system's supply.
- *Cost-Effectiveness Approach:* This approach focuses on alternatives that provide greater benefits than costs. It is based on the assumption that an individual's contribution to national income is proportional to their level of education and that income differences within a society are due to income differences measured by their ability to finance education, rather than differences in talent or national background.

In essence, planning is a process that directs efforts to achieve a goal. National development planning is a process that directs all efforts, including the capacity and utilization of resources. National educational planning should be oriented toward achieving national development goals and normative vision, as well as internal forces and global trends that influence the direction of national development.

The national education and training planning process is not only about achieving quantitative targets; it is also about making the system more effective and efficient, improving the quality of the learning and teaching process, and ensuring that the materials presented in this process meet national development goals. Education and training, as a process for developing the human resources who will implement and benefit from national development, should be aligned with the process of achieving national development goals.

Educational planning is the process of developing policies, tools, and techniques to set priorities. It is an integral part of a country's socio-economic development planning. It also serves as a bridge between the expectations of students, parents, society, and the government to achieve educational goals. As pointed out, educational planning is a decision made over a specific period based on the planning period to make the education system more effective and efficient, produce higher-quality graduates, and align with development needs. Educational institutions are surrounded by an environment composed of various systems, called the supersystem in educational planning. The systems within the supersystem are closely and harmoniously interconnected and receive feedback from each other. These systems within the environment must be taken into account by educational planners, as they will invariably influence the planning objectives when achieving these goals. For planning to function smoothly, it can be said that planning is related to the factors that influence education. Factors supporting education include demographic, socioeconomic, human resources, and financial resources. As advocates of education, these factors are essential for educational planning to ensure the natural development and progress of planned educational elements at both the macro and micro levels.

#### 4. THE RELATIONSHIP BETWEEN EDUCATIONAL PLANNING AND SOCIO-ECONOMIC FACTORS

There is a close and vital relationship between educational planning and socio-economic aspects. The widespread belief that someone with a formal education is more likely to achieve economic success is an example of the impact of educational institutions on the economic activities of society's members.

Robert K. Merton (2010) and Özer & Suna (2023) noted that every social institution not only protects and reveals its goals but also serves a function that reflects the benefits of its formation. The emergence of the societal assumption that education affects a person's economic success is not a spontaneous or unfounded belief. For example, based on a social trend seen in the early decades of 21<sup>st</sup> century, most business sectors required employees with formal education. Almost all those with formal education were integrated into the workforce. This is inextricably linked to the government's need to utilize the skills and expertise of educated employees in the industrialization and modernization of national development. Therefore, government policies aimed at building the foundations of economic prosperity will remain strongly linked to education practices as the ultimate enabler of transformation, progress, and economic growth.

Education must be closely linked to the needs and opportunities of economic and social development to prepare students for life and meet the needs of society. Given that the five-year development plan lays the foundation for subsequent development by prioritizing agriculture, supporting industries, small and light industry, mining, infrastructure, and tourism, a management approach aligned with these priorities must be adopted. This is essential for the educational levels that will produce graduates in the coming years. This clearly demonstrates the role of education in supporting the national economy, which is focused on strong efforts to increase industrially oriented economic growth. The above explanation demonstrates the close relationship between the education sector and the economic sector. Both components are state assets requiring careful management. More specifically, this relationship encompasses the three main factors that serve as inputs into national income production: physical capital, labor, and technological progress. The more workers there are, the higher the national income and the higher the economic growth.

In social life, we recognize two important, interrelated terms: social and economic. Society is the social environment. The social environment is defined as all other people who influence others, including social interactions, traditions, religion, and beliefs. Society, or the social environment, which is the focal point of the relationship between schools and society, is the social environment encompassing people and their culture.

Society is a collection of individuals and groups bound together by the unity of the state, culture, and religion. Every society has specific ideals, rules, and power systems. Xuan et al (2019) and Kotler, Roberto and Lee (2002) formulated the relationship between educational institutions and society as follows: (a) identifying individuals within society, (b) their concerns, dreams, and opinions regarding educational institutions, (c) formulating goals for the relationship between institutions and society aligned with their dreams and opinions, (d) assessing the program's cost-effectiveness, and (e) implementing and evaluating the results. This interrelationship process aims to create specific programs to be implemented within a specific timeframe. For example, specific skills training programs for school dropouts, family education development programs, and programs that utilize the community as an educational and social learning environment. Every society must experience changes in its life. By their nature, these changes can lead not only to progress but also to regression. Social change is a symptom present in every society. Changes occurring in society will cause disharmony among existing social elements, resulting in a way of life that is inappropriate for the function of the relevant society.

According to Gillin and Gillin (1950), social change is a change in accepted ways of life, whether through geographical conditions, culture, population dynamics and structure, ideology, or new discoveries within society. Samuel Koenig (1968), on the other hand, explains that social change refers to changes in human life patterns. These changes occur due to internal or external causes. Keller and Selo Soemardjan, on the other hand, explain that social change is any change in social institutions within a society that affects the social system, including the values, attitudes, and behavioral patterns among groups within that society.

## 5. CONCLUSION

The economic life of a society, whether production, consumption, or distribution, is a reflection of its economic actors. There is a connection between the economy and education, and developments in one drive developments in the other. Research and writings on the economics of education emphasize the relationship between education and the economy. According to Lascelles Anderson and Douglas M. Windham (1982), in their early studies on the economics of education and human capital, they tended to view education as a tool that could be manipulated to achieve higher levels of economic development. This means that education is an indispensable factor in development activities. While it would be very difficult to develop education and the economy separately, both should be developed simultaneously.

## References

- [1] Anderson, L. & Windham, D. (1982). *Education and development: Issues in the analysis and planning of postcolonial societies*. Lexington Books, 1982
- [2] Gillin and Gillin, (1950). *Cultural Sociology*, The Macmillan Co., New York, 1950, p. 785
- [3] Keller, S. & Soemardjan, S. (1979). *Rulers and Elites: The Role of Elite-Determinants in Modern Society*. (Penguasa dan Kelompok Elit: Peranan Elit-Penentu dalam Masyarakat Modern.). Rajawali, Indonesia. 1979
- [4] Koenig, S. (1968). *Sociology : An Introduction to the Science of Society*. Barnes & Noble Books, 1968
- [5] Kotler, P.; Roberto, N. & Lee, N. R. (2002). *Social Marketing: Improving the Quality of Life*. SAGE Publications, 2002
- [6] Merton, R. K. (2010). *Sociology of Science and Sociology as Science*. Columbia University Press, 2010.
- [7] Özer, M., & Suna, E. (2023). The Relationship between School Socioeconomic Composition and Academic Achievement in Türkiye. *Journal of Economy Culture and Society*(66), 17-27.
- [8] Ramadhani, Y. R. ; Tanjung, R; Saputro, A.N.C.; , Utami N. R.; Purba, P.B; Purba,S.; Kato I. (2021). *Educational Planning Basics*. Editor: Abdul Karim & Janner Simarmata, Yayasan Kita Menulis. 2021
- [9] Suna, H. E., Gür, B. S., Gelbal, S., & Özer, M. (2020). Science high school students' socioeconomic background and their preferences regarding their transition into higher education. *Journal of Higher Education*, 10(3)
- [10] Xuan, X., Xue, Y., Zhang, C., Luo, Y., Jiang, W., Qi, M., & Wang, Y. (2019). Relationship among school socioeconomic status, teacher-student relationship, and middle school students' academic achievement in China: Using the multilevel mediation model. *PloS one*, 14(3)



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