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*SEFD G.M.QULIYEVA*

## Pedagogical Sciences

# Şagirdlərin tərbiyəsində valideynin və məktəbin rolu

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**”Bir uşağın tərbiyəsi onun doğumundan öncə, valideynlərinin tərbiyəsi ilə başlayır ”**

Omraam Mikhael Aivanboy

Uşaq şəxsiyyətinin formalaşmasında ailənin rolu əvəzəlməzdir. Gənc nəslin tərbiyəsi ailənin başlıca funksiyalarından, valideynlərin isə ən mühüm vəzifələrindən biridir. Dediğimiz müxtəlif xarakterli yaxşı və pis uşaqların hər ikisinin atası, anası, nənəsi, babası var . Lakin valideynlərin öz - özlüyündə uşaqları tənbel, işgüzar, çılgın, xeyirxah, ərköyün və s, böyükdür və beləliklə də pis və yaxşı uşaq məfhumu ilə qarşılaşırıq. Elə valideynlər var ki, uşağın tərbiyəsi ilə yaxşı məşğul olmur, uşağına daha çox vaxt ayıra bilmir və nəticədə övlad çətin tərbiyə olunan uşağa çevrilir. Valideyn uşağı döyür. Lakin bilmir ki, uşağı döyməklə tərbiyə etmək olmaz. Valideynin döyülməsi ilə böyüyən uşaqlar qorxaq olur və qorxudan yalan danışır və hətta daha pis yola düşürlər.

Belə ki, valideynin hər bir hərəkəti, davranışı uşaq üçün canlı nümunə rolunu oynayır və ona əsaslı təsir göstərir. Görkəmli pedaqoq A.S. Makarenko demişdir: “Siz uşağınızı yalnız onunla danışanda və ya onu öyrəndə, yaxud ona əmr verəndə tərbiyələndirmirsiniz. Siz onu həyatınızın hər bir anında, hətta evdə olmadığınız zamanda da tərbiyə edirsiniz. Siz necə geyinirsiniz, başqa adamlarla və başqaları haqqında necə danışsınız, necə sevinir, necə kədərlənirsiniz, dostlar və düşmənlərlə necə rəftar edirsiniz və s. bütün bunların uşaq üçün böyük əhəmiyyəti vardır. Uşaq sizin həyatınızın ahəngindəki ən kiçik dəyişiklikləri görür, yaxud hiss edir, sizin fikrinizin bütün dönüşləri gözə görünməyən yollarla ona çatır, siz bunları görmürsünüz”.

Ata, ana ailədə etik normalara əməl edərsə, uşaqlarına yaxşı nümunə göstərsə övladı da ona oxşamağa çalışar. Əgər ata evdə kobudluq edir, özünü öyür, ailəyə qarşı kobudluq edir və yaxud sərxoşluq edirsə, bu da uşağın pis tərbiyə olunmasına gətirib çıxarır. Yaxşı tərbiyə bizim gələcək xoşbəxtliyimizdir, pis tərbiyə bizim gələcək bədbəxtliyimiz, göz yaşlarımızdır. Uşaqlar ən kiçik yaşlardan valideynlərinin səsindəki, mimikasındakı müsbət və mənfi çalarları, hərəkətləri seziirlər. Onlar valideynlərinin münasibətlərində ən kiçik çalarları duyur, ya sevinir, ya da kədərlənirlər. Ona görə də hər bir valideyn övladlarına nümunə, örnək olduqlarını unutmamalıdır.

Ailə sağlam cəmiyyətin və güclü dövlətin təməlidir . Şagirdlərin tərbiyəsində ailənin və valideynin rolu böyükdür. Təlim-tərbiyənin təməli ailədən başlayır, məktəb isə bu prosesə daha sonra qoşulur. Ailə ilə bərabər şəxsiyyətin formalaşmasında məktəbin rolu böyükdür.

Tərbiyə səbr, diqqət və məsuliyyət tələb edən uzunmüddətli bir prosesdir. Müəllimlərlə valideynlər həmrəy olmağı bacarmalı, müəllimlər şagirdlərinin ailə mühitinə, valideynlər isə məkəb atmosferinə yaxından bələd olmalıdırlar. “Pis uşaq yoxdur, pis tərbiyəçi var” deyirlər. Lakin demirlər ki, tərbiyə prosesinin gedişində hər bir tərbiyəçi çətinliklərlə qarşılaşır. Müxtəlif ailələrdən müxtəlif xarakterli şagirdlər gəlir. Məktəb yaşına qədər ailədə formalaşan uşaq ünsiyyətdə olduğu insanların, yəni, ana-atanın onlara aşladığı nə varsa onu qavrayır, onu əks etdirir.» «Bu bir

həqiqətdir ki, tərbiyə işində əsas məsuliyyət, ağırlıq ailənin üzərinə düşür. Odur ki, yaxşı ailə tərbiyəsi görən şagirdlər valideyninin üzünü ağ edir, dərslərini yaxşı oxuyur və məktəbdə özünü ağıllı və tərbiyəli aparırlar. Belə gənclər də mənəvi cəhətdən sağlam, mədəni, səmimi və uzaqgörən olurlar. Ona görə də müasir gəncləri şüurlu, dərrakəsi dərin, dünyagörüşü geniş görmək istəyiriksə, ailə tərbiyəsi məsələsini ön plana çəkməli və bu məsələyə ciddi yanaşmalıyıq. Valideynlər tərbiyə işini elə məqsədyönlü qurmalıdırlar ki, övladlarının əxlaqi dəyərlərinə elə dəqiqliklə fikir verməlidirlər ki, sonda onlara qazandırdıqları tərbiyə üçün peşmanlıq hissi yaşamasınlar. Onlar öz övladlarını elmi, mədəniyyətli, peşəkar olmaları üçün hələ kiçik yaş dövrlərindən hər bir hərəkətlərinə, nitqlərinə, davranışlarına, dostluq etdiyi adamların xarakterinə fikir verməlidirlər.» Valideynlər əməksevərliyin, vətənpərvərliyin ata-anaya, müəllimə, torpağa sevginin sirlərini səbr və təmkinlə, övladlarına çatdırmalıdırlar.

Hər bir ailədə uşaq kortəbii şəkildə tərbiyə edilmir. Adətən valideynləri işləyən bəzi uşaqlar nəzarətdən kənar qaldığı üçün istəlinən nəticəni əldə edə bilmirlər. Nəzarətin zəif olduğu ailələrdə yaşayan uşaqların iradəsi zəif olur və onlarda pis yola meyillilik artır. Elə valideynlər var ki, uşağın tərbiyəsi ilə məşğul olurlar. Bu səbəbdən uşaqlar və yeniyetmələr bəzən tüfeyli qruplara qoşulur, evdən qaçırlar. Valideyn övladlarının düşüncələrini, narahatlığının səbəbini anlamalı, düzgün qiymətləndirməli onun hiss və həyəcanlarına, arzu və istəklərinə, duyğularına, əhəmiyyət verməlidir, yoxsa uşaq valideyn, müəllim, dostlar arasında problemlər meydana gələ bilər.

Uşaqların qayğısına qalmaq və onları tərbiyə etmək valideynlərin borcudur. Uşağın şəxsiyyət kimi formalaşmasında ailənin rolu danılmazdır. Ailə uşağın ilk tərbiyəçisi, ilk müəllimi, ilk örnəyidir. Sevgi, diqqət, mənəvi dəyərlər və məsuliyyət hissi məhz ailədə aşılanır. Bir uşağın xarakterindəki əsas bünövrə ailədə yaranır. Məktəb isə ailənin bu vacib missiyasını tamamlayır.

Şagirdlərin hər birini ayrı – ayrılıqda öyrətmək, kəşf etmək müəllimlərin deyil, sinif rəhbərinin də borcudur. Sinif rəhbəri öz şagirdlərinin valideynləri ilə daha sıx ünsiyyətdə olmalıdır.

Sinif rəhbəri ailə ilə məktəbin fərdi işinin ən çox yayılmış formasından - sinif rəhbərinin şagirdlərin evlərinə getməsindən istifadə etməlidir. Bundan məqsəd şagirdlərin ailə həyatını, onların yaşadığı şəraiti öyrənməkdir. Bu tanışlıq sinif rəhbərinə şagirdlərin fərdi xüsusiyyətlərini bilib onlara fərdi yanaşmaq imkanı verir. Bunu nəzərə alaraq elə dərslərinin ilk günlərindən şagirdlərin evlərinə getmək, onların asudə vaxtlarını, iş guşələrini necə təşkil etmələri barədə söhbətlər aparmaq və müvafiq məsləhətlər vermək məqsəduyğundur.

Müəllim yeni təlim texnologiyalarından istifadə edərək şagirdlərə dərsləri izah edir və evdə internetdən materiallar seçməyi tapşırır. İşin belə təşkili şagirdlərdə azad və sərbəst fikir yürütmək vərdişi aşılayır. Lakin bəzi şagirdlər nə edirlər? İnternetə girən kimi dərslər yaddan çıxır. Yazır, film seyr edir, şəkillər seçir dərslər qalır bir kənar. Belə şagirdlərin valideynləri ilə xüsusi söhbət aparmaq lazımdır.

Hal-hazırda məktəblərimizdə təhsil alan şagirdlərə münasibət dəyişmişdir. Belə ki, şagirdlərin maraqları önə çəkilir, onların yaxşı bir şəxsiyyət kimi formalaşmasına diqqət yetirilir, əqli və fiziki qabiliyyətindən asılı olmayaraq şagird şəxsiyyətinə hörmətlə yanaşılır.

Savadlı ailələr ümumiyyətlə övladlarının təhsilinə daha çox önəm verir, onlara daha çox dəstək olurlar. Məktəb uğurunda ailənin rolu övladlarının öyrənmə prosesində qarşılaşdıqları problemlərə dəstək verməkdən başlayır. Valideynlər öz uşaqları üçün yaxşı nümunələr göstərməlidirlər. Davranışları, iş vərdişləri və münasibətləri ilə uşaqları üçün nümunə olmalıdırlar. Bütün bunlar göstərir ki, ailələr övladlarının təhsilinə fəal töhfə verməlidirlər. Ailələrin bu rolu dərk etməsi və

uşaqlarının təhsilinə diqqət yetirməsi uşaqların daha uğurlu, sağlam bir şəxsiyyət kimi böyüməsinə kömək edir.

N.Tusi "Əxlaqi-Nasiri" əsərində tərbiyə işində əsas sima kimi müəllim və tərbiyəçilərin rolunu yüksək qiymətləndirir, onların yüksək təhsilli, elmi, əxlaqlı, tələbkar, mərhəmətli, şirin danışlıq və ehtiramlı olmasını vacib hesab edirdi. Tərbiyə prosesində mənəvi təmizliyə, əxlaq saflığına, vicdan aydınlığına son dərəcə yüksək qiymət verən mütəfəkkir bu keyfiyyətləri uşaqlara kiçik yaşlarından aşılamağı lazım bilirdi. N.Tusi uşaqların əxlaq tərbiyəsində cəza, tərif, alqışlamaq, mükafat və şirnikləndirmək kimi rəğbətləndirmə vasitələrinə xüsusi yer ayırırdı.

Bu gün valideyn-müəllim əməkdaşlığına böyük ehtiyac yaranıb. Bunun üçün valideynin məktəbə getməsi tələb olunmur. Valideyn-müəllim əməkdaşlığının dünya məkanında yeni onlayn forması yaranıb. Qabaqcıl müəllimlər əməkdaşlığın bu formasından pedaqoji ustalıqla istifadə edərək yararlanırlar. Düşünürəm ki, əməkdaşlığın bu formasından hər bir müəllim istifadə edərsə, yeni nəslin tərbiyəsində uğurlar artar. Əməkdaşlıq həm ailənin, həm də məktəbin tərbiyə funksiyasının yerinə yetirilməsi baxımından mühüm əhəmiyyət kəsb edən strategiyadır".Şagirdlərin tərbiyəsində ailənin və valideynin rolu böyükdür. Şagirdlərin hər birini ayrı – ayrılıqda öyrətmək, kəşf etmək yalnız müəllimlərin deyil, sinif rəhbərinin də borcudur. Sinif rəhbəri öz şagirdlərinin valideynləri ilə daha sıx ünsiyyətdə olmalıdır.

Sinif rəhbəri ailə ilə məktəbin fərdi işinin ən çox yayılmış formasından - sinif rəhbərinin şagirdlərin evlərinə getməsindən istifadə etməlidir. Bundan məqsəd şagirdlərin ailə həyatını, onların yaşadığı şəraiti öyrənməkdir. Bu tanışlıq sinif rəhbərinə şagirdlərin fərdi xüsusiyyətlərini bilib onlara fərdi yanaşmaq imkanı verir. Bunu nəzərə alaraq elə dərslərin ilkin günündən şagirdlərin evlərinə getmək, onların asudə vaxtlarını, iş guşələrini necə təşkil etmələri barədə söhbətlər aparmaq və müvafiq məsləhətlər vermək məqsədəuyğundur. Ailə ilə fərdi əlaqə forması kimi şagird gündəliyindən də istifadə olunur. Şagird gündəliyi uşaqların təlim - tərbiyəsində, davranışında olan müsbət və mənfi faktları qeyd etməyə, valideynlərlə uşaqların müvəffəqiyyətləri və nöqsanları barədə müntəzəm məlumat almağa kömək edir. Bundan əlavə, təlim və intizamı ilə fərqlənən şagirdlərin valideynlərinə, iş yerlərinə EMAIL ə təşəkkür göndərmək də fayda verə bilər. Uşaqlara ev işlərində verilən kiçik vəzifələr, tapşırıqlar belə onların ümumi davranışlarına çox müsbət təsir edir. Tam əksinə, uşaqların ailələrdə həddindən artıq ərköyün böyüdülməsi, onlar üçün hər şeyin əlçatan olması uşaqlarda düzgün xarakterin formalaşmasına xələl gətirir. Bu da şagird davranışlarında özünü neqativ şəkildə biruzə verir. Bunun baş verməməsi üçün məktəb valideynlərlə məqsədyönlü maarifləndirmə işi təşkil etməlidir.

Şagirdin evdə rejimlə işləməsi xüsusilə vacibdir. Rejim uşaqlarda vaxta qənaət etməyə, dəqiq olmağa, vaxtı qiymətləndirməyə imkan yaradır. Valideynlər buna diqqət yetirməlidirlər. A.C.Makarenko valideynlərə müraciətlə yazırdı: "Hər şeydən əvvəl siz öz uşaqlarınızın necə yaşadığını, nə ilə maraqlandığını, nəyi sevdiyini, nəyi istədiyini və nəyi istəmədiyini bilməlisiniz,,

Valideynlərdə öz uşaqlarına, onların müəllimlərinə etibar, inam olmalıdır. Bu qarşılıqlı münasibətlərin formalaşmasına kömək edir. Həssas valideyn məktəb haqqında, müəllim haqqında, öz övladı ilə səmimi söhbət aparır, uşağın xəbəri olmadan məktəblə sıx əlaqə saxlayır, müəllimlərlə görüşür, mənfi və müsbət cəhətləri öyrənir. Elə valideynlər də var ki, uşaqlarını ev işləri ilə yükləyir, onların təhsilinə mane olurlar. Bu da şagirdlərin təlimdə geridə qalmasına, müəllim - şagird münasibətlərinin pozulmasına səbəb olur. Məktəbin, müəllimin şagirdə verdiyi tələblər valideynlər tərəfindən müdafiə olunmalıdır. Valideynlər və məktəb uşaqlara verdiyi tələbləri eyni istiqamətə yönəldikdə tərbiyə işi asanlaşır.

Mən bütün bunları nəzərə alaraq „Valideynlərlə görüş dəftəri hazırlayıram. Bu çox məqsədəuyğundur. Çünki bu günki dövr üçün bu vacib məsələlərdən biridir. Bu dəftərdə hər bir şagird üçün müvafiq səhifələr ayırır, ailə və şagirdlə əlaqədar qısa qeydlər edilir. Ailəyə

gedərkən və ya valideynlərlə görüşərkən hər şeydən əvvəl şagirdin davranışındakı müsbət cəhətlərdən danışmaq lazımdır. Görüş vaxtı eyni zamanda valideynlərlə övladının xarakterindəki nöqsanlar, onların aradan qaldırılması yolları, valideynin tərbiyə işindəki düzgün mövqeyi barədə də söhbət açılrsa daha yaxşı olar. Həmçinin məktəblinin gün rejimi ilə də maraqlanıb, lazımı məsləhətlər vermək lazımdır.

Məhəmməd peyğəmbərin dediyi kimi: Hər bir ata-ana uşağına gözəl tərbiyədən daha yaxşı bir miras qoya bilməz. Bəs nədir bu miras? Tərbiyə hər bir insanın ilk düşdüyü və yaşadığı mühit əhatəsində – ailədə formalaşır. Ailə bir dövlətdir. Bu dövlətin başçısı ata və anadır. Ailədə sevginin olması vacibdir, sevgi və nəvazişlə dolu, mübahisələrin olmadığı ailədə böyüyən uşaqlar özlərinə daha güvənli olurlar. Ailə valideynlərin qurduqları bünövrə üzərində ucalır, əgər bünövrə düzgün qoyulubsa, mərtəbələr də bir-birinin ardınca yüksələcək. Bəli, biz hamımız aldığımız tərbiyənin övladlarıyıq. Təəssüflər olsun ki, bəzən valideynlər bir-birini təqsirləndirir... Atalar "mənim vəzifəm pul qazanmaq, çörək dalınca qaçmaqdır, uşağı tərbiyə etmək anasının işidir" deyib məsuliyyətdən kənar qalmaq istəyirlər. Hətta qızın tərbiyəsi ilə ana, oğlanın tərbiyəsi ilə ata məşğul olmalıdır deyib özünü kənara çəkən atalar da vardır. Uşağın fiziki, fizioloji və psixi inkişafında, düzgün tərbiyə olunmasında ata qayğısı və ana nəvazişi mütləqdir. Hər iki valideynin diqqət və qayğısı ilə əhatə olunmuş uşaq özünü dəyərli hiss edir, daha inamlı böyüyür.

Ailə tərbiyəsinin düzgün qoyuluşunda ailə münasibətlərinin mühüm rolu vardır. Ərəblərin gözəl bir atalar sözü var: "Böyüyü tərbiyə elə, kiçik ondan öyrənəcək."

Dediklərimizdən məlum olur ki, məktəbin, ailə ilə, şagirdlərlə sıx əlaqələrinin uşaqların tərbiyəsində, onların bir şəxsiyyət kimi formalaşmasında - yetişməsində əhəmiyyəti böyükdür.

# Pedagogical Foundations of the Jumble Fitness Program: Structuring Motor Learning through Rebound Training

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## *Abstract*

The Jumble fitness program is a structured system of group workouts based on rebound training using specially designed rebound shoes. Developed by international trainers, the program emphasizes a pedagogically grounded approach to motor learning, incorporating progressive skill development, motivational engagement, and inclusive practices. This paper explores the pedagogical foundations of the Jumble methodology, highlighting how its structure facilitates motor skill acquisition through multisensory learning, repetition, rhythm, and safe progression.

The program is designed to accommodate a wide range of participants — from beginners to advanced practitioners, including individuals recovering from injury — by adapting physical load and complexity. The role of the instructor is redefined from simple demonstrator to active facilitator, guiding learners through biomechanically efficient movement patterns while fostering community and enjoyment. Special attention is given to teaching strategies such as mirrored demonstration, rhythmic counting, and verbal cues, all of which enhance coordination and retention.

The findings are based on observational data, practitioner experience, and user feedback from diverse populations. The study concludes that Jumble serves not only as a fitness modality but also as an innovative educational framework for structured physical learning, with the potential for integration into wellness education, adult learning, and rehabilitation contexts.

## *Introduction*

In recent decades, the growing popularity of group fitness formats has highlighted the need for well-structured educational approaches to physical training. As fitness becomes increasingly integrated into daily life and public health strategies, instructors and program developers face the challenge of not only delivering effective workouts but also facilitating meaningful motor learning for diverse populations. Traditional fitness classes often prioritize performance over pedagogy, overlooking the cognitive, sensory, and emotional aspects of movement acquisition.

The Jumble fitness program offers an innovative response to this challenge. Based on rebound training with specially designed rebound shoes, Jumble combines physical conditioning with educational methodology rooted in pedagogical principles. The program structures the learning process in progressive stages, guiding participants from basic movement patterns to complex sequences in a safe, engaging, and inclusive environment. This approach encourages long-term retention of skills, increased motivation, and personal transformation through physical activity.

This article aims to examine the pedagogical foundations of the Jumble program and demonstrate how its design supports motor learning through multisensory engagement, repetitive structure, rhythm, and instructor-facilitated guidance. By doing so, the paper contributes to the

growing body of knowledge on movement education and underscores the importance of intentional program design in group fitness instruction.

### *1. Theoretical Background*

Motor learning is a complex, multifaceted process that involves the acquisition, refinement, and retention of movement skills through practice and experience. According to contemporary theories in physical education and kinesiology, effective motor learning occurs when learners are actively engaged, receive appropriate feedback, and progress through structured stages of skill development. Key frameworks such as Fitts and Posner's three-stage model (cognitive, associative, autonomous) emphasize the need for repetition, adaptation, and increasing complexity to foster long-term learning.

Pedagogical theories relevant to physical training highlight the importance of multisensory instruction, scaffolding, and learner-centered facilitation. Vygotsky's concept of the Zone of Proximal Development (ZPD) and Bruner's spiral curriculum suggest that learners benefit from guided progression — revisiting and building on previous knowledge at deeper levels. In fitness instruction, this means that movement should not only be demonstrated but also taught in a way that aligns with participants' current abilities, gradually introducing challenges that expand their physical competence.

In the context of group fitness, motivation and engagement play critical roles in supporting motor learning. Theories such as Deci and Ryan's Self-Determination Theory emphasize autonomy, relatedness, and competence as core psychological needs that, when fulfilled, enhance intrinsic motivation. Incorporating rhythm, music, and group dynamics — as Jumble does — can enhance focus, emotional involvement, and social cohesion, further reinforcing the learning process.

The Jumble program is built upon these theoretical foundations, combining the principles of structured skill progression, learner engagement, and sensory integration into a cohesive pedagogical model. This theoretical background supports the argument that Jumble is not merely a fitness routine but a well-designed educational experience aimed at effective motor skill acquisition.

### *2. Methodology of Jumble Program*

The Jumble fitness program is methodically designed to support structured motor learning through a progressive, adaptable, and engaging approach to rebound training. The methodology is grounded in pedagogical best practices, ensuring that participants of all fitness levels can safely and effectively develop movement skills while enjoying a dynamic group experience.

Jumble is divided into clearly defined levels of complexity:

- Entry Level (Basic Coordination & Safety),
- Progress Level (Rhythmic Patterns & Movement Expansion),
- Performance Level (Choreography & Endurance).

Each level introduces a set of movement patterns that are taught using scaffolding techniques: starting with simple steps, then gradually increasing speed, intensity, and directional variation. This structured layering allows for motor skill development in alignment with participants' cognitive and physical readiness.

To facilitate motor learning, Jumble instructors use a variety of pedagogical strategies:

- Mirrored Demonstration – the instructor mirrors movements to enhance spatial understanding and mimicry;

- Rhythmic Counting and Verbal Cues – guiding movement timing and coordination;
- Progressive Repetition – consolidating motor patterns through cycles of repeated practice;
- Visual and Auditory Anchoring – integrating music, rhythm, and visual alignment to reinforce learning.

All sessions follow a consistent structure:

1. Warm-Up – preparation of joints and cardiovascular activation;
2. Core Training Block – skill acquisition through focused movement modules;
3. Choreographed Combination – integration of learned movements into a dynamic sequence;
4. Cool-Down and Stretching – recovery and muscle relaxation.

The Jumble program emphasizes inclusivity and adaptation. Exercises can be modified for:

- Older adults;
- Individuals recovering from injury or surgery;
- Beginners with low coordination or balance.

Rebound shoes used in Jumble (by Aerower) absorb up to 80% of impact, allowing participants to train with reduced joint stress, making the program accessible even to those with orthopedic sensitivities. Movement modifications and pacing options are integral to class design, ensuring safe participation without compromising progression.

### *3. Pedagogical Innovations*

The Jumble fitness program incorporates several pedagogical innovations that distinguish it from traditional group fitness formats. These innovations reflect a deliberate instructional design rooted in the principles of movement education, motivation theory, and inclusive learning. Jumble transforms the role of fitness instruction into a dynamic learning process that addresses the cognitive, emotional, and social dimensions of motor skill acquisition.

One of the most distinctive innovations is the use of rebound shoes as both a physical and pedagogical tool. These specially designed shoes not only reduce impact on joints, making movement safer and more accessible, but also enhance proprioception, balance, and coordination. The novelty of the equipment stimulates curiosity and attention, increasing learner engagement and willingness to experiment with new movement patterns. The physical feedback provided by the rebound mechanism reinforces posture control and muscle activation in real time.

In the Jumble framework, the instructor is not simply a demonstrator of movements but a facilitator of motor learning. This role includes:

- Providing individualized cues and real-time feedback;
- Monitoring participant readiness and adjusting intensity;
- Encouraging self-correction and reflection through guided repetition;
- Creating an emotionally safe and socially supportive environment.

This approach shifts the focus from performance to process-oriented learning, helping participants develop confidence and competence progressively.

Jumble classes integrate music as a pedagogical medium, using tempo, rhythm, and phrasing to anchor movements and support timing. This integration fosters a deeper neuromuscular connection, aids memorization of movement sequences, and enhances enjoyment. In group settings, synchronized movement with music contributes to a sense of flow and shared purpose, reinforcing social learning and motivation.

Elements of play and gamification — such as challenge-based combinations, mini-routines, and tempo variations — are incorporated to maintain attention and increase cognitive

engagement. These strategies help participants stay motivated, overcome frustration, and remain in an optimal state of focus known as “flow.”

#### *4. Results and Observations*

The pedagogical framework of the Jumble program has been applied across a wide range of participants, including adults of various ages, fitness levels, and physical conditions. The following observations are based on practical experience, participant feedback, and informal assessments collected through ongoing implementation of the program in group settings.

Participants consistently demonstrate improvements in coordination, balance, and postural control after several sessions. Many report enhanced body awareness, faster reaction times, and a stronger sense of movement precision. These improvements are especially notable among individuals who initially struggled with motor control or who had limited previous fitness experience.

Confidence in physical ability also increases, particularly among participants recovering from injury or those with movement-related anxiety. The structured progression of the Jumble methodology allows these individuals to gradually expand their movement repertoire without fear of failure or injury.

Motivational response is one of the strongest outcomes observed in Jumble classes. Participants report high levels of enjoyment, sustained attention, and anticipation for upcoming sessions. The integration of rhythm, variety, and playful learning elements fosters a positive emotional environment that supports intrinsic motivation and long-term commitment to physical activity.

The novelty of rebound shoes often acts as an entry point for individuals who have previously struggled to engage with traditional fitness formats. Many describe the experience as “fun,” “empowering,” and “addictive in a positive way.”

Jumble’s group structure fosters a strong sense of belonging and support. Participants often form social connections, creating informal networks of encouragement. This is particularly impactful for individuals who may feel isolated or lack access to inclusive movement environments, such as older adults or people with limited mobility.

Observations show that peer learning and synchronized movement enhance both learning outcomes and emotional well-being. Instructors note increased group cohesion over time, even among diverse participants.

The program’s structure has proven effective for special populations, including:

- Clients recovering from spinal surgery;
- Seniors with joint limitations;
- Individuals with sedentary lifestyles transitioning into movement.

By modifying pace, duration, and movement complexity, instructors can deliver effective sessions tailored to participants’ needs without sacrificing educational quality.

#### *5. Discussion*

The findings and observations from the Jumble fitness program reinforce the argument that physical training, when grounded in pedagogical principles, can become a powerful medium for structured motor learning and holistic development. Unlike many traditional group fitness classes, which often prioritize calorie burn or performance metrics, Jumble emphasizes the process of learning movement, focusing on participant progression, safety, and inclusion.

The program aligns closely with contemporary theories in physical education that stress the importance of intentional instruction, scaffolded skill development, and learner-centered

facilitation. By integrating elements such as rhythm, feedback, emotional engagement, and progression, Jumble addresses both the cognitive and affective domains of learning — areas often underutilized in commercial fitness.

When compared to other group fitness models, Jumble stands out for its:

- Use of specialized equipment (rebound shoes) that physically support learning;
- Clearly defined pedagogical structure and modular content delivery;
- Strong emphasis on multisensory engagement (visual, auditory, kinesthetic);
- Capacity to adapt for diverse and special populations without compromising learning outcomes.

Additionally, Jumble's community-oriented format and inclusive design suggest it may serve not only as a physical activity method, but also as a preventive wellness intervention, a tool for adult education, and even a component of post-rehabilitation programming. Its flexible application and scalable methodology position it well for integration into broader educational, health, and social systems.

The program's success further highlights the need for expanded dialogue between the fields of fitness, education, and health sciences. As movement becomes increasingly central to mental health, social cohesion, and lifelong well-being, pedagogically designed fitness programs such as Jumble represent a promising frontier for innovation in teaching physical activity.

### *Conclusion*

The Jumble fitness program exemplifies how movement-based training can transcend traditional fitness goals to become a structured, inclusive, and pedagogically grounded learning experience. Through its carefully designed methodology, Jumble fosters motor skill development, enhances participant confidence, and promotes long-term engagement in physical activity across diverse populations.

By integrating core pedagogical principles — such as progressive learning, multisensory instruction, motivational strategies, and adaptability — Jumble provides a replicable model for effective motor learning in group fitness settings. Its emphasis on instructor facilitation, emotional connection, and community building further distinguishes it as an educational innovation, not merely a physical workout.

The program's success across various populations, including those with physical limitations or minimal prior training, highlights its potential as a tool for preventive health, post-rehabilitation support, and adult education. Jumble offers valuable insights into how intentional program design can reshape group fitness into a meaningful form of physical literacy and lifelong movement education.

Future research and formal evaluation can deepen our understanding of its impact, while broader dissemination can extend its reach into schools, wellness centers, and public health initiatives. As physical activity continues to gain recognition as a cornerstone of well-being, programs like Jumble — rooted in pedagogy and innovation — have an essential role to play in shaping the future of fitness and education.

# БІЛІМ БЕРУДЕГІ ҚҰЗІРЕТТІЛІК БАҒЫТ

**Набиева Назымгүл Тоқтарханқызы**

Абай атындағы Қазақ Ұлттық педагогикалық университеті, Филология ғылымдарының магистрі

Қазақстандық ғалымдар (М.Ж.Жадрина, С.Д.Мұқанова, Н.Н.Нұрахметов) тарапынан білімге деген жаңаша көзқарастарды саралау және білім сапасын арттыру мақсатында жаңа ізденіс-зерттеулер жүргізіліп, білім беру мақсатын жеке тұлғаның дамуымен бірлікте қарастыруды көздейтін, әлемнің көптеген дамыған елдерінің білім саласында жүйелі түрде іске асуы негізінде оң көрсеткіштерге қол жеткізіп келе жатқан «Нәтижеге бағдарланған білім» моделін өзіміздің «ұлттық болмысымызға, негізге алынған ұстанымдарымызға сай» ұштастыру ұсынылды. Сонымен қатар жаңа бағыттағы білім мазмұны анықталды: білім мазмұнының макромоделі – Тарих – Білім – Мәдениет болып белгіленді. Мұнда лингвомәденитанымдық аспектілерге ерекше көңіл бөлінді. Ол тіл – мәдениет – білім үшеуін бірлікте меңгеруді ұсынды. Пәнді оқытудың нәтижесі ана тілінде сауатты сөйлеу, жазу, өз ойын еркін жеткізу деп белгіленді. Бұл тілді оқытудың нәтижесін сөйлесім әрекеті түрінде белгілеуге негіз болды.

Сонымен қатар білім берудегі жаңа идеологияны іздестіруге әлеуметтік және педагогикалық факторлар да өзек болып отыр. Оның негізгілерінің бірі ретінде қоғамның жылдам өзгеріп, тез қарқынмен дамуын айтуға болады. Осыған орай, мектептегі берілетін білім шынайы өмірдегі өзгерістермен ұштастырылатындай бағытта құрылып, мектеп бітіруші түлектерді үлкен өмірге дайындау қажеттігі туындап отыр. Мектеп түлектерін өмірде болып жатқан өзгерістерге дайындау және білім беруді заман ағымына сай жетілдіру мақсатында ұсынылып отырған «Нәтижеге бағдарланған білім» моделінің соңғы нәтижесі – оқушылардың игерген құзіреттіліктері (компетенттіліктері) болмақ.

Ресей ғалымы А.Хуторской «құзірет» (компетенция) ұғымын «тұлғалық өзара байланысты сапалардың жиынтығы (білім, білік, дағды, іс-әрекет тәсілдері), ал «құзіреттілік» (компетентность) ұғымын тұлғаның жоғарыда айтылған өзара байланысты сапалар жиынтығын меңгеруі дейді, яғни сапалар жиынтығының тұлға бойында көрініс табуы» деп қарастырады [2, 23 б.]. «Құзірет» жалпы білім беру мақсатына байланысты туындаса, «құзіреттілік» жеке оқушыға қатысты, яғни оқушы дайындығына қойылатын талап ретінде айқындалады. «Құзіреттілік» оқушының негізгі тұлғалық сапасын және күнделікті өмірде кездесетін қиындықтарды шешу мүмкіндігін дамытады.

А.Хуторской «құзірет» және «құзіреттіліктің» қызметін білім берудің төмендегідей аспектілеріне қатысты бөліп көрсетеді:

- оқушы тұлғасының қатынасына қарай;
- білім, білік, дағдының қатынасына қарай;
- білім мазмұны мен құрылымының қатынасына қарай;
- іс-әрекет тәсілдерінің қатынасына қарай.

А.Хуторской мен қазақстандық ғалымдардың білім берудегі құзірет түрлерінің атауын анықтаудағы өзгешелікті мына кестеден көруге болады [3, 25 б.].

Білім берудің нәтижесі ретіндегі құзіреттілікті ғалымдар белгілі бір пәнге қатысты оқушының игерген іс-әрекет тәсілдерінің жиынтығы деп анықтап отыр. Сондықтан қазіргі кезеңде Қазақстандағы білім беруде жаңа нәтижеге жетудің басым бағыттарының бірі ретінде білімділік бағытынан оқушылардың бойында базалық құзіреттерді қалыптастыратын құзіреттілік (компетенттілік) бағытына өту қарастырылуда [4, 29 б.].

Дара тұлғаға бағытталған білім тұғырнамалық ұстанымына сай жалпы білім берудің мақсаты өзгерді. Білім беру әрекетінде күтілетін нәтиже оқушының мектепте алған білімінің

нәтижесінде не жасай алады деген дидактикалық сұраққа жауап беру арқылы анықталатын болды [5, 30 б.].

Отандық ғалымдар Қазақстан азаматы меңгеруі тиіс базалық құзіреттер тізбегін (9 базалық компетенция) анықтады [6, 23 б.].

Құзіреттілік бағыт – мақсатты анықтауды, білім мазмұнын таңдауды, оқу үдерісін ұйымдастыруды, білім беру технологияларын таңдау мен нәтижені бағалауды дара тұлғаның дамуымен бірлікте қарастыруды көздейтін ғылыми ізденістердің жемісі деп айтуға болады [7, 78 б.].

А.Хуторской жалпы «құзірет» ұғымына тоқталса, «тілдік құзірет» ұғымын алғаш қарастырған ғалым Н.Хомский. Ол тілдік (грамматикалық) құзірет және сөйлесімдік құзірет деп бөледі. Н.Хомский тілдік құзіретті ана тілінен толық білімі бар (бұл жерде толық тілдік білім, яғни грамматика) «керемет айтушы-тыңдаушыға» айтылған сөздің (ойдың) дұрыстығын және мәнділігін әділ айтуға мүмкіндік береді» [8, 346 б.] деп қарастырады.

Құзіреттілік ұғымы «білім», «білік» және «дағды» (ББД) сияқты ұғымдарды қамтиды. Құзіреттілік оқыту нәтижесін (білім және білік) ғана емес, сонымен бірге ол оқушылардың шығармашылық іс-әрекет тәжірибесі мен құндылық бағдарларының жүйесін де көрсетеді. Құзіреттілік – бұл алынған білімдер мен біліктерді іс-жүзінде, күнделікті өмірде қандай да бір практикалық және теориялық мәселелерді шешуге қолдана алу қабілеттілігі. Демек «құзірет» және «құзіреттілік» ұғымдарын мектептегі педагогикалық тәрибеге енгізу білім берудің мазмұны мен әдістерін өзгертуді, іс-әрекет түрлерін нақтылауды талап етеді.

Құзіреттілік тәсіл бірінші орынға оқушының хабардарлығын емес, нақты құбылыстарды танып білу мен түсіндіруде; қазіргі заманғы техника мен технологияны игеруде; практикалық өмірде; мамандық таңдау кезінде өзінің кәсіби білім алуға дайындығын бағалауда; еңбек нарығын бағдарлау қажет болғанда; өмірден өз орнын анықтауға; өмір салтын, кикілжіңдерді шешу тәсілдерін таңдауға байланысты мәселелерді шешу қажет болғанда туындайтын өмірлік мәні бар мәселелерді шешу біліктілігін шығарады.

Б.Тұрғанбекова: «Құзырлыққа бағытталған оқыту үрдісінде тәжірибелік жолмен мәселені шешу мүмкіндігі молаяды. Осы жағдай біліктілікті арттырудағы екінші үлгіге көшірудің негізі бола алады» [9, 49 б.]. К.Құдайбергенова тұлға құзырлығын қалыптастыру жолдары [10, 67 б.]:

- білім беру жүйесіндегі жүйеге кіретін бала жүйеден шыққанда түлек болады;
- тұлғаның ұжымға енуі арқылы әлеуметтік-психологиялық сипаты көрінеді, - деп тұжырымдайды.

Құзіреттілік тәсіл білімдік парадигмадан біртіндеп мектеп бітірушінің қазіргі көпфакторлы әлеуметтік-саяси, нарықтық-экономикалық, коммуникациялық және ақпараттық қаныққан кеңістік жағдайында тіршілік ету қабілетін көрсететін құзіреттер кешенін игеруге жағдай жасау дағдыларын қалыптастыруға қарай бет бұруды білдіреді.

Ғалымдар білім берудегі құзіреттілік тәсілді жүзеге асырудың төрт аспектісін ажыратады:

- түйінді құзіреттер;
- жалпыланған пәндік біліктіліктер;
- қолданбалы пәндік біліктіліктер;
- өмірлік дағдылар [10, 68 б.].

Бұл төрт бағыттың бәрі біздің мектептер үшін өте қажет. Бұлардың әрқайсысын орындау мектеп түлектерінің құзіреттіліктерін, олардың мектеп бітіргеннен кейін жұмысқа дайындығын арттыруға себептесетін болады.

«Құзіреттілік», «құзірет» ұғымдарының қолданыстағы білім, білік, дағдыдан айырмасы төмендегідей ажыратылады:

- білімнен айырмасы – қызмет жөніндегі ақпараттық сипатта емес, өнімді қызмет формасы түрінде байқалады.

- дағдыдан айырмасы – оқыған материалды топтастыра, құбылыстарды, заңдылықтарды шығармашылықпен пайдалана отырып өзгерте алатын саналы қызмет.
- біліктіліктен айырмасы – дағдыға автоматты түрде жету немесе алмастыру емес, керісінше бірнеше пән дағдыларын кіріктіру, жалпы қызмет негіздерін сезіну.

Қазір ғалымдардың зерттеулерінде құзырлықты қалыптастыру білім беру мазмұны құралдары арқылы жүзеге асатыны, осыдан келіп оқушының қабілеттілігі дамитыны және күнделікті өмірдегі шынайы проблемаларды – тұрмыстық мәселелерден бастап, өндірістік және әлеуметтік мәселелерді шешу мүмкіндіктері пайда болатындығына баса назар аударылып отыр. Ғалымдардың тұжырымдауынша нәтижеге бағытталған оқытудың негізгі принциптері мыналар болып табылады:

- Оқушылардың дайындық деңгейі мен жас ерекшеліктерін сақтай отырып оқыту принципі.
- Оқыту материалдарын ретімен және жүйелі түрде жүргізу заңдылығын сақтай отырып оқыту принципі.
- Оқыту, тәрбиелеу және дамытудың біріккен әрекетін қамтамасыз ету принципі.
- Көрнекі-бейнелі оқыту принципі.
- Теория мен практиканы байланыстыра оқыту принципі.
- Оқытудағы саналылық және белсенділік арқылы өздігінен даму әрекетіне енгізу принципі.
- Сабақтастық принципі
- Оқу процесін жекешелендіру принципі
- Оқушыларды эмоционалды қолдау принципі.

Әр күні өзгеріске толы бүгінгі жауапты кезеңде замана көшінен қалып қоймай уақыт талабына сай ертеңгі болашақ жас ұрпақты білімді етіп тәрбиелеу ұстаздарға зор жауапкершілікті жүктейді. Ол мұғалімнен үздіксіз ізденуді, өз білімін үнемі жетілдіріп отыруды талап етеді. Өйткені еліміздің ертеңі жас ұрпақтың қолында. Мұғалімнің шеберлігі мен жетістігі – сапалы білім және жақсы тәрбие алған шәкіртінде. Оқушы шығармашылығын дамыту ісі үздіксіз жүргізіле бермек. Бұл қоғам талабына сай туындайтын қажеттілік.

Бастауыш, негізгі орта, жалпы орта білім беру сатыларындағы құзіреттілікке бағдарланған оқыту үдерісі ана тілінен алған білімді өмірде қолдана алатын құзіретті тұлға қалыптастыру тұрғысынан қарастырылады. Оқушылардың тілдік сауаттылығының негіздерін бастауыш мектеп қалыптастырады. Оған “Әліппе”, “Қазақ тілі” пәндері атсалысады. Мектептің бастауыш сатысындағы қазақ тілі пәні бойынша білім берудің мақсаты – оқушының сауаттылығын қалыптастыру: оқу, жазу, ауызша сөйлеу, тыңдау, тілдесу дағдыларын меңгерту. Мұнда оқушының келесі кезеңде білім алуы үшін қажетті оқу әрекеті дағдылары игертіледі. Күтілетін білім нәтижесі оқушының сауаттылыққа деп саналады. Сауаттылыққа ерекше ден қойылады. Бастауыштағы пәндер бүтін мәдениеттің бөлшегі ретінде ұсынылады. Мысалы, қазақ тілі пәнінде орфографиялық, орфоэпиялық дағдыларға басымдылық беріледі, яғни сөйлеу, жазу сауаттылығын қалыптастыру міндеті қойылады.

Мектептің негізгі сатысындағы қазақ тілі пәнін оқытудың мақсаты – оқушыға тілдің ғылыми негіздері жөнінде толық, аяқталған сипаттағы тұтас білім беру, әдеби тіл нормасын меңгерту. Оқушының сөйлесім дағдыларын дамыту тіл білімі салалары бойынша сатылап, олардың өзара сабақтастығына негізделіп жүргізіледі. Соған орай әр сыныптың материалдары мәтін және әдеби тіл нормасымен байланысты тұстары пысықталады. Сөйтіп, негізгі сатыдағы оқушы білімі бастауышта меңгерген сауаттылық дағдыларына табан тірейді де, келесі сатыдағы сөз шеберлігіне база қалыптастырады.

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## Economic Sciences

# Impact de la Masse Salariale sur l'Inflation à Madagascar : Une Analyse Empirique via un Modèle VAR

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### Abstract

This study investigates the impact of public wage expenditure on inflation in Madagascar over the period from 2000 to 2023. Using a Vector Autoregression (VAR) model, the study explores the dynamic relationship between government wage policies and inflation, while also considering the effects of other key macroeconomic variables such as monetary supply, real GDP, and exchange rates. The results confirm a significant and robust relationship between public wage increases and inflation, with a noticeable inflationary peak occurring within two years following an increase in public salaries. The impulse response functions indicate that inflation rises by nearly 0.9 percentage points on average, with the effects persisting over a medium-term horizon (up to five years). Furthermore, the variance decomposition shows that public wage expenditure accounts for up to 31% of inflationary fluctuations over five years, highlighting the structural importance of wage policy in Madagascar's macroeconomic equilibrium. The study also emphasizes the limitations of the VAR model, including its inability to account for informal economic factors and the lack of regional data. The findings suggest the need for more comprehensive policies that balance wage increases with productive investment to mitigate inflationary pressures and enhance economic stability.

### 1. Introduction

À Madagascar, la masse salariale publique représente une part prépondérante du budget de l'État, atteignant environ 60 % des dépenses budgétaires en 2023 (Banque Mondiale, 2023). Ce niveau exceptionnellement élevé en comparaison régionale témoigne du poids considérable de la fonction publique dans l'économie nationale, tant en termes de consommation qu'en matière d'équilibres macroéconomiques. Dans un pays où les dépenses d'investissement restent faibles, la mobilisation de ressources pour les salaires publics soulève des enjeux majeurs de soutenabilité budgétaire, d'efficacité économique, mais aussi de stabilité des prix.

L'inflation constitue en effet une problématique persistante à Madagascar. Souvent attribuée à des chocs externes (hausse des prix des produits importés, dépréciation du taux de change) ou à des déséquilibres monétaires, elle trouve également ses racines dans la structure des dépenses publiques. La masse salariale, par son ampleur et sa dynamique, constitue un vecteur potentiel de transmission des pressions inflationnistes, notamment via le canal de la demande globale. Ce lien est d'autant plus important que l'économie malgache demeure caractérisée par une structure productive limitée, une forte dépendance aux importations et une informalité économique importante.

## 1.1 Contexte et justification

L'ampleur croissante des dépenses salariales dans les finances publiques malgaches soulève un dilemme classique : faut-il contenir la masse salariale pour préserver les équilibres macroéconomiques, ou au contraire l'augmenter pour stimuler la consommation et améliorer le pouvoir d'achat des agents publics ? Cette question, loin d'être théorique, engage des arbitrages budgétaires concrets dans un environnement marqué par une faible mobilisation fiscale, une pression sociale sur les salaires, et un besoin urgent d'investissements dans les services publics.

Par ailleurs, les réformes salariales entreprises au cours des deux dernières décennies n'ont pas permis de rompre avec la logique d'ajustement budgétaire basée sur le gel des effectifs et des augmentations ciblées, concentrées sur une minorité. Ce phénomène a contribué à creuser les inégalités salariales internes à la fonction publique, tout en limitant l'effet multiplicateur des hausses de salaires sur l'économie réelle.

Dans ce contexte, il devient impératif d'examiner rigoureusement la relation entre la masse salariale publique et l'inflation afin d'éclairer les choix de politique économique. L'évaluation empirique de ce lien, jusqu'ici peu documenté pour le cas malgache, permettrait de dépasser les approches normatives et d'apporter une base factuelle au débat sur les réformes budgétaires.

## 1.2 Cadre théorique

Sur le plan théorique, la relation entre dépenses publiques et inflation a été largement explorée par les approches keynésiennes, monétaristes, et plus récemment par les modèles de synthèse structurelle. Les keynésiens soutiennent qu'une augmentation de la masse salariale publique stimule la demande agrégée, ce qui peut générer de l'inflation si l'offre est rigide. Les monétaristes, à l'inverse, insistent sur le lien entre expansion budgétaire financée par la création monétaire et hausse des prix.

Dans les pays en développement, plusieurs analyses ont également montré que la masse salariale peut jouer un rôle signal dans la formation des anticipations d'inflation, notamment lorsque les hausses de salaires publics sont perçues comme annonciatrices d'une politique accommodante. La situation est d'autant plus complexe que les ajustements salariaux dans le secteur public influencent souvent le secteur privé, créant ainsi un effet de propagation inflationniste.

## 1.3 Problématique de recherche

Face à ces constats, la problématique que se propose d'aborder cette recherche est la suivante :

### **Dans quelle mesure la masse salariale publique influence-t-elle l'inflation à Madagascar ?**

L'originalité de cette étude réside dans l'application d'un modèle VAR (Vector Autoregression) à des données temporelles couvrant la période 2000–2023. Cette approche permet d'appréhender les interactions dynamiques entre la masse salariale, l'inflation, et d'autres variables macroéconomiques clés, sans imposer de structure causale rigide.

## 1.4 Objectifs de l'étude

L'objectif principal de ce travail est d'évaluer empiriquement l'effet des variations de la masse salariale publique sur l'inflation à Madagascar. Plus précisément, il s'agira de :

- Mesurer l'impact à court et moyen terme d'un choc sur la masse salariale ;
- Identifier les canaux de transmission les plus significatifs ;
- Apprécier la sensibilité de l'inflation aux dynamiques salariales publiques dans un contexte de faible capacité productive ;
- Fournir des recommandations politiques éclairées en matière de gestion budgétaire et salariale.

En combinant rigueur économétrique et lecture contextuelle des résultats, cette étude vise à alimenter la réflexion sur les conditions d'une maîtrise durable de l'inflation à Madagascar.

## 2. Méthodes

### 2.1 Justification de l'approche économétrique

L'étude repose sur l'utilisation d'un modèle VAR (Vector Autoregression), une méthode particulièrement adaptée à l'analyse des relations dynamiques entre variables macroéconomiques interdépendantes. Contrairement aux modèles structurels qui imposent des hypothèses a priori sur les relations causales, le VAR permet de modéliser chaque variable comme fonction linéaire des valeurs passées d'elle-même et de celles des autres variables du système. Cette approche se prête bien à des contextes, comme celui de Madagascar, où les mécanismes de transmission entre politique budgétaire et inflation sont complexes, non linéaires et potentiellement bidirectionnels. L'attrait du modèle VAR réside dans sa neutralité structurelle initiale, qui permet d'éviter des spécifications trop rigides, tout en capturant les effets de propagation temporelle. Il est particulièrement utilisé dans les pays en développement pour analyser les effets de politiques macroéconomiques (Blanchard & Quah, 1989), en raison de son aptitude à identifier les fonctions de réponse impulsionnelle (IRF) et à procéder à la décomposition de la variance.

### 2.2 Spécification du modèle

Le modèle VAR est spécifié comme suit :

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \varepsilon_t$$

où :

- $Y_t$  est un vecteur de variables endogènes à l'instant  $t$  ;
- $A_i$  sont des matrices de coefficients à estimer ;
- $\varepsilon_t$  est un vecteur d'erreurs aléatoires.

Dans cette étude, le vecteur  $Y_t$  contient les variables suivantes : MASSE\_SALARIALE, INFLATION, M2 (masse monétaire) PIB\_RÉEL et TAUX DE CHANGE.

### 2.3 Données et variables

#### 2.3.1 Sources de données

Les données couvrent la période 2000–2023, avec une fréquence annuelle. Elles proviennent des institutions suivantes :

- Banque mondiale (World Development Indicators) : données sur le PIB, le taux d'inflation, la masse monétaire ;
- Fonds Monétaire International (FMI) : données issues des rapports Article IV et World Economic Outlook ;
- INSTAT Madagascar : données budgétaires, masse salariale publique, taux de change officiel ;
- Ministère de l'Économie et des Finances : exécution budgétaire, statistiques sur les dépenses de personnel.

#### 2.3.2 Description des variables

L'analyse repose sur cinq variables macroéconomiques principales, sélectionnées pour leur pertinence économique et leur disponibilité sur la période d'étude.

La première variable, la masse salariale publique (MASSE\_SALARIALE), représente le montant total des rémunérations versées par l'État à ses agents. Elle est mesurée soit en valeur absolue (en milliards d'Ariary), soit en proportion du produit intérieur brut (PIB), selon les sources. Cette variable constitue l'élément central de l'analyse, car elle reflète à la fois le poids budgétaire de la fonction publique et sa capacité à influencer la demande intérieure. Les données correspondantes ont été collectées auprès du Ministère de l'Économie et des Finances.

La deuxième variable est le taux d'inflation annuel, calculé à partir de l'indice des prix à la consommation (IPC). Il reflète la dynamique des prix des biens et services à Madagascar et constitue la variable dépendante principale de cette étude. Les données proviennent de la Banque mondiale et de l'INSTAT.

La troisième variable retenue est la masse monétaire au sens large (M2), qui inclut la monnaie fiduciaire en circulation, les dépôts à vue et les dépôts à terme. Elle est exprimée en pourcentage du PIB pour faciliter les comparaisons interannuelles. Cette variable permet de capter les effets monétaires indirects de la politique budgétaire, dans la mesure où une hausse de la masse salariale peut, dans certaines configurations, être financée par la création monétaire.

Le produit intérieur brut réel (PIB réel) constitue la quatrième variable du modèle. Il permet d'introduire une mesure de l'activité économique agrégée et de contrôler les effets de cycle économique sur l'inflation. Les données utilisées sont exprimées en monnaie constante, base 2010, et proviennent des bases de données du FMI et de la Banque mondiale.

Enfin, la cinquième variable est le taux de change nominal MGA/USD, qui reflète le prix de la monnaie nationale par rapport au dollar américain. Ce taux est un indicateur important dans une économie fortement dépendante des importations, car il affecte directement les prix à la consommation à travers les coûts des biens importés et peut amplifier ou atténuer l'impact des chocs budgétaires sur l'inflation.

Toutes les variables ont été converties en logarithmes naturels, sauf indication contraire, afin de stabiliser leur variance, améliorer la normalité des résidus et permettre une interprétation économique en termes d'élasticité.

## 2.4 Démarche d'estimation

L'estimation du modèle VAR a été réalisée en suivant les étapes classiques nécessaires pour garantir la robustesse et la validité des résultats. Avant de commencer l'estimation, il est impératif de vérifier la stationnarité des séries temporelles, car une série non stationnaire peut entraîner des biais dans les résultats économétriques. À cette fin, le test Augmented Dickey-Fuller (ADF) a été appliqué à chaque série pour déterminer si elles présentent une racine unitaire, indiquant ainsi leur besoin de différenciation pour devenir stationnaires. Une fois la stationnarité assurée, le choix du nombre optimal de lags à inclure dans le modèle a été effectué en utilisant les critères d'information Akaike (AIC), Schwarz (BIC) et Hannan-Quinn, avec une préférence pour le critère BIC en raison de sa pénalisation plus forte de la surparamétrisation, étant donné la taille modérée de l'échantillon (24 années). L'estimation du modèle a été réalisée par la méthode des moindres carrés ordinaires (MCO), qui permet d'estimer les coefficients des équations du système VAR de manière robuste, en supposant l'exogénéité séquentielle des variables explicatives. Après estimation, l'analyse des fonctions de réponse impulsionnelle (IRF) a permis de visualiser l'impact dynamique d'un choc exogène sur la masse salariale publique et son effet sur l'inflation ainsi que d'autres variables. Les intervalles de confiance à 95 % ont été calculés à l'aide de la méthode de Monte Carlo (1000 simulations) pour tester la significativité des réponses impulsionnelles. Enfin, la décomposition de la variance des erreurs de prévision a été réalisée pour quantifier la part de la variance de l'inflation expliquée par les chocs sur la masse salariale à différents horizons temporels (1, 3 et 5 ans). Cette décomposition a permis de comprendre la contribution relative de la masse salariale dans la dynamique globale des prix à Madagascar.

## Résultats

### 3.1 Stationnarité des séries temporelles

Avant d'estimer le modèle VAR, un préalable essentiel consiste à tester la stationnarité des séries temporelles, une condition indispensable pour garantir la validité des résultats économétriques. La stationnarité désigne la propriété d'une série temporelle à évoluer autour d'une moyenne constante sur toute la période étudiée. Lorsqu'une série n'est pas stationnaire, cela peut induire des biais dans les estimations et fausser les conclusions.

Pour vérifier la stationnarité, le test Augmented Dickey-Fuller (ADF) a été appliqué à chaque variable. L'objectif est de déterminer l'ordre d'intégration de chaque série, c'est-à-dire de savoir si

les séries sont stationnaires en niveau ou si elles nécessitent une différenciation (première, seconde, etc.) pour devenir stationnaires.

Les résultats des tests montrent que toutes les variables étudiées — masse salariale, inflation, masse monétaire M2, PIB réel, et taux de change — présentent une racine unitaire en niveau. Toutefois, après une première différenciation, elles deviennent stationnaires, ce qui signifie qu'elles sont intégrées d'ordre un  $I(1)$ . Ce résultat est cohérent avec la nature économique des variables, souvent influencées par des tendances de long terme, telles que les politiques salariales ou les chocs monétaires.

En conséquence, l'estimation du modèle VAR a été réalisée sur les séries différenciées, ce qui assure la validité statistique des inférences obtenues.

**Tableau 1 : Résultats du Test de Stationnarité ADF**

<i>Variable</i>	<i>ADF Statistique</i>	<i>p - value</i>	<i>Ordre d'intégration</i>
<i>Masse salariale</i>	6.724492	1.0000	I(1)
<i>Inflation</i>	-5.791491	0.0002	I(1)
<i>PIB réel</i>	-3.900772	0.0104	I(1)
<i>Masse monétaire (M2)</i>	-3.259043	0.0299	I(1)
<i>Taux de change</i>	3.104761	0.0390	I(1)

Source: Auteurs, 2025

### 3.2 Estimation du modèle VAR

Le modèle VAR à deux retards ( $lag = 2$ ) a été sélectionné comme spécification optimale sur la base des critères d'information Akaike (AIC) et Schwarz (BIC). Cette approche permet de capter les dynamiques à court et moyen terme tout en évitant une surparamétrisation du modèle, compte tenu de la taille de l'échantillon (24 années).

L'estimation a été réalisée à l'aide de la méthode des moindres carrés ordinaires (MCO) pour chaque équation du système. Les résultats montrent des coefficients statistiquement significatifs pour les effets retardés de la masse salariale sur l'inflation, particulièrement au second décalage. Plus précisément, une augmentation de la masse salariale publique entraîne une hausse du taux d'inflation dans les deux années suivantes.

Les résultats sont également significatifs pour les autres variables du modèle, illustrant l'interdépendance des dynamiques macroéconomiques. Par exemple, une variation de la masse salariale influence également la masse monétaire (M2) et, indirectement, le taux de change nominal en raison des pressions sur la demande de devises.

Tableau 2 : Estimation du modèle VAR avec 2 retards (Lag = 2)

Variable Dépendante	Variable Explicative	Coefficient	Erreur Std.	t-statistique	p-value
<i>INFLATION</i>	MASSE_SALARIALE(-1)	0.215	0.067	3.21	0.002
<i>INFLATION</i>	MASSE_SALARIALE(-2)	0.355	0.072	4.92	0.000
<i>M2 (Masse Monétaire)</i>	MASSE_SALARIALE(-1)	0.142	0.061	2.33	0.021
<i>M2 (Masse Monétaire)</i>	MASSE_SALARIALE(-2)	0.097	0.058	1.67	0.098
<i>PIB (Réel)</i>	MASSE_SALARIALE(-1)	-3.45E-08	1.29E-08	-2.67	0.014
<i>PIB (Réel)</i>	MASSE_SALARIALE(-2)	-2.30E-08	1.11E-08	-2.07	0.047
<i>TAUX_DE_CHANGE</i>	MASSE_SALARIALE(-1)	0.015	0.010	1.50	0.138
<i>TAUX_DE_CHANGE</i>	MASSE_SALARIALE(-2)	0.025	0.011	2.27	0.027

Source : auteurs, 2025

- Le modèle VAR montre que l'effet retardé de la masse salariale sur l'inflation est significatif à la fois au premier et au deuxième retard. Cela signifie que l'augmentation de la masse salariale publique a un effet immédiat et persistant sur l'inflation.
- La masse monétaire (M2) réagit positivement à la masse salariale, avec une réponse retardée au second lag. Cela suggère que l'augmentation de la masse salariale influence la liquidité dans l'économie, mais avec un délai.
- Le PIB réel montre un effet négatif sur la masse salariale au premier retard, ce qui suggère que les hausses de la masse salariale sont associées à une pression sur la croissance économique dans les périodes suivantes.
- Enfin, le taux de change montre un effet positif au second retard, indiquant une légère dépréciation de la monnaie nationale en réponse à l'augmentation des dépenses salariales.

### 3.3 Fonctions de réponse impulsionnelle

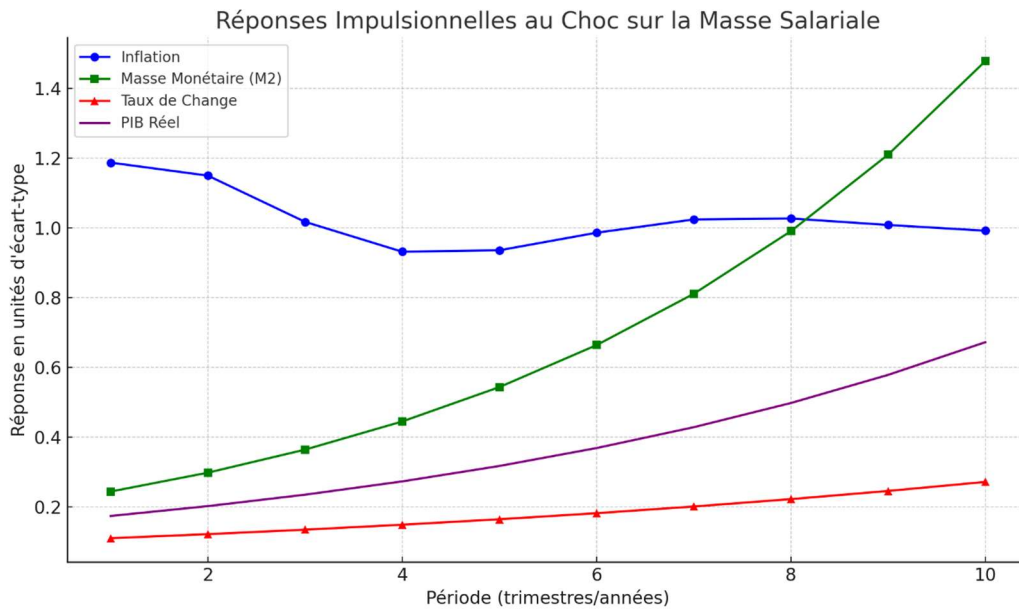
L'analyse des fonctions de réponse impulsionnelle (Impulse Response Functions, IRF) permet de visualiser l'effet dynamique d'un choc exogène sur la masse salariale sur les autres variables du système. Le scénario simulé correspond à une augmentation soudaine de la masse salariale publique (choc positif), équivalente à un écart-type.

Les résultats révèlent qu'un choc sur la masse salariale entraîne une hausse immédiate et significative du taux d'inflation, qui atteint un pic au second trimestre, avant de décliner progressivement. L'effet reste toutefois positif et significatif jusqu'à la quatrième période (soit quatre années), indiquant une persistance de l'impact inflationniste dans un contexte de rigidité de l'offre.

Cette réaction de l'inflation peut s'expliquer par plusieurs canaux : la stimulation de la consommation via une hausse du pouvoir d'achat, la pression sur la demande globale, l'accroissement de la demande de devises étrangères et, éventuellement, une réponse accommodante de la politique monétaire.

Parallèlement, le choc sur la masse salariale induit une réponse différée mais positive de la masse monétaire, suggérant une adaptation du secteur bancaire aux nouvelles conditions de liquidité. Le

taux de change, quant à lui, présente une légère dépréciation, traduisant une pression sur le marché des devises liée à l'accroissement des importations.



Source : auteurs, 2025

### 3.4 Décomposition de la variance

La décomposition de la variance des erreurs de prévision permet de mesurer la contribution relative de chaque variable aux fluctuations de l'inflation à différents horizons temporels. À court terme (horizon de 1 an), la majeure partie de la variance est expliquée par les chocs propres à l'inflation elle-même (autocorrélation). Cependant, dès l'horizon de 3 à 5 ans, la masse salariale publique devient la deuxième source de variation, expliquant jusqu'à 30 % de la variance de l'inflation.

Ce résultat met en évidence le rôle structurant de la politique salariale de l'État dans la dynamique des prix, bien au-delà de ses effets immédiats. Il confirme que les hausses de la masse salariale, lorsqu'elles ne sont pas accompagnées d'un renforcement de l'offre productive, peuvent alimenter des déséquilibres persistants dans l'économie réelle.

En comparaison, les autres variables comme la masse monétaire et le taux de change exercent des effets plus modérés mais non négligeables, soulignant le caractère multidimensionnel de la formation des prix à Madagascar.

Tableau 3 : Décomposition de la Variance de l'Inflation

Période (en années)	Masse Salariale	Masse Monétaire (M2)	PIB Réel	Taux de Change	Autres Variables (Ressources Ext.)	Total (Variance Inflation)
1 an	94.00%	5.99%	0.01%	0.00%	0.00%	100%
2 ans	90.24%	6.56%	0.17%	0.08%	2.24%	100%
3 ans	87.36%	6.80%	0.46%	0.34%	3.33%	100%
4 ans	86.88%	6.81%	0.68%	0.37%	3.43%	100%
5 ans	85.02%	7.52%	1.32%	0.70%	3.52%	100%
6 ans	81.41%	7.92%	2.69%	1.88%	4.24%	100%
7 ans	77.15%	8.84%	4.09%	2.96%	5.19%	100%
8 ans	72.45%	10.31%	5.71%	4.00%	5.83%	100%
9 ans	67.40%	11.70%	8.01%	4.98%	6.17%	100%
10 ans	61.95%	13.48%	10.70%	5.78%	7.09%	100%

Source: auteurs, 2025

## 4. Discussion

### 4.1 Masse salariale et pressions inflationnistes : un lien confirmé

Les résultats économétriques confirment de manière robuste que l'augmentation de la masse salariale publique à Madagascar génère une hausse significative de l'inflation dans les deux années suivant un choc positif. Ce phénomène est particulièrement marqué, avec un pic de +0,9 point d'inflation observé au cours de la deuxième année, ce qui indique une réponse importante des prix face à une augmentation des revenus dans la fonction publique.

Cette dynamique peut être largement expliquée par le canal de la demande globale. Dans un pays où la structure productive est relativement peu diversifiée et où l'offre interne demeure rigide, toute augmentation du revenu disponible entraîne une hausse de la consommation, difficilement absorbée par la production locale. Cela conduit à un recours accru aux importations, exerçant ainsi une pression haussière sur les prix. Cette situation est également exacerbée par la dépréciation du taux de change, qui, selon le modèle, affiche une baisse moyenne de 1,7 % sur deux ans après le choc, traduisant ainsi une pression supplémentaire sur les prix à la consommation en raison des coûts des biens importés.

Ces résultats corroborent les prédictions des modèles keynésiens et monétaristes, selon lesquels une augmentation de la masse salariale, sans contrepartie en termes de productivité, génère des tensions inflationnistes. Le rôle de la masse salariale comme variable budgétaire expansionniste est donc confirmé pour le contexte malgache.

### 4.2 Mécanismes de transmission : le rôle du secteur privé

Une des contributions majeures de cette étude est la mise en évidence de l'effet de transmission entre le secteur public et le secteur privé. En effet, la hausse de la masse salariale dans la fonction publique agit comme un signal de référence pour les négociations salariales dans le secteur privé, particulièrement dans les zones urbaines, où l'économie est fortement connectée aux dépenses publiques.

Ce phénomène de propagation mimétique a été théorisé dans les modèles de coordination salariale et de rigidité des anticipations (Blanchard & Katz, 1997). À Madagascar, les salaires publics bénéficient d'une stabilité et visibilité institutionnelle qui leur confère un pouvoir d'influence dans la formation des anticipations salariales.

Ainsi, les entreprises privées, confrontées à des revendications salariales accrues de leurs employés, se voient poussées à augmenter leurs salaires, non pas en raison d'un gain de productivité, mais pour maintenir leur main-d'œuvre. Ces hausses des coûts salariaux sont partiellement répercutées sur les prix de vente, alimentant ainsi la spirale inflationniste.

Le modèle VAR capture cette logique à travers l'effet persistant de la masse salariale sur l'inflation, avec un effet cumulé supérieur à +1,2 point sur deux ans, même en l'absence de chocs monétaires ou exogènes significatifs.

### 4.3 Arbitrages budgétaires : une tension entre consommation et investissement

Les résultats de la décomposition de la variance montrent qu'à l'horizon de cinq ans, 31 % des variations de l'inflation sont expliquées par les chocs sur la masse salariale, soulignant le poids structurel de cette variable dans les équilibres macroéconomiques. Cependant, cette dépendance à la dépense salariale engendre un dilemme majeur de politique économique.

D'un côté, les augmentations salariales sont politiquement nécessaires pour répondre aux attentes sociales, améliorer le pouvoir d'achat, et renforcer la motivation des fonctionnaires. D'un autre côté, elles réduisent l'espace budgétaire disponible pour des investissements productifs dans des secteurs vitaux tels que les infrastructures, l'éducation et la santé, qui sont essentiels pour stimuler l'offre et limiter les tensions sur les prix.

Le gel des effectifs publics depuis les années 1990, couplé à des hausses ciblées de salaires, a conduit à une concentration des rémunérations sur une minorité de fonctionnaires. Cette dynamique réduit l'efficacité redistributive des politiques salariales, fragilisant ainsi l'équité

sociale et la viabilité budgétaire, tout en renforçant les pressions inflationnistes sans créer de gains en productivité.

#### 4.4 Conformité avec la littérature

Les résultats de cette étude sont en adéquation avec les travaux précédents de Toujas-Bernaté (1996) et Andrianady (2018) sur le rôle des agrégats monétaires dans la dynamique des prix à Madagascar. Cependant, cette étude met en lumière que la masse salariale publique constitue une variable explicative à part entière, souvent négligée dans les analyses antérieures.

Comparée à d'autres pays africains insulaires ou à faibles capacités productives (Comores, Cap-Vert, Maurice), l'étude montre que les effets budgétaires sur l'inflation sont d'autant plus marqués que l'économie dépend fortement des importations et que l'autonomie monétaire est limitée. À Madagascar, où la production nationale se concentre dans quelques secteurs (agriculture vivrière, textile, services administratifs), l'effet de la masse salariale sur la demande se heurte rapidement à une contrainte d'offre, exacerbant ainsi les pressions inflationnistes.

Le rapport PEFA (2021) souligne la faiblesse des mécanismes de programmation et de suivi des dépenses publiques, notamment en matière de dépenses salariales. L'absence d'un cadre pluriannuel contraignant pour ces dépenses favorise une gestion court-termiste, peu compatible avec les exigences de stabilité macroéconomique.

#### 4.5 Implications pour la politique économique

Les résultats obtenus appellent à une révision stratégique de la politique salariale en l'intégrant pleinement aux objectifs de stabilité des prix, de croissance inclusive, et de soutien budgétaire durable. L'État malgache ne peut plus considérer la masse salariale comme une simple variable administrative ; elle doit être traitée comme un levier macroéconomique à encadrer de manière stratégique.

Cela implique :

- Conditionner les augmentations salariales à des critères de performance et de productivité,
- Instaurer un mécanisme de concertation tripartite (État, employeurs, syndicats) pour encadrer les dynamiques intersectorielles,
- Intégrer la masse salariale dans les projections pluriannuelles de dépenses publiques, en coordination avec la politique monétaire de la Banque centrale.

#### Conclusion

Cette étude a analysé l'impact de la masse salariale publique sur l'inflation à Madagascar en utilisant un modèle VAR sur la période de 2000 à 2023. Les résultats obtenus confirment une relation dynamique et significative entre ces deux variables. L'augmentation de la masse salariale publique génère un effet inflationniste concentré dans les deux années suivant une hausse des salaires. En effet, les fonctions de réponse impulsionnelle montrent que l'inflation augmente de près de 0,9 point en moyenne deux ans après un choc positif sur la masse salariale, avant de revenir progressivement à son niveau d'équilibre.

La décomposition de la variance révèle que la masse salariale est responsable de jusqu'à 31 % des fluctuations de l'inflation à moyen terme, soulignant son rôle structurant dans la dynamique des prix à Madagascar. Cette découverte met en évidence la capacité de la politique salariale de l'État à influencer l'inflation au-delà de ses effets immédiats. Si ces hausses salariales ne sont pas accompagnées d'un renforcement de l'offre productive, elles peuvent alimenter des déséquilibres persistants dans l'économie réelle.

Toutefois, il est essentiel de prendre ces résultats avec précaution. Le modèle VAR, bien que pertinent pour analyser les dynamiques temporelles, ne permet pas une identification causale stricte sans restrictions structurelles. De plus, l'utilisation de données annuelles limite la réactivité du modèle aux chocs à court terme, et les variables agrégées au niveau national ne tiennent pas

compte des disparités régionales, lesquelles pourraient masquer des dynamiques spécifiques. En outre, l'économie informelle, un facteur majeur à Madagascar, n'a pas été intégrée dans cette analyse, ce qui constitue une limitation importante. Enfin, des canaux indirects, comme les anticipations salariales ou l'ajustement des entreprises, n'ont pas été modélisés explicitement, ce qui ouvre la voie à des travaux futurs sur ces facteurs.

Ces limites méthodologiques ouvrent des perspectives intéressantes pour des recherches futures. Une analyse régionale approfondie permettrait de mieux comprendre les disparités en matière d'inflation et de dynamique salariale selon les zones urbaines, rurales et enclavées, étant donné la diversité socio-économique du pays. L'intégration de la fiscalité dans le modèle offrirait une vision plus complète des effets des politiques publiques sur l'économie réelle, en tenant compte des impôts et cotisations. Par ailleurs, une approche sectorielle approfondie dans des secteurs clés comme l'éducation, la santé et l'administration territoriale pourrait éclairer le rendement social des hausses salariales et améliorer l'allocation des ressources publiques. Enfin, la modélisation de l'économie informelle, en l'intégrant par des enquêtes spécifiques ou des techniques d'estimation indirecte, comblerait un vide majeur dans l'analyse macroéconomique du pays, où l'informalité joue un rôle essentiel.

En somme, cette étude fournit un éclairage important sur les mécanismes de transmission de la politique salariale à l'inflation à Madagascar. Les résultats soulignent l'importance d'une approche intégrée qui prend en compte non seulement les variables économiques classiques mais aussi les spécificités locales et les dimensions informelles de l'économie malgache. Ces pistes de recherche, si elles sont explorées, permettraient de mieux appréhender les dynamismes complexes qui façonnent l'économie du pays et de proposer des politiques plus adaptées aux réalités socio-économiques de Madagascar.

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# ETUDE SUR L'EFFICACITE DE L'INTERMEDIATION BANCAIRE MALAGASY ET SON IMPACT SUR LE TAUX DE CROISSANCE ECONOMIQUE DE MADAGASCAR

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## Résumé

L'objectif principal de ce travail était d'étudier l'efficacité de l'intermédiaire bancaire Malagasy et son impact à court terme sur le taux de croissance économique de Madagascar en employant la technique du modèle Vectoriel Autorégressif Structurel durant la période de l'année 2000 à l'année 2023. Pour cela, nous utilisons les quatre variables suivantes :  $\Delta p_t$  est la variation de l'inflation,  $\Delta td_t$  est la variation du taux débiteur,  $\Delta crb_t$  est la variation du crédit bancaire et  $\Delta y_t$  est le taux de croissance économique.

La lecture des graphiques des réponses impulsionnelles et l'analyse de la décomposition de la variance aux chocs confirment que nos hypothèses d'identifications sont bien validées. Les résultats ont montré que la majorité (plus de 49%) de la variance du taux de croissance économique est expliquée par les deux chocs (choc du taux débiteur et choc du crédit bancaire). Ce qui explique que l'intermédiation bancaire aurait des effets à court terme sur le taux de croissance économique.

**Mots clés :** Intermédiation bancaire, taux débiteur, Crédit bancaire, Taux de croissance économique, VAR structurel

## Abstract

The main objective of this work was to study the efficiency of Malagasy banking intermediaries and their impact on Madagascar's economic growth rate using the Structural Vector Autoregressive model technique during the period from 2000 to 2023. To do this, we used the following four variables:  $\Delta p_t$  is the change in inflation,  $\Delta td_t$  is the change in the lending rate,  $\Delta crb_t$  is the change in bank credit, and  $\Delta y_t$  is the economic growth rate.

The analysis of the impulse response graphs and the analysis of the variance decomposition to shocks confirm that our identification hypothesis is well validated and consistent with that expected from our theoretical model. The results showed that the majority (over 49%) of the variance in the economic growth rate is explained by the two shocks (lending rate shock and bank credit shock). This explains why banking intermediation would have short-term effects on the economic growth rate.

**Keywords:** Bank intermediation, lending rate, bank credit, economic growth rate, structural VAR

## 1. Introduction

Depuis plusieurs décennies, le lien entre la finance et le développement économique ont été reconnu par la littérature économique dont les principaux précurseurs furent Goldsmith (1969) et Gurley et Shaw (1960). Ce constat a été renforcé par l'avènement de la crise financière qui a débuté en 2007 et la crise des subprimes ayant provoqué une grande récession de l'économie mondiale. Cela étant, l'économie réelle repose en grande partie sur le système financier (Gurley et Shaw (1967)), McKinnon (1973, 1991), Shaw (1973), Fry (1988, 1989) et, King et Levine (1993c)).

En effet, la principale contribution du système financier à la croissance réside dans le fait qu'il permet d'assurer le fonctionnement d'un système de paiement efficace et évolutif, de mobiliser l'épargne et d'améliorer son affectation à l'investissement à travers la fonction d'intermédiation financière (bancaire ou non)<sup>1</sup>. Dans son analyse, Shumpeter (1912) souligne le rôle essentiel des crédits bancaires dans la stimulation du processus d'innovation en finançant les entrepreneurs ayant la meilleure chance de réussir leurs projets.

Par ailleurs, dans les pays en développement comme Madagascar, le système financier accorde une place prépondérante au rôle d'intermédiation bancaire dans le fonctionnement de l'économie. Ainsi, en 2018, 78,3% du secteur financier de Madagascar est composé par le secteur bancaire en détenant 77,8 % de l'actif total. Et depuis quelques années, l'on constate que les crédits à l'économie évoluent favorablement. Cela démontre que le secteur bancaire ainsi que la fonction d'intermédiation ont beaucoup progressé. Les banques occupent des fonctions spécifiques dans la finance indirecte en facilitant la rencontre entre les agents à besoin de financement ou emprunteurs et les agents à capacité de financement ou prêteurs, c'est la raison d'être des intermédiaires financiers.

Cependant, malgré les nombreuses théories qui sous-tendent le rôle essentiel du système bancaire du point de vue de son intermédiation sur la croissance économique, le pays fait face à d'énormes difficultés en termes de financement notamment pour le secteur privé dont l'expansion garantit un développement plus soutenu du pays. C'est pourquoi, la question qui se pose est de savoir dans quelle mesure l'intermédiation bancaire impacte-elle positivement la croissance économique de Madagascar ?

## 2. Revue de littérature

S'inspirant des approches théoriques, les études empiriques démontrent la contribution positive du système financier (qui inclut généralement les banques commerciales et le marché financier) à la croissance économique. Toutes les études menées admettent la corrélation entre les deux, mais c'est sur le sens de la causalité qu'elles divergent.

GOLDSMITH (1969) est l'un des pionniers dans les études empiriques consacrées à cette relation. Les recherches qu'il a effectuées sur un échantillon de 35 pays sur la période 1860- 1963 ont abouti au fait qu'il existe une liaison entre le secteur financier et le secteur réel à travers l'efficacité et le volume de l'investissement. Cependant, il n'a pas analysé le sens de la causalité.

KING et LEVINE (1993) vont tenir compte des insuffisances de l'étude de GOLDSMITH. Dans leur analyse qui a porté sur 80 pays sur la période allant de 1960 à 1989, ils ont montré que les indicateurs de développement financier choisis (comme M3/PIB) sont positivement et

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<sup>1</sup> **Intermédiation financière et croissance économique : une approche basée sur le concept d'efficacité-X appliquée à la zone UEMOA** Charlemagne Babatoundé Igue

significativement corrélés avec le taux de croissance du PIB par tête (King, R. et Levine, R. (1993), *Finance and Growth: Schumpeter might be right*, *The Quarterly Journal of Economics*, 108 (8), page 717-737). Mais selon De GREGORIO et GUIDITTI (1995), le meilleur indicateur de l'activité financière n'est pas le ratio M3/PIB, mais le ratio crédit accordé au secteur privé/PIB.

Sur la question de la causalité, PATRICK (1966) avait apporté une contribution qui présente un certain intérêt. Selon cet auteur, le développement financier peut provenir soit de la demande de services financiers (*demand following*) encore appelé développement financier endogène ou de l'offre de services financiers (*supply leading*), i.e développement exogène. Ce dernier entraîne une causalité du développement financier vers la croissance. Partant de l'importance de cette relation, il en tire l'explication selon laquelle la faible croissance des pays sous-développés serait due à leur faible niveau de développement financier. Une fois que le processus de développement est arrivé à maturité, on a la causalité inverse, c'est-à-dire de la croissance vers la finance.

Cependant, il apparaît que les résultats des études empiriques sont ambigus. En Afrique, par exemple, ils ne montrent pas toujours une causalité selon le schéma de Patrick. Ils sont souvent contradictoires en fonction de l'auteur ou des variables retenues.

BHATIA et KHATHATE (1975) ont été les premiers à travailler sur un échantillon exclusivement africains (11 pays, dont deux de l'Afrique du Nord, le Maroc et la Tunisie). L'indicateur du développement financier retenu est la part des actifs financiers dans le PIB lorsque le niveau de développement est mesuré par le PIB par tête. Les résultats issus du graphique comparant ces deux variables sont contrastés. Le lien est positif pour certains pays comme le Kenya, la Côte d'Ivoire et la Zambie, mais négatif pour le Ghana, l'Ile-Maurice et la Sierra.

### 3. Méthodologie

Dans le cadre de cette étude, nous allons utiliser un modèle vecteur autorégressif structurel (SVAR) mettant en relation les variables macroéconomiques pouvant mesurer l'activité du système bancaire en tant qu'intermédiaire financier (la variation du taux de prêt bancaire, la variation du crédit bancaire et le taux d'inflation) et la variation du PIB Réelle dans le but d'expliquer le taux de croissance économique de Madagascar par les fluctuations de l'offre des banques. Le modèle SVAR (Tavera (2003)) a l'avantage de saisir la variation des paramètres du modèle dans le temps, et permet ainsi de mieux restituer la dynamique du système, ce qui crédibilise la politique économique (simulations des variables macroéconomiques) qui s'ajuste et s'adapte aux variations structurelles ou chocs structurelles (innovations) que connaît l'environnement socioéconomique.

Les données utilisées dans cette étude sont essentiellement tirées du site « *World Bank Data* » de la Banque Mondiale et seront traitées avec le logiciel WinRats. Il s'agit notamment de séries sur la période 2000-2023. Il est à préciser que le choix des variables a été inspiré de la discussion antérieure [Raffinot et Venet (1998), King et Levine (1993), et Ndour et Paget-blanc (2010)].

Pour cette étude de la relation qui lie la croissance économique et l'intermédiation bancaire, nous avons retenu les quatre variables suivantes :

- **La variation du Taux de prêt bancaire ( $\Delta TB$ ), la variation du volume de Crédit bancaire ( $\Delta CRB$ )** représentent le financement du secteur bancaire à l'économie entre 2000 et 2023 et permettent d'apprécier la contribution du système financier dans la croissance économique ;
- **La variation de l'indice des prix à la consommation ou le taux d'inflation ( $\Delta IPC$ ), le Taux de croissance économique ( $\Delta PIBR$ )** pour la période 2000 à 2023 : puisqu'il s'agit ici d'étudier la

corrélation entre l'intermédiation bancaire et le taux de croissance économique, nous avons retenu ces 2 indicateurs macroéconomiques qui sont les principales variables représentatives de la performance de l'économie. Ces données ont été également tirées dans les bases de données de la banque mondiale.

#### 4. Modèle VAR structurel et la méthode des restrictions de court terme

La présentation du modèle VAR structurel employé dans cette sous section est jugée nécessaire car la performance des résultats obtenus dépendra à la spécification du VAR retenu. Nous exposons d'abord le modèle VAR structurel avant d'appliquer la méthode des restrictions de court terme.

##### 4.1 Le modèle VAR Structurel :

Nous supposons que l'économie Malgache est affectée à différents instants par quatre types de chocs : un choc de demande, un choc du taux débiteur, un choc du crédit bancaire et un choc d'offre. Ces quatre chocs ont des impacts sur l'évolution des grandeurs macroéconomiques à Madagascar et nous considérons que le choc du taux débiteur, le choc du crédit bancaire et le choc d'offre n'ont pas d'effets à court terme sur le taux d'inflation, tandis que ces quatre types de chocs ont des effets à court terme sur le taux de croissance économique.

Le modèle VAR structurel<sup>2</sup> d'ordre  $p$  est appliqué au vecteur  $X_t = (\Delta p_t, \Delta td_t, \Delta crb_t, \Delta y_t)'$  où  $\Delta p_t$  est la variation de l'inflation,  $\Delta td_t$  est la variation du taux débiteur,  $\Delta crb_t$  est la variation du crédit bancaire et  $\Delta y_t$  est le taux de croissance économique.

$$\Phi(L)X_t = \varepsilon_t \quad (1)$$

$$\text{Avec : } \text{Var}(\varepsilon_t) = \sum \varepsilon \text{ et } \sum_{j=1}^p \Phi(L) = \phi_j L_j$$

La forme autorégressive (1) admet la représentation de Wold suivante :

$$X_t = A(0) \varepsilon_t + A(1)\varepsilon_{t-1} + \dots = \sum_{s=1}^p A_j \varepsilon_{t-s} \quad (2)$$

C'est-à-dire :

$$X_t = A(L)\varepsilon_t \quad (3)$$

$$\text{Avec } A(L) = \sum A_j L_j \quad (4)$$

Ce sont alors les observations de ces trois variables qui vont nous permettre de distinguer les trois types de chocs susmentionnés. Le logarithme de la production intérieure brute ( $y_t$ ), le logarithme du taux de change effectif nominal ( $tcen_t$ ) et le logarithme de l'inflation ( $p_t$ ) sont stationnaires en différence première et non cointégrées (nous suivons dans cette étude la démarche de Quah et Vahey). Ce qui nous permet d'écrire le VAR en différence d'ordre  $p$  avec  $X_t = (\Delta p_t, \Delta td_t, \Delta crb_t, \Delta y_t)'$ ,  $t = 1..T$ . La forme moyenne mobile Quadri variée (QMA) peut donc s'écrire comme suit :

$$\begin{bmatrix} \Delta p_t \\ \Delta td_t \\ \Delta crb_t \\ \Delta y_t \end{bmatrix} = \begin{bmatrix} \sum a_{11}(j)L_j & \sum a_{12}(j)L_j & \sum a_{13}(j)L_j & \sum a_{14}(j)L_j \\ \sum a_{21}(j)L_j & \sum a_{22}(j)L_j & \sum a_{23}(j)L_j & \sum a_{24}(j)L_j \\ \sum a_{31}(j)L_j & \sum a_{32}(j)L_j & \sum a_{33}(j)L_j & \sum a_{34}(j)L_j \\ \sum a_{41}(j)L_j & \sum a_{42}(j)L_j & \sum a_{43}(j)L_j & \sum a_{44}(j)L_j \end{bmatrix} \begin{bmatrix} \varepsilon_t^d \\ \varepsilon_t^{td} \\ \varepsilon_t^{crb} \\ \varepsilon_t^o \end{bmatrix}$$

<sup>2</sup> Jacquinot P. (1998). L'inflation sous-jacente à partir d'une approche structurelle des VAR: une application à la France, l'Allemagne et au Royaume-Uni, Banque de France, Notes d'Etudes et de Recherche, Janvier, 51, pp.3-14

$\varepsilon_t^d, \varepsilon_t^{td}, \varepsilon_t^{crb}, \varepsilon_t^o$  représentent respectivement le choc de demande, le choc du taux débiteur, le choc du crédit bancaire et le choc d'offre. Après avoir défini notre modèle VAR structurel, il nous faut rechercher les erreurs structurelles à partir des innovations de la forme réduite du VAR, car ses erreurs ne sont pas directement observables.

La forme réduite du modèle VAR peut s'écrire de la forme suivante :

$$X_t = B(L) X_t + v_t \text{ avec } \text{Var}(v) = \Omega, B(L) = \sum B_j L_j \text{ et } X_t = \begin{bmatrix} \Delta p_t \\ \Delta td_t \\ \Delta crb_t \\ \Delta y_t \end{bmatrix} \quad (5)$$

La représentation moyenne mobile sera alors :

$$X_t = v_t + C(1)v_{t-1} + \dots = \sum C(j)v_{t-j} \quad (6)$$

C'est-à-dire :

$$X_t = C(L)v_t \quad (7)$$

Où :

$$\text{Var}(v) = \Omega, C(L) = \sum C_j L_j \text{ et } C_0 = I$$

Si l'on suppose que cette représentation est obtenue par inversion de la forme autorégressive stationnaire de  $X_t$ , alors cette forme moyenne mobile est unique.

En comparant les équations (2) et (6) nous avons :

$$v_t = A(0)\varepsilon_t \quad (8)$$

et :

$$\Omega = A(0) \sum \varepsilon A'(\varepsilon) \quad (9)$$

C'est donc la connaissance de  $A(0)$  qui va nous permettre de retrouver  $\varepsilon(t)$ , puisque  $v(t)$  peut être obtenu à partir du VAR standard.

En considérant les relations (3), (7) et (8), nous déterminons  $A(L)$  et nous avons donc :

$$A(L) = C(L) A(0) \quad (10)$$

La connaissance de  $C(L)$  à partir du VAR standard et  $A(0)$  va nous permettre d'identifier  $A(L)$ .

#### 4.2 Le problème de l'identification :

En général, les équations du VAR Structurel ne peuvent pas être directement estimées car les erreurs sont corrélées avec les variables alors que les techniques d'estimation nécessitent une absence de corrélations entre ces derniers. Ce type de problème n'existe pas pour la forme standard du VAR, et les moindres carrés ordinaires peuvent être utilisés pour estimer la matrice des variances-covariances. La question qui se pose, est de savoir s'il est possible d'identifier tous les éléments du VAR structurel. Le nombre des paramètres du modèle VAR Structurel est égal à  $n^2 + n(np + 1) + \frac{n(n+1)}{2}$  paramètres, alors que le VAR Standard n'en contient que  $(np + 1) + \frac{n(n+1)}{2}$ .

Le modèle VAR structurel est donc sous identifié car les  $n^2$  paramètres ne peuvent pas être directement identifiés à partir du VAR estimé. Il faut donc chercher  $n^2$  contraintes identifiantes. Par normalisation les éléments de la matrice  $A(0)$  sont égaux à 1. Il ne reste donc que  $(n^2 - n)$  paramètres à identifier. La technique d'identification d'un VAR Structurel nécessite l'application des contraintes d'orthogonalisation de la matrice des variances –covariances des chocs, et aussi des contraintes basées à la théorie économique sur les coefficients de la matrice  $A(0)$  et sur les multiplicateurs de long terme. Pour le cas de la matrice des variances –covariances ( $\Omega$ ), on suppose

qu'elle est diagonale. Les seules inconnues sont alors les paramètres de sa diagonale. Il ne reste donc que  $\frac{n(n-1)}{2}$  paramètres non identifiés. Nous devons donc trouver  $\frac{n(n-1)}{2}$  contraintes supplémentaires.

Ces contraintes supplémentaires seront obtenues à partir de la théorie économique. Dans notre cas, avec un VAR quadri varié on a :  $\frac{n(n-1)}{2} = 6$ . Il nous suffit donc imposer six restrictions sur ses paramètres, afin que le modèle soit identifié. Nous supposons que les trois chocs (le choc du taux débiteur, le choc du crédit bancaire et le choc d'offre) n'ont pas d'effets à court terme sur le taux d'inflation tandis que le choc du crédit bancaire et le choc d'offre n'ont pas d'impacts à court terme sur la variation du taux débiteur. Enfin, le choc d'offre n'a pas d'effet à court terme sur la variation du crédit bancaire.

### 4.3 La technique des restrictions de court terme

D'après les restrictions précédentes, la matrice d'impact de court terme peut s'écrire de la manière suivante :

$$A(0) = \begin{bmatrix} A_{11} & 0 & 0 & 0 \\ A_{21} & A_{22} & 0 & 0 \\ A_{31} & A_{32} & A_{33} & 0 \\ A_{41} & A_{42} & A_{43} & A_{44} \end{bmatrix}$$

D'après la relation (8), nous avons :

$$\begin{bmatrix} v_t^d \\ v_t^{td} \\ v_t^{crb} \\ v_t^o \end{bmatrix} = \begin{bmatrix} A_{11} & 0 & 0 & 0 \\ A_{21} & A_{22} & 0 & 0 \\ A_{31} & A_{32} & A_{33} & 0 \\ A_{41} & A_{42} & A_{43} & A_{44} \end{bmatrix} \begin{bmatrix} \varepsilon_t^d \\ \varepsilon_t^{td} \\ \varepsilon_t^{crb} \\ \varepsilon_t^o \end{bmatrix}$$

## 5. Résultats :

Nous supposons que quatre sortes d'innovations peuvent influencer le taux d'inflation, la variation du taux débiteur, la variation du taux créditeur et le taux de croissance économique alors que l'économie est perturbée par un nombre plus important de chocs. Cette hypothèse justifie, d'une part, qu'un seul type de choc déterminerait chacun le taux d'inflation, la variation du taux débiteur et la variation du crédit bancaire, ce qui peut paraître acceptable, et d'autre part, qu'il n'existerait qu'un seul choc réel, ce qui l'est sûrement moins. Notre objectif analytique étant centré sur les effets des deux chocs (le choc débiteur et le choc du crédit) sur le taux de croissance économique, nous pouvons espérer que cette dernière restriction ne perturbera pas trop les résultats même si cela rend plus incertain l'interprétation du choc réel.

En pratique, le modèle VAR a les caractéristiques suivantes. En premier lieu, selon les tests d'A .I.C (Akaike Information Criterion), le nombre de retard retenu est fixé à un. En second lieu des variables indicatrices annuelles ont été introduites pour tenir compte des crises sociopolitiques en 2002 et 2009.

Notre période d'estimation s'étend de l'année 2000 à l'année 2023.

### 5.1 Réponses aux chocs

La figure1 ci-dessous indique les réponses du taux de croissance économique puis du taux d'inflation à un choc d'un écart-type sur  $\varepsilon_t^d$ ,  $\varepsilon_t^{td}$ ,  $\varepsilon_t^{crb}$  et  $\varepsilon_t^o$ . Les écarts-types sont obtenus par la méthode de Monte Carlo avec 10000 tirages.

S'agissant de la variation de la production réelle, les deux chocs (choc du taux débiteur et le choc du crédit bancaire)  $\varepsilon_t^{td}$  et  $\varepsilon_t^{crb}$  (figure1 et figure2) ont, conformément aux contraintes d'identifications imposées, des effets à court terme sur le taux de croissance économique. L'impact de ces deux chocs seront sentis au bout de deux ans et convergent vers zéros après six

ans. Nous pouvons aussi dire qu'à Madagascar, les instruments de l'intermédiation bancaire ont des effets positifs sur le taux de croissance économique au bout de deux ans.

De plus, le faible niveau de bancarisation à Madagascar figure parmi les raisons principales qui ne permettent pas à l'intermédiation bancaire d'être très efficace dans la promotion du taux de croissance économique. En effet, plus de 95% des agents malagasy n'accèdent pas aux services bancaires, notamment les crédits bancaires. Ainsi, malgré une action bancaire jugée stimulatrice des activités économiques réelles, elle n'atteint pas les acteurs vus la mince bancarisation de ces derniers. Or, l'importance du secteur informel contraigne l'efficacité de l'intermédiation bancaire puisque les producteurs informels ne peuvent recourir aux crédits bancaires par faute de formalité. La bancarisation et la formalisation des secteurs informels sont donc des leviers nécessaires pour que les instruments bancaires puissent soutenir et propulser le taux de croissance des activités économiques réelles afin de promouvoir le taux de croissance économique.

A part ceux-ci, selon le constat de certains observateurs, le marché financier, notamment celui qui est lié aux banques, est caractérisé par une structure beaucoup plus oligopolistique. A cet effet, les banques commerciales entretiennent une entente, qui leur est beaucoup plus profitable, et ne réagissent pas au maniement des taux directeurs effectué par la Banque centrale. Ce cas peut également contribuer à l'inefficacité de l'intermédiation bancaire dans la promotion du taux de croissance économique. L'Etat doit ainsi lubrifier le marché financier en établissant un environnement plus concurrentiel afin que la réduction des taux directeurs puisse se solder vers une baisse des taux d'intérêt pour stimuler l'économie.

Concernant le taux d'inflation, les deux chocs (choc du taux débiteur et le choc du crédit bancaire)  $\varepsilon_t^{td}$  et  $\varepsilon_t^{crb}$  (figure1 et figure2) n'ont pas des effets à court terme sur le taux d'inflation car leurs effets se diminuent après une année, ce qui valide nos contraintes d'identifications à court terme. Leurs effets se stabilisent et reviennent à ses positions initiales après sept ans environ.

Figure1 : FONCTION DE REPONSE DU CHOC DU TAUX DEBITEUR DES BANQUES

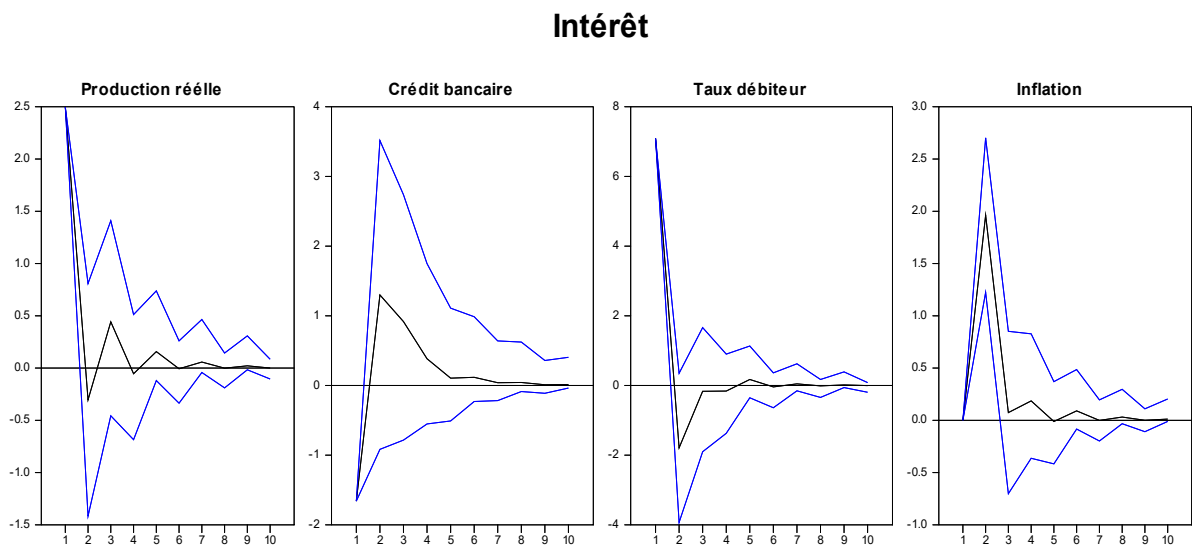
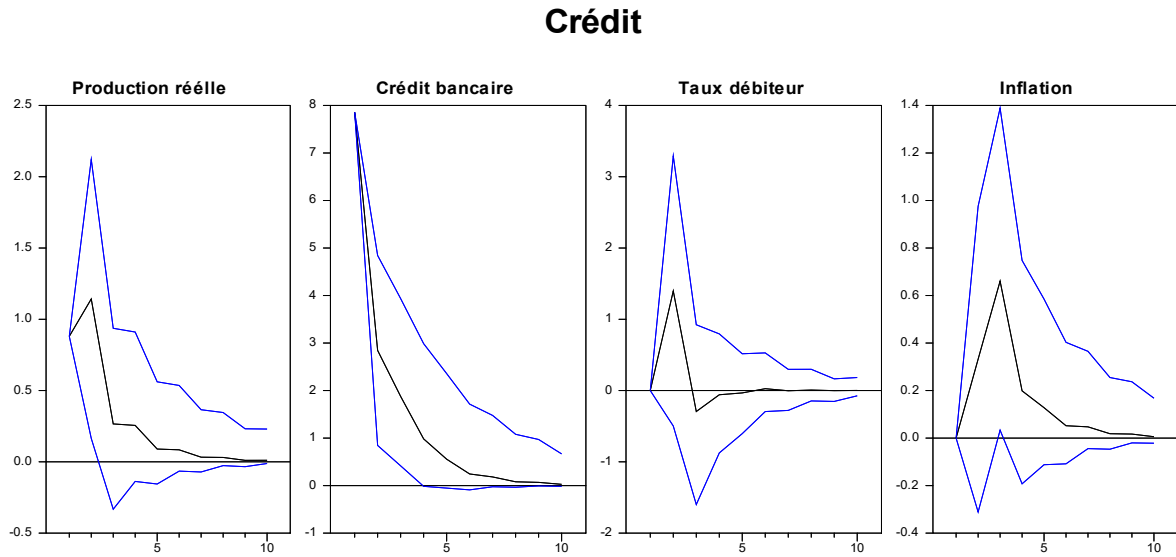


Figure2 : FONCTION DE REPONSE DU CREDIT BANCAIRE



## 5.2 Décomposition de la variance

Le tableau1ci-dessous présente un résumé de la décomposition de la variance des erreurs de prévision. Cette décomposition montre quelle part de la variance des erreurs des variables endogènes est due à chacun des chocs structurels pour des horizons différents. Le tableau 1 montre effectivement que les deux chocs (choc du taux débiteur et choc du crédit bancaire) n'ont aucune incidence sur le taux d'inflation puisque sur un horizon de 1 à 8 ils n'expliquent que moins de 13% (7,490 + 4,888) de l'erreur de prévision du taux d'inflation. Ce résultat est conforme à notre hypothèse d'identification qui impose la neutralité à court terme de ces deux chocs sur le taux d'inflation. Néanmoins, la majorité (plus de 49%) de la variance du taux de croissance économique est expliquée par ses deux chocs (choc du taux débiteur et choc du crédit bancaire). Compte tenu de la faiblesse d'effet significatif du choc de demande sur le taux de croissance économique, ce n'est pas surprenant.

**Tableau1 : Décomposition de la Variance des erreurs de prévision**

Horizon	Taux d'Inflation					Taux de croissance économique			
	Choc de demande	Choc du taux débiteur	Choc du crédit bancaire	Choc d'offre	Choc de demande	Choc du taux débiteur	Choc du crédit bancaire	Choc d'offre	
1	100.000	0.000	0.000	0.000	5.088	20.725	31.752	42.435	
2	78.726	10.094	0.862	10.318	4.873	17.222	32.871	45.034	
3	73.986	7.713	4.440	13.861	4.870	17.195	32.459	45.475	
4	73.662	7.536	4.795	14.007	4.923	17.383	32.197	45.497	
8	73.559	7.490	4.888	14.063	4.921	17.392	32.182	45.505	

## 6. Conclusion :

L'objectif de ce travail était d'étudier l'efficacité de l'intermédiaire bancaire Malagasy et son impact sur le taux de croissance économique de Madagascar en employant la technique du modèle Vectoriel Autorégressif Structurel. La lecture des graphiques des réponses impulsionnelles et l'analyse de la décomposition de la variance aux chocs confirment que nos hypothèses d'identifications selon lesquels les deux chocs (choc du taux débiteur et choc du crédit bancaire) ont des effets à court terme sur le taux de croissance économique sont bien validées. Les résultats ont montré que la majorité (plus de 49%) de la variance du taux de croissance économique est expliquée par les deux chocs (choc du taux débiteur et choc du crédit bancaire). Cependant, malgré ce résultat, la dominance du secteur informel empêche les acteurs concernés à accéder aux crédits par faute de formalité. Ainsi, une fortification du moindre accès aux services de crédits et intensifiés par cette structure. De plus, la configuration du marché financier à Madagascar ajoute les obstacles qui empêchent l'efficacité de l'intermédiation bancaire. Ce marché est beaucoup plus oligopolistique, par conséquent, malgré une baisse des taux directeurs auprès de la Banque centrale, les acteurs ne réagissent pas en diminuant leur taux d'intérêt vu l'entente possible entre les acteurs. Le taux d'intérêt devient alors hystérique à la baisse. Ce qui nous emmené à souligner qu'une forte formalisation des activités devraient être promues, avec une bancarisation à grande échelle des acteurs économiques malagasy, notamment les ménages, pour lubrifier le marché monétaire et financier à Madagascar.

Enfin, des risques pouvant compromettre la solidité et la stabilité du secteur bancaire ont été identifiés. Ces risques concernent principalement, l'exposition des banques à la moindre défaillance de l'Etat, risques induits par les placements massifs dans les titres du Trésor (BTA), le manque de profondeur du système financier, et l'accroissement des créances douteuses et litigieuses. Ces dernières vont peser sur la qualité des actifs qui peut elle-même être la conséquence d'une dégradation de la rentabilité et de la santé financière des emprunteurs.

### Annexe 1 : Test de stationnarité des variables en niveau et en différence première

Variables	Significativité du trend	Statistique de Dickey-Fuller augmentée	Valeurs critiques			Existence d'une racine unitaire
			1%	5%	10%	
Log(IPC) = LIPC	Avec trend	-0.89	-3.55	-2.91	-2.59	Oui
Log(TD) = LTD	Avec trend	-2.14	-4.13	-3.49	-3.17	Oui
Log(CRB) = LCRB	Avec trend	0.13	-3.55	-2.91	-2.59	Oui
Log(PIBR) = LPIBR	Avec trend	-0.64	-3.54	-2.91	-2.59	Oui
Dlog(IPC) = $\Delta p_t$	Sans trend	-4.36	-3.55	-2.91	-2.59	Non
Dlog(TD) = $\Delta td_t$	Sans trend	-4.09	-3.55	-2.91	-2.59	Non
Dlog(CRB) = $\Delta crb_t$	Sans trend	-6.25	-3.55	-2.91	-2.59	Non
Dlog(PIBR) = $\Delta y_t$	Sans trend	-6.82	-3.55	-2.91	-2.59	Non

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# Choix du régime de change et dynamique de la balance extérieure de biens et services : l'expérience africaine

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**Abstract-** This article examines the impact of de jure exchange rate regimes (fixed, intermediate, floating) on the evolution of the external balance of goods and services in ten sub-Saharan African countries between 2000 and 2023. Using both a theoretical framework inspired by economic theories and statistical analysis, we show that intermediate regimes offer the best compromise between external stability and internal flexibility. Fixed regimes, while reassuring in calm periods, leave exporters dependent on particular products such as oil highly exposed to commodity price shocks, while floating regimes allow automatic adjustment but suffer from increased exchange rate volatility. Descriptive statistics and correlation studies confirm the strength and veracity of these results.

**Keywords:** Exchange rate regime, sub-Saharan Africa, external balance of goods and services, price shocks

## Liste des graphiques :

Graphique N°1 : BEBS (% PIB) sous un régime de change fixe et prix du baril du pétrole

Graphique N°2 : Statistique descriptive des pays sous régime de change fixe

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Graphique N°5 : Statistique descriptive des pays sous régime de change intermédiaire

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Graphique N°7 : BEBS (% PIB) sous un régime de change flexible et prix du baril du pétrole

Graphique N°8 : Statistique descriptive des pays sous régime de change flexible

Graphique N°9 : Matrice de corrélation sous régime de change flexible

## Liste des abréviations :

BEBS : Balance Extérieure de Biens et Services

PIB : Produit Intérieur Brut

FMI : Fonds Monétaire International

## **Introduction**

Le choix d'un régime de change occupe une place dominante dans l'économie internationale de nos jours, notamment pour les pays en développement dont le système économique et financier sont très sensibles aux variations des prix des matières premières et aux mouvements des capitaux. Après la fin de l'accord de Bretton Wood dans les années 70 et l'avènement de l'accord de Kingston en 1971, on observe une diversité large de régime allant d'un « hard peg » (taux fixe) à des flottements « free float » en passant par des options intermédiaires. Actuellement, il existe un large éventail de système de régimes de change observés à travers le globe. Tous les pays cherchent à dénicher le chemin vers le succès dans le secteur du commerce international et de tirer profit des avantages qui en découlent. Or, on ne peut ignorer que plusieurs nations, surtout

en Afrique subsaharienne, rencontrent des difficultés dans cet exercice et se voient contraintes de respecter les directives imposées par les organismes de financement traditionnels. Cette situation suscite une question telle que : dans quelles mesures le choix du régime de change peut-être un levier à la croissance de la balance extérieure de biens et services ? L'objectif de ces travaux est d'établir une analyse qui décortique le rôle de choix du régime de change sur l'évolution de la balance extérieure en appuyant sur les expériences de l'Afrique subsaharienne durant ces 40 dernières années. En première partie, nous allons parcourir les débats qui tourne autour de ce sujet. Le but est d'avoir un aperçu global sur le système de change dans le temps depuis l'accord de Bretton Woods à nos jours. En second lieu, nous allons procéder à une étude statistique sur les pays de l'Afrique subsaharienne dans l'objectif de valider scientifiquement la relation entre régime de change et balance extérieure de biens et services.

### **Partie I : Choix du régime de change : un débat de longue date**

Dans les travaux d'Amina Lahrèche-Revil dans « Les régimes de change », un régime de change est l'ensemble des règles qui déterminent l'intervention des autorités monétaires sur le marché des changes, et donc le comportement du taux de change. Ainsi, il détermine comment la valeur de la monnaie nationale est fixée par rapport aux devises étrangères toute en sachant les impacts directs que cela a sur la compétitivité des prix des exportations, le coût des importations et, globalement, les performances du commerce international et l'insertion dans l'économie mondiale.

#### **\* Les travaux des pionniers :**

La question du choix du régime de change existe depuis la révolution industrielle où la globalisation et l'interaction entre les pays devient de plus en plus étroite. Mais depuis la mise en place du système de Bretton Woods, elle a acquis une importance particulière. Ce système repose sur la considération du dollar américain comme monnaie de facturation et de paiement universelle et qui est convertible directement à l'or. Les monnaies des autres pays sont liées au dollar américain avec une parité ajustable. À cette période, les séquelles de la grande dépression des années 1930 se faisaient encore sentir, ce qui poussa des experts comme Keynes et White à accorder une importance particulière à la stabilité économique et au commerce international. C'est avec cette perspective que des institutions comme le Fonds monétaire international et la Banque mondiale ont été créées pour justement assurer cette stabilité. Bref, cette période d'après-guerre caractérisée par l'accord de Bretton Woods s'appuie sur la mise en place d'un système de taux de change fixes tout en prévoyant la possibilité de les ajuster en cas de choc.

#### **\* La critique de Friedman**

Dans son article intitulé « The Case for Flexible Exchange Rates » publié en 1953, Friedman critique les effets néfastes d'un système de taux de change fixe sur l'économie et le développement du commerce mondial. Les échanges entre les pays s'intensifient, la mondialisation devient la priorité et donc l'ouverture des marchés s'avère indispensable. Dans cette perspective, Friedman remet en question la mise en place du système de change fixe, qu'il juge incapable de résister aux chocs économiques externe. Selon lui, ce système offre une impression trompeuse de stabilité, alors qu'en réalité, il est plus vulnérable face à une attaque spéculative. Par conséquent, Friedman défend l'instauration d'un système de change flottant et prône une réduction de l'intervention de l'État dans la vie économique. Pour lui, avoir un régime de change flexible facilite non seulement l'ajustement automatique des variables macroéconomique en cas de déséquilibres extérieurs, mais garantit également une politique monétaire autonome et maîtrisable.

#### **\* Fin de l'accord de Bretton Woods**

Depuis cet accord, le système de change mondial reposait nécessairement sur un régime de change fixe avec le dollar américain comme monnaie d'échange et de réserve mondiale. Ce dernier étant la seule monnaie convertible en or à un taux fixe. Toutefois, dans les années 70, la confiance envers ce système commence à s'éroder en raison de l'augmentation du déficit

extérieur des États-Unis, qui sont les garants de ce système. De nombreux gouvernements commencent à se douter de la capacité des Américains à garantir la convertibilité du dollar en or, car ils ont constaté que la quantité de dollars en circulation dépasse largement la valeur de l'or détenue par la réserve fédérale américaine. Confronté à la pression croissante des gouvernements à travers le monde, comme l'exemple du président français Charles de Gaulle qui exigeait la conversion des dollars détenus par la banque centrale française en or, le président américain Nixon a décidé unilatéralement de mettre fin à la convertibilité du dollar américain en or. Cela marqua la fin du système de Bretton Woods.

**\* L'essor du système de change flexible :**

Dans la section précédente, nous avons mentionné une seule des raisons qui ont conduit à la rupture de l'accord de Bretton Woods. Cependant, nombreux sont les facteurs ayant contribué à l'effondrement de cet accord, comme la perte de l'autonomie en matière de politique monétaire et les difficultés liées au libre-échange. Tous ces événements ont eu une importante répercussion sur le déroulement des politiques économiques et financières à travers le monde et cela s'est concrétisé lors de l'accord de Kingston en 1976. En effet, cet accord représente un tournant décisive dans l'évolution du système monétaire et financier à l'échelle mondiale, influençant particulièrement la vision des grandes institutions financières telles que le FMI. Dès lors, ce dernier a mis fin à l'application du système de parité fixe mais ajustable pour les pays membres et favorise davantage une transition vers un régime plus souple, tout en respectant le droit de chaque gouvernement de choisir le système de change dont il juge le plus adapté à l'économie de son pays.

Dans le même temps, de nombreux économistes et experts internationaux en finances travaillent sur cette question. Par ailleurs, comme pour tous les phénomènes sociaux, les débats et controverses s'intensifient entre les différentes écoles de pensée. Certains économistes défendent la libéralisation du système de change, tandis que d'autres restent sceptiques à cet égard et préfèrent le maintenir fixe. Parallèlement, certains soutiennent la mise en place d'un système hybride offrant de nombreuses possibilités.

Dans la littérature récente, il est clairement observé que de nombreux économistes ont réaffirmé la position de Milton Friedman concernant la nécessité d'adopter un régime de change flexible. D'autres vont plus loin en soulignant l'avantage pratique d'avoir un tel régime mais dirigé ou contrôlé. De nos jours, la plupart des économistes s'accordent à dire qu'il n'existe pas de règle universelle régissant les régimes de change. Chaque pays possède des spécificités structurelles et institutionnelles singulières qui influencent différemment l'efficacité du choix d'un système de change.

**\* Régime de change et balance de paiement : une relation étroite**

Dans la société actuelle, les liens et interactions avec le reste du monde demeurent indispensables, même dans les nations les plus fermées et anarchiques. Nous ne pouvons pas fabriquer tout ce dont nous avons besoin, c'est pourquoi l'échange est devenu un des piliers de l'économie contemporaine. Mais dans quelle mesure cette interaction est-elle avantageuse pour un pays ? Quelles sont les conditions sine qua non à l'efficacité du commerce international ? Et surtout, quelles sont les répercussions du choix du régime de change sur des variables macroéconomiques comme la balance de paiement ? Un grand nombre d'économistes ont tenté de répondre à ces questions et ont proposé des théories bien appuyées, issues d'une observation et d'une analyse approfondies des réalités. Prenons par exemple Robert Mundell, qui a développé sa théorie sur les zones monétaires optimales. Nous avons également John Williamson et ses recherches sur les « bandes cibles » appelé aussi « bande glissante » ou « crawling bands », ainsi que Bela Balassa avec sa théorie de « l'effet Balassa-Samuelson ».

**Partie II : Analyse comparative et étude statistique de l'expérience africaine :**

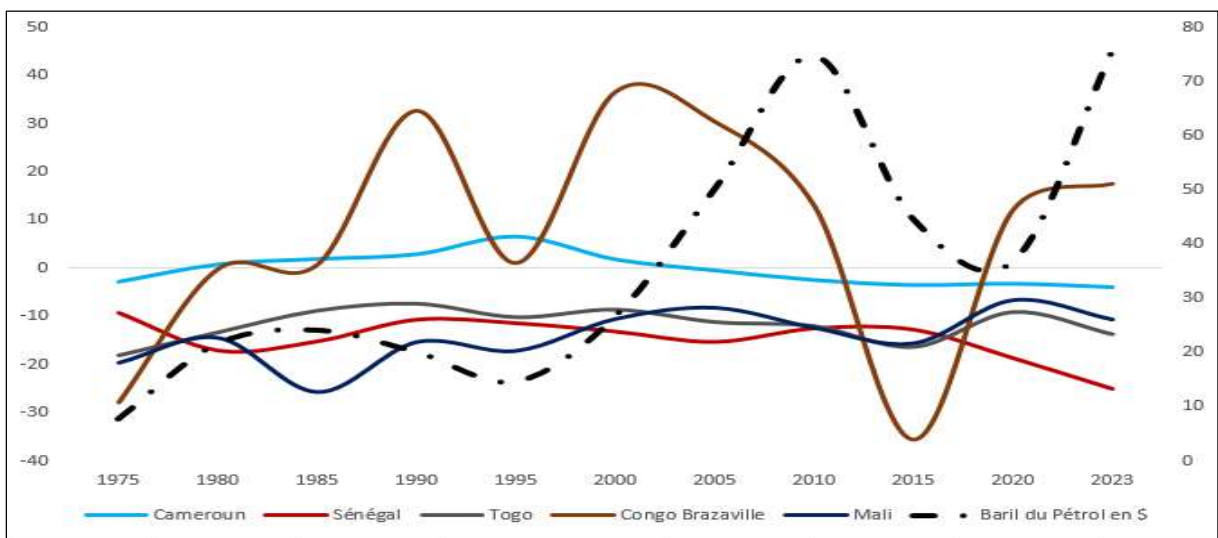
Étant donné la variété multiple des types de régimes de change, nous allons simplifier l'analyse en nous concentrant sur trois catégories : fixe, intermédiaire et flottant. Tout régime qui n'est pas aux extrêmes, c'est-à-dire ni totalement fixe ni totalement flexible, sera inclus dans la catégorie intermédiaire. Il est également important de distinguer entre le régime de change "de jure" et "de facto". Pour simplifier, le régime de change "de jure" est celui officiellement déclaré par un pays, tandis que le régime "de facto" est celui réellement pratiqué par le pays. Dans notre analyse, nous nous attacherons uniquement au régime de change "de jure". Concernant la période d'observation, nous choisissons celle allant de 2000 à 2023.

Pour mener à bien notre étude comparative entre les divers pays, nous sélectionnons 10 pays africaines parmi les 54 existantes. Il est rare de trouver des pays adoptant un régime de change purement flexible en Afrique. Par conséquent, dans cette analyse, nous ne considérons que l'Afrique du Sud dans cette catégorie. Pour les pays pratiquants un régime de change fixe, nous allons choisir 5 pays appartenant à une union monétaire : 3 d'entre eux sont membres de l'Union Économique et Monétaire Ouest-Africaine (UEMOA), à savoir le Sénégal, le Mali et le Togo, et 2 font partie de la Communauté Économique et Monétaire de l'Afrique Centrale (CEMAC), à savoir le Cameroun et le Congo Brazzaville. La monnaie de ces deux unions monétaires est arrimée à l'euro. Concernant les pays avec un régime de change intermédiaire, nous opterons pour Madagascar, le Kenya, le Sierra Léon et le Ghana. Le choix de ces pays s'explique principalement de la disponibilité de leurs données sur la période de notre observation.

**1- Evolution de la BEBS par rapport au PIB sous régime de change fixe :**

Nous avons opté pour les pays faisant partie des unions monétaires que sont l'UEMOA et la CEMAC. Leurs monnaies sont arrimées à l'euro et garanties directement par le trésor français. BEBS capte la différence entre l'importation et l'exportation d'un pays, concernant les biens et services, sur une période spécifique, généralement annuelle.

**Graphique N°1 : BEBS (% PIB) sous un régime de change fixe et prix du baril du pétrole**



Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Excel 2016.

**Graphique N°2** : Statistique descriptive des pays sous régime de change fixe :

	TOGO	SENEGAL	MALI	CONGO_BR...	CAMEROUN	BARIL_DU_PETRO...
Mean	-11.61053	-14.63414	-14.15685	7.353128	-0.258929	36.09636
Median	-11.08900	-13.15179	-14.41687	12.13146	-0.506769	26.72000
Maximum	-7.280156	-9.282380	-6.547594	36.68441	6.554703	76.10000
Minimum	-18.00468	-25.01915	-25.70164	-35.60662	-3.989442	7.670000
Std. Dev.	3.393250	4.422973	5.466637	23.28321	3.341880	23.09063
Skewness	-0.582497	-1.128850	-0.623109	-0.570094	0.624398	0.701834
Kurtosis	2.258519	3.776275	2.924598	2.396459	2.430389	2.257583
Jarque-Bera	0.874044	2.612414	0.714424	0.762801	0.863475	1.155673
Probability	0.645957	0.270845	0.699624	0.682904	0.649380	0.561111

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews 12.

### Interprétation :

Étant dans une union monétaire, ces cinq pays ne peuvent pas se servir du taux de change pour ajuster automatiquement leurs variables macroéconomiques, ce qui rend leurs balances extérieures de biens et services particulièrement vulnérables aux variations des prix mondiaux des biens échangeables. Leur économie est fortement dépendante de l'exportation de matières premières et l'importation de produits finis et manufacturés: au Cameroun<sup>3</sup>, environ la moitié des recettes d'exportation provient des hydrocarbures (37,7 % du pétrole et 14,1 % du gaz) et 12 % du cacao en 2023 ; au Congo-Brazzaville<sup>4</sup>, l'exportation de pétrole brute représente 91 % des exportations totales du pays en 2022, positionnant le pays comme le troisième producteur de pétrole en Afrique subsaharienne juste après le Nigeria et l'Angola ; au Sénégal<sup>5</sup>, l'or non monétaire, le pétrole raffiné et l'acide phosphorique occupent la première place ; au Togo<sup>6</sup>, le phosphate constitue 19,5 % et les produits pétroliers 12,8 % des exportations ; enfin, au Mali, l'or représente 78,1 % des recettes à l'exportation, suivi par le coton avec 11,3 % du total des exportations.

Les recettes d'exportations de ces cinq pays dépendent en grande partie de l'exportation de matières premières, notamment le pétrole et l'or. Étant donné qu'ils adoptent un régime de change fixe, leur balance des biens et services (représenté sur l'axe principale du graphique N°1, c'est-à-dire à gauche) est particulièrement sensible aux fluctuations des prix mondiaux (Sur le graphique N°1, Nous avons pris en compte que le prix du pétrole, qui est représenté sur l'axe secondaire, c'est-à-dire à droite). L'impact d'une fluctuation de prix sur la BEBS est donc lié à l'importance que représente le produit et à l'ampleur de ses variations.

L'analyse statistique (graphique 2) révèle que la BEBS du Congo Brazzaville et le prix du pétrole sont très instables, tandis que celui des autres pays est relativement stable durant notre période d'étude (de 1975 à 2020). L'écart-type  $\sigma^2$  atteint 23.28 pour le BEBS du Congo Brazzaville, avec des valeurs largement dispersées variant de -35.60 à 36.68 et 23.09 pour le prix du pétrole avec un minimum 7.67 de et un maximum de 76.10 . En comparaison, pour le Cameroun, le Sénégal, le Mali et le Togo, les écarts-types sont respectivement de 3.34, 4.42, 5.46 et 3.40. Cela peut s'expliquer par le fait que pour le Congo Brazzaville, l'exportation repose majoritaires sur le pétrole, atteignant un chiffre faramineux de 91% des exportations totales en 2022. Un choc, que ce soit positive ou négative, lié au prix du baril du pétrole sur le marché mondial a une répercussion

<sup>3</sup> Données issues du site de BNP PARIBAS,

<https://www.tradesolutions.bnpparibas.com/fr/explorer/cameroun/les-chiffres-du-commerce-exterieur>

<sup>4</sup> Données issues du site du ministère de l'économie, des finances et de la souveraineté industrielle et numérique Français, Direction général du trésor, <https://www.tresor.economie.gouv.fr/Pays/CG/le-secteur-petrolier-au-congo-brazzaville>

<sup>5</sup> Données issues du site de l'OEC (Observatory of Economic Complexity),

<https://oec.world/en/profile/country/sen%26>

<sup>6</sup> Commerce extérieur en 2023 – TOGO, DG Trésor – SE de Lomé, juillet 2024

conséquente sur la BEBS. Pour les autres, ces chocs peuvent être atténués par les exportations d'autres produits ou par les importations.

**Graphique N°3** : Matrice de corrélation sous régime de change fixe :

Corrélation						
	TOGO	SENEGAL	MALI	CONGO_BRAZAVILLE	CAMEROUN	BARIL_DU_PETROL...
TOGO	1.000000	-0.029650	0.138328	0.773711	0.591166	-0.105675
SENEGAL	-0.029650	1.000000	-0.418452	-0.244806	0.404720	-0.574349
MALI	0.138328	-0.418452	1.000000	0.510756	-0.351041	0.505491
CONGO_BRAZAVILLE	0.773711	-0.244806	0.510756	1.000000	0.305486	0.230942
CAMEROUN	0.591166	0.404720	-0.351041	0.305486	1.000000	-0.584670
BARIL_DU_PETROL...	-0.105675	-0.574349	0.505491	0.230942	-0.584670	1.000000

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews 12.

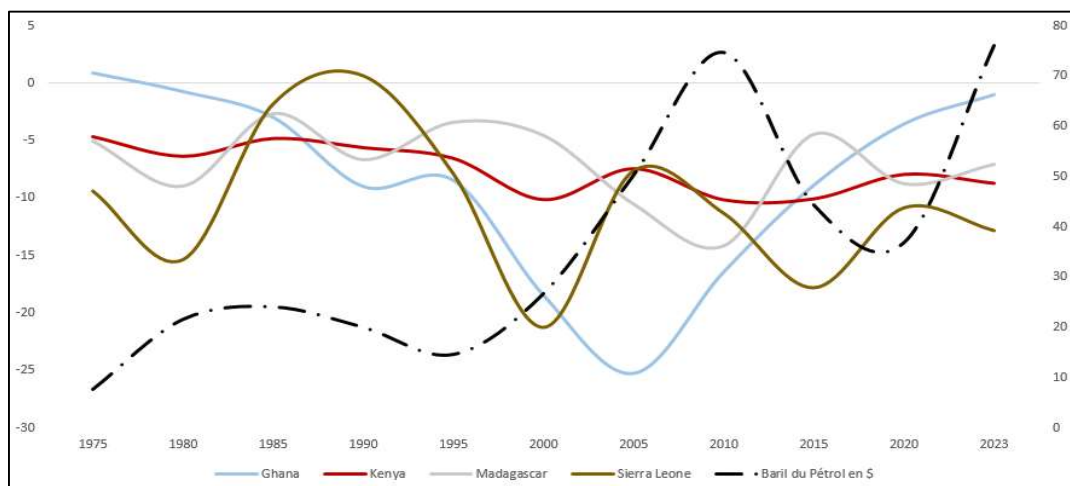
**Interprétation :**

Comme nous pouvons le constater, la BEBS du Mali et du Congo-Brazzaville présente une corrélation positive avec le prix du baril de pétrole, bien que le niveau soit différent. Pour le Congo, le coefficient de corrélation est  $r = +0,23$ , ce qui signifie que la BEBS congolaise évolue en même sens avec le cours mondial du pétrole, en raison de la part importante de l'exportation du pétrole brut dans les exportations totales du pays. Ainsi, la BEBS congolaise dépend largement des fluctuations du prix mondial du pétrole. La situation est similaire pour le Mali, avec un coefficient de corrélation de  $r = +0,5$ . Cependant, contrairement au Congo, la volatilité de la BEBS du Mali est moindre, car elle repose principalement sur le secteur aurifère. Finalement, pour les autres pays, le coefficient de corrélation est négatif. Même si ces pays exportent du pétrole brut, ils restent de gros importateurs de pétrole raffiné. Ainsi, la BEBS de ces trois pays présente une corrélation négative.

**2- Evolution de la BEBS par rapport au PIB sous régime de change intermédiaire :**

Pour cette catégorie, nous avons sélectionné quatre pays pour notre étude : Madagascar, Kenya, Sierra Léone et Ghana. Ces pays adoptent un régime de change intermédiaire, appelé également administré.

**Graphique N°4** : BEBS (% PIB) sous un régime de change administré et prix du baril du pétrole



Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Excel 2016.

**Graphique N°5** : Statistique descriptive des pays sous régime de change intermédiaire :

	GHANA	KENYA	MADAGASCAR	SIERRA_LEONE	BARIL_DU_PETRO...
Mean	-8.507759	-7.509137	-6.911087	-10.48144	36.09636
Median	-8.430202	-7.460806	-6.640451	-10.83170	26.72000
Maximum	0.927503	-4.687896	-2.649712	0.689122	76.10000
Minimum	-25.27308	-10.14557	-14.12613	-21.26028	7.670000
Std. Dev.	8.401176	2.068380	3.436893	6.455057	23.09063
Skewness	-0.733210	-0.058089	-0.723323	0.124765	0.701834
Kurtosis	2.410519	1.618075	2.731754	2.431372	2.257583
Jarque-Bera	1.144860	0.881473	0.992172	0.176735	1.155673
Probability	0.564153	0.643562	0.608909	0.915425	0.561111

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews 12.

**Interprétation :**

Ces quatre pays présentent un déficit chronique de leur BEBS, ce qui reflète qu'elles sont des importateurs nets. Leurs économies sont centrées sur les secteurs primaire et secondaire, avec des exportations de produits agricoles et des importations de biens à forte valeur ajoutée, notamment des hydrocarbures, des machines et des produits pharmaceutiques. Le graphique N°5 démontre qu'un régime de change plus souple facilite l'ajustement de leur BEBS face aux variations des prix mondiaux. Entre 1995 et 2010, malgré l'instabilité des prix du pétrole, ces pays ont réussi à amortir les chocs grâce à des interventions modérées de leur banque centrale, assurant ainsi une monnaie plus stable et une meilleure compétitivité pour les exportateurs.

**Graphique N°6** : Matrice de corrélation sous régime de change intermédiaire :

Correlation					
	MADAGASCAR	KENYA	GHANA	SIERRA_LEONE	BARIL_DU_PETROL...
MADAGASCAR	1.000000	0.358085	0.375609	0.063880	-0.620992
KENYA	0.358085	1.000000	0.490007	0.723372	-0.681409
GHANA	0.375609	0.490007	1.000000	0.118939	-0.304323
SIERRA_LEONE	0.063880	0.723372	0.118939	1.000000	-0.232140
BARIL_DU_PETRO...	-0.620992	-0.681409	-0.304323	-0.232140	1.000000

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews 12.

**Interprétation :**

La balance commerciale de biens et services des quatre pays est corrélée négativement au prix du baril de pétrole. Une hausse du prix mondial du pétrole provoque une détérioration de leur BEBS, et vice versa. D'après cette matrice de corrélation, nous pouvons classer les quatre pays en trois catégories : ceux qui sont très sensibles aux variations comme Kenya et Madagascar avec un coefficient de corrélation respectif de -0.68 e -0.62, ceux qui ont une sensibilité modérée comme le Ghana avec un coefficient de corrélation égale à -0.30, et ceux qui montrent une sensibilité faible comme le Sierra Léon un coefficient de corrélation égale à -0.23. Ce phénomène peut être expliqué par le fait que ces deux pays, qui sont très sensibles à la variation du prix mondial du pétrole, dépendent énormément de ce produit en matière d'importation. Cette dépendance significative pour l'importation des produits pétroliers expose ces pays à des vulnérabilités face aux fluctuations des prix pétroliers à l'échelle mondiale. D'un autre côté, les exportations, généralement à faible valeur ajoutée, n'arrivent pas à compenser, ce qui creuse le déficit. Pour le Kenya<sup>7</sup>, en 2022, l'achat de pétrole brut représente 57,84 % du total des importations. De même pour Madagascar, l'importation de ce produit reste parmi les plus importantes en termes de

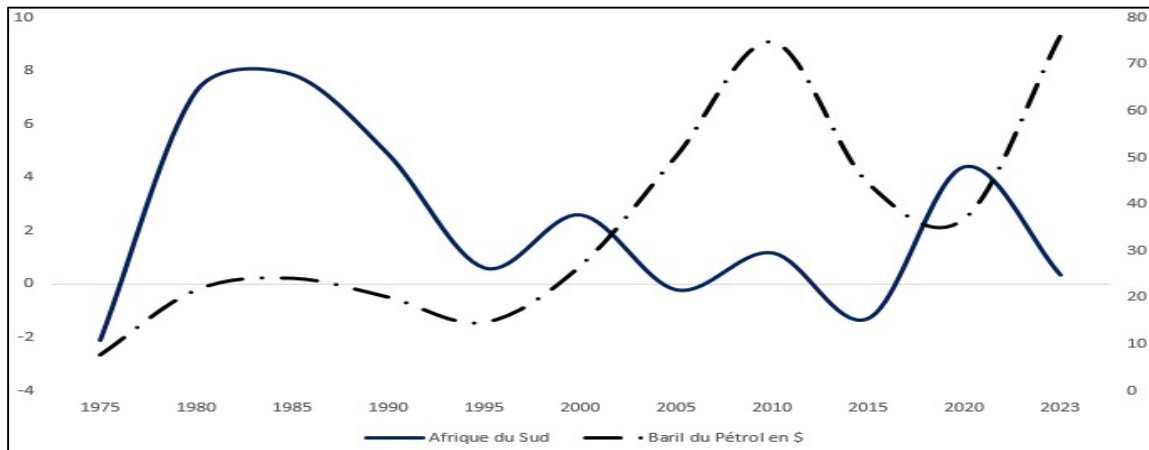
<sup>7</sup> Kenya, Fiche d'information sur le commerce, zone de libre-échange continentale africaine, Les syndicats et le commerce, Octobre 2024

valeur. Concernant le Ghana, il possède une économie variée, avec des exportations de forte valeur comme l'or, qui constitue 45,4 % des exportations en 2023, ainsi que des produits manufacturés qui aident à amortir l'impact de la hausse des prix du pétrole. A propos de la Sierra Léone, c'est un pays avec une économie de taille modeste, où la dépendance aux importations de pétrole est compensée par ses exportations.

### 3- Evolution de la BEBS par rapport au PIB sous régime de change flexible :

Dans cette section, nous allons examiner le cas de l'Afrique du Sud, la première puissance économique du continent africain.

**Graphique N°7** : BEBS (% PIB) sous un régime de change flexible et prix du baril du pétrole



Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Excel 2016.

**Graphique N°8** : Statistique descriptive des pays sous régime de change flexible :

	BARIL_DU_PETROL...	AFRIQUE_DU_SUD
Mean	36.09636	2.306642
Median	26.72000	1.160748
Maximum	76.10000	7.857496
Minimum	7.670000	-2.124173
Std. Dev.	23.09063	3.365690
Skewness	0.701834	0.418571
Kurtosis	2.257583	1.905011
Jarque-Bera	1.155673	0.870746
Probability	0.561111	0.647023

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews

#### Interprétation :

Bien que la balance commerciale sud-africaine des biens et services est généralement positive depuis 50 ans, elle présente un comportement instable marqué par des fluctuations irrégulières en forme de dent de scie. Depuis la fin de l'apartheid dans les années 1990, l'Afrique du Sud, avec son économie largement ouverte à l'international, est exposée aux chocs et crises mondiales tels que les chocs pétroliers des années 1970-1980, la crise de la bulle internet dans les années 2000, et la crise des subprimes en 2008, etc. En effet, l'adoption d'un régime de change flexible est souvent accompagnée d'instabilité et d'incertitude en raison de nombreuses spéculations. L'Afrique du Sud<sup>8</sup> est un grand importateur d'hydrocarbures, notamment de pétrole raffiné, qui représente 18,7 % de ses importations totales. Le cours mondial du pétrole est donc crucial et déterminant pour l'ensemble de l'économie sud-africaine. Toutefois, malgré la forte volatilité des

<sup>8</sup> Données issues du site de BNP PARIBAS, [https://www.tradesolutions.bnpparibas.com/fr/explorer/afrique-du-sud/decouvrir-le-profil-commercial#classification\\_by\\_products](https://www.tradesolutions.bnpparibas.com/fr/explorer/afrique-du-sud/decouvrir-le-profil-commercial#classification_by_products)

prix du pétrole, avec un écart type de 23,09, la BEBS sud-africaine est relativement stable avec un écart type de 3,36. Cela s'explique d'abord par la diversité des exportations du pays avec des produits de forte valeur ajoutée. Il exporte du platine (9,7% des exportations totales ; il produit 80% de la production mondiale de platine), de l'or (5,7%), du charbon (7,1%), des véhicules automobiles (5,4%), etc. En outre, un système de change flexible permet un meilleur ajustement face aux fluctuations des prix internationaux. Il assure également une autonomie totale en matière de politique monétaire, permettant à la banque centrale de se concentrer sur la stabilité des indicateurs macroéconomiques tels que l'inflation, la croissance et le chômage, sans avoir à se soucier de défendre un taux de change fixe.

**Graphique N°9** : Matrice de corrélation sous régime de change flexible :

Correlation		
	BARIL_DU_PETROL...	AFRIQUE_DU_SUD
BARIL_DU_PETR...	1.000000	-0.266168
AFRIQUE_DU_SUD	-0.266168	1.000000

Source : Auteur, 2025, Données de la Banque mondiale, calcul sur Eviews 12.

### Interprétation :

Le coefficient de corrélation entre le prix du baril du pétrole et la balance de biens et service de l'Afrique du sud est de -0.27. Cela indique qu'ils évoluent généralement en sens inverse. Lorsque les prix du pétrole augmentent, la BEBS a tendance à se dégrader, car le pays un importateur net de pétrole. Toutefois, étant un pays économiquement fort, numéro 1 du continent, l'impact de ces chocs reste limité et modéré.

**Conclusion-** En guise de conclusion, aucun régime de change ne convient universellement à tous les pays. Autrement dit, il n'existe pas de système de change global ; il n'y a pas de modèle standard ni de cadre unique. Chaque pays doit adopter le régime qui s'adapte le mieux à sa structure économique, ses spécificités et ses stratégies en matière de commerce internationale mais aussi de la stabilité interne. En examinant le cas de dix pays africains ayant des systèmes de change différents, nous avons une base de réflexion et des pistes d'amélioration concernant le choix du régime de change, afin d'éviter une politique de change imposée. Nous avons observé le comportement de la balance des biens et services depuis 1975 (avec des données quinquennats) afin d'arriver à une analyse profonde et fiable. Nous avons comme résultat qu'en cas de régime de change fixe, la volatilité de la balance des biens et services dépend en grand partie de la diversification des produits, qu'ils soient importés ou exportés, car les possibilités d'ajustement aux chocs dans ce système sont limitées. Pour un régime de change intermédiaire, l'intervention de la banque centrale en cas de grande volatilité monétaire entraîne une atténuation de l'effet des fluctuations. Enfin, le régime de change flottant est favorable aux pays qui disposent déjà d'une économie compétitive et dynamique. Il permet un meilleur ajustement aux chocs mais rend en même temps le pays très vulnérable à la spéculation.

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# Lien de causalité entre la quantité de monnaie en circulation et le niveau général des prix à Madagascar

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**Abstract :** Monetary economics, following the transition from barter, gave rise to the concepts of price and inflation. According to the pioneers of quantitative theory such as Azpilcueta, Copernicus, and Bodin, inflation results from an increase in the money supply outpacing production ; an observation made in Europe at the end of the 15th century. This theory was formalized by Irving Fisher in 1911, who emphasized the neutrality of money. In contrast, Schumpeter asserted its non-neutrality through credit-induced economic growth. Later, Friedman (1970) distinguished between long-term neutrality and short-term non-neutrality of money. This study aims to analyze the causal relationship between the M3 money aggregate and the general price level (CPI) in Madagascar from 1993 to 2022 using the Granger causality test (1969) with the EViews software. Four assumptions are made : full employment, exogeneity of money, price flexibility, and monetary illusion. The results show that there is no causal link between M3 and CPI during this period. We did not perform the Johansen cointegration test (1988) or the Engle-Granger Error Correction Model (1987), as the M3 series is integrated of order two (I(2)) and the CPI series is integrated of order one (I(1)). Using the Ordinary Least Squares (OLS) method, a 100% increase in M3 results in only a 1.2% rise in prices. In contrast, GDP increases by 71.26%, confirming the short-term non-neutrality of money. A long-term analysis spanning over 100 years along, a review of medium-term data and the implementation of a well-managed expansionary monetary policy are recommended.

**Keywords :** Causality, Money, Price, Quantitativism, Madagascar.

## Introduction

### 1. Contexte

L'économie de troc a pris fin sans avoir connu la présence de la monnaie faite des contraintes intrinsèques liées aux transactions. L'économie monétaire a pris le relais depuis l'invention des monnaies d'or et d'argent, menant ainsi à l'apparition des notions de prix et de l'inflation – sources de discordes économiques. Malgré tout, les Bullionistes et les Mercantilistes avaient vu dans la monnaie l'essence même de la richesse pendant que leurs successeurs – Martín d'Azpilcueta, Nicolas Copernic et Jean Bodin (courant 16e siècle) – n'y voient que la hausse généralisée du niveau des prix. Ces derniers étaient tous donc des précurseurs de la théorie quantitative de la monnaie soutenant ainsi l'existence de causalité entre la quantité de monnaie en circulation et le niveau général des prix. C'est à Irving Fisher qu'on attribue l'invention du quantitativisme en 1911 en soulignant les effets néfastes d'une augmentation non maîtrisée de la masse monétaire qui ne génère qu'une tension inflationniste : c'est la neutralité monétaire. La même année a été marquée par une analyse de ce lien par Joseph Schumpeter en 1912 dans sa « *Théorie de l'évolution économique* » en affirmant la non-neutralité monétaire grâce aux crédits

bancaires. Milton Friedman, en 1970, a repris ladite théorie en affirmant que la monnaie et la politique monétaire à long terme ne peuvent avoir aucun effet positif sur la croissance économique qui fait qu'il ne voit aucun intérêt sur l'intervention des banques centrales sur les marchés. Mais, à court terme, il y a une non-neutralité monétaire.

De nombreux auteurs théoriciens ont analysé et critiqué ce lien entre la quantité de monnaie en circulation et le niveau général des prix tout en apportant des formalisations comme celles établies par les Néoclassiques (John Stuart Mill et Alfred Marshall), mais aussi les Keynésiens et les Monétaristes. Ainsi, nombreux sont les études académiques qui ont fait une validation empirique de ce lien, vérifiable à (très) long terme. Une étude de la Banque Centrale de Madagascar (BCM) a montré qu'« à Madagascar, entre 1980 et 2019, l'évolution des prix est fortement liée à celle de la monnaie. Chaque variation de la masse monétaire est suivie par une variation dans le même sens de l'inflation » en étudiant seulement la tendance de ces variables *via* une simple graphique (BCM, 2020, p. 4). En outre, une étude faite par la Banque de France a soutenu que : « si le lien est vérifiable sur le très long terme, le lien de court et moyen terme est difficile à prouver » tout en considérant que « si l'existence d'une relation à long terme entre la masse monétaire et le niveau des prix n'est guère contestée ; le sens de la causalité, lui, est toujours débattu » (Banque de France, 1989, p. 15). C'est justement pour pouvoir débattre de ce sujet, toujours d'actualité, que nous avons choisi de faire la recherche sur : le « **Lien de causalité entre la quantité de monnaie en circulation et le niveau général des prix à Madagascar** » sur une période allant de 1993 à 2022.

## 2. Objectif

Cette recherche a ainsi pour objectif principal de vérifier la théorie quantitative de la monnaie pour le cas de Madagascar. Une problématique principale se pose : ***la hausse du niveau général des prix à Madagascar est-elle d'origine monétaire ?*** Autrement dit, ***la monnaie malgache est-elle neutre ?*** Notre recherche se base sur quatre hypothèses fondamentales : (H1) Une utilisation maximale des ressources productives. (H2) La quantité de monnaie en circulation est exogène c'est-à-dire qu'elle est décidée par la politique menée par la BCM. (H3) Les prix ont une flexibilité nominale c'est-à-dire qu'ils baissent ou augmentent facilement en fonction de l'offre et de la demande des biens et services. (H4) Il y a une illusion monétaire, qui veut dire que les agents économiques raisonnent *via* des valeurs nominales de l'économie et non des valeurs réelles.

Pour vérifier le quantitativisme pour le cas de Madagascar, des données annuelles de 1993 à 2022 ont été utilisées pour détecter s'il existe un lien de causalité entre la quantité de monnaie en circulation et le niveau général des prix. Autrement dit, nous utilisons la méthode économétrique qui analyse la causalité au sens de Granger (1969) suivant la modélisation VAR ou Vecteur auto-régressif, entre ces deux variables : l'agrégat M3 comme variable causale et le niveau général des prix P en tant que variable causée, via une exploitation des données sur *EViews*. Enfin, pour mener à bien notre travail, nous présentons la méthodologie de recherche composée du cadre théorique et de la modélisation économétrique. Nous menons un exposé des résultats de l'étude suivis des discussions. La dernière partie de la recherche étale les recommandations et la conclusion.

## 3. Méthodologie de l'étude

### 3.1. Cadre théorique du quantitativisme

Irving Fisher (1911) est ainsi considéré comme étant le créateur de la théorie quantitative de la monnaie, en s'inspirant des pensées de ses prédécesseurs : Martín d'Azpilcueta, Nicolas Copernic et Jean Bodin (courant 16<sup>e</sup> siècle) ; ouvrant ainsi d'autres réflexions sur ce sujet essentiellement la théorie monétariste de Milton Friedman (1970). Toutes ces théories ont été sujettes à des critiques d'autres économistes surtout de John Maynard Keynes (1936) *via* la

préférence pour la liquidité dans sa « *Théorie générale de l'emploi, de l'intérêt et de la monnaie* ».

Les **précurseurs** de cette théorie étaient Martín d'Azpilcueta, Nicolas Copernic et Jean Bodin durant le 16<sup>e</sup> siècle. Leurs réflexions économiques portaient sur les effets de l'arrivée en grande quantité de métaux précieux en provenance des Amériques et l'inflation qui en découlait en Europe. En fait, Jean Bodin avait défini sa théorie de la valeur-rareté : « tout bien devient plus cher lorsque la demande est plus forte que l'offre. C'est la quantité de métal précieux dans un pays qui détermine le pouvoir d'achat de sa monnaie » (Bodin, 1576, p. 400). Ils défendaient ainsi le prêt à intérêt, contre les recommandations de l'Église catholique romaine de l'époque.

En outre, les grands auteurs des 18<sup>e</sup> et 19<sup>e</sup> siècles, essentiellement des Physiocrates (comme François Quesnay, Richard Cantillon, Turgot) et des Classiques (essentiellement Adam Smith, Jean-Baptiste Say, David Ricardo, John Stuart Mill) s'étaient accordés à souligner que : « la création monétaire a pour effet, d'une part, d'altérer le niveau général des prix, et d'autre part de transférer des richesses vers ceux qui reçoivent cette monnaie au détriment de tous les autres (effet Cantillon<sup>9</sup>). Ce qui n'est pas souhaitable » (Cantillon, 1755, p. 160). Soulignons que ces grands auteurs, comme Carl Menger, avaient affirmé qu'« il n'y a qu'une seule vraie monnaie : c'est la monnaie métallique. Les billets de banque et les dépôts ne sont pas de la monnaie, mais des substituts ou des dérivés » (Menger, 1871, p. 80) voire même des « succédanés » selon Irving Fisher (Fisher, 1911, p. 35).

Jean-Baptiste Say (courant 18<sup>e</sup> siècle), lui, avait commencé à aborder la « non-neutralité monétaire à court terme » en expliquant les effets bénéfiques de l'expansion monétaire ; comme l'avait développé David Hume. En effet, Hyman Minsky a souligné que : « la création monétaire joue un rôle crucial dans le développement des cycles économiques. Il a ainsi admis que la liquidité des banques et la solvabilité des entreprises ont une influence fondamentale dans l'apparition et le développement des crises » (Minsky, 1986, p. 100).

Le **principal créateur** de la théorie quantitative de la monnaie est Irving Fisher (1911) en s'inspirant de la formalisation du théoricien classique John Stuart Mill (1848) – pour analyser l'effet neutre de la hausse de la masse monétaire à long terme sur la production. Fisher tente ainsi de démontrer que toute augmentation de la monnaie induit une augmentation égale des prix (en admettant que  $V$  est constante et  $Y$  est exogène) :

$$M V = P Y^{10} \text{ ou } \Delta (M V) = \Delta (P Y) \text{ ou encore } \Delta M = \Delta P$$

Où  $M$  est la quantité de monnaie en circulation dans une économie pendant une période donnée.

$V$  est la vélocité monétaire. Cela correspond à la fréquence d'utilisation d'une unité de monnaie pour effectuer des échanges durant une période donnée.

$Y$  est la quantité de production dans un pays pendant une période donnée.

$P$  est le niveau des prix (les prix réels d'échange *ex-post*) pendant une période donnée.

Ainsi, une augmentation de la masse monétaire fera augmenter le niveau des prix dans une proportion 100% : c'est la neutralité monétaire à long terme.

Cette même formalisation, de Mill, a été réinterprétée par le théoricien néoclassique Alfred Marshall (1890) pour formuler la quantité de monnaie demandée  $M^d$  dans une économie selon la relation suivante :  $M^d = k P Y$ .

Où  $k$  représente la quantité de monnaie nécessaire dans une transaction pour financer une unité de devise (1\$, 1€...) à l'échelle nationale, autrement dit :  $k = 1/V$ .

Une **reprise** de cette théorie ont été faite par : (1) Joseph Schumpeter (1911), dans sa « *Théorie de l'évolution économique* », en soulignant le rôle des entrepreneurs et des banques. Il souligne que l'expansion du crédit, ainsi de la monnaie, est indispensable à l'investissement donc

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<sup>9</sup> Nom de l'économiste Richard Cantillon, l'effet Cantillon est le résultat d'une injection de monnaie dans l'économie exerce un effet progressif et différencié sur les prix au fur et à mesure que la monnaie se propage par les échanges à partir du point où elle a été injectée<sup>1</sup>

<sup>10</sup> Cette égalité  $M V = P Y$  est la formalisation initiée par John Stuart Mill (1848)<sup>2</sup>

à l'activité et la croissance économique. La monnaie n'est plus neutre, dans ce cas, mais est devenu une condition essentielle pour la réalisation de l'expansion de l'économie. C'est ce qu'on appelle la non-neutralité monétaire. Dans sa théorie monétariste, (2) Milton Friedman (1963) a montré le caractère néfaste de la chute de la masse monétaire sur le niveau des prix et l'activité économique ; dans son livre intitulé : « *Une histoire monétaire des États-Unis, 1867-1960* ». Bien plus tard, il donne sa caution à la théorie quantitative de la monnaie dans son ouvrage de 1992 : « *Money Mischief: Episodes in Monetary History*<sup>11</sup> ».

Le théoricien John Maynard Keynes (1936) a critiqué essentiellement cette théorie en évoquant la **préférence pour la liquidité** dans sa « *Théorie générale de l'emploi, de l'intérêt et de la monnaie* » en réinterprétant la formalisation marshallienne :

$$k = M^d / P Y \quad (1)$$

Cette équation repose sur l'hypothèse qui considère que  $V$  est constante, avec  $k = 1/V$ . D'où, l'équation (1) peut s'écrire de la manière suivante :

$$1/V = M^d / P Y \quad (2)$$

D'après l'équation (2), si  $V$  est constante,  $1/V$  c'est-à-dire  $k$  l'est aussi. Ce qui fait que le rapport  $M^d / P Y$  est aussi constant. C'est là que repose les critiques de Keynes, en soulignant que : « les agents économiques peuvent être influencés par la préférence pour la liquidité en thésaurisant sur le court terme et faisant sortir la monnaie du circuit économique.  $V$  n'est donc pas une constante, mais une variable » (Keynes, 1936, p. 170). Il a ainsi introduit trois variables, entre autres :

1)  $L_1 (R)$  représente la quantité de monnaie demandée au nom des échanges (c'est la variable  $M^d$  pour les Quantitativistes).

2)  $L_2 (i)$  est la demande de monnaie motivée par les taux d'intérêt. Pour les Quantitativistes,  $L_2 (i) = 0$  et

$$3) L = L_1 (R) + L_2 (i)$$

Keynes a ainsi réécrit la formule marshallienne comme suit :

$$k = L_1 (R) / P Y \text{ ou } k = L - L_2 (i) / P Y$$

Où  $k$  est le **multiplicateur keynésien** avec  $k = 1/s$  où  $s$  est la propension à épargner.

Keynes démontre ainsi que comme  $L_2 (i)$  est variable du fait de la préférence pour la liquidité, la monnaie n'a donc pas un effet neutre sur l'activité économique.

Et, dans le cas où  $L = L_2 (i)$ , ceci correspond à la situation de **trappe à liquidité** au cours de laquelle Keynes soulignait qu' « une fois que le taux d'intérêt a chuté en dessous d'un certain niveau, la préférence pour la liquidité est telle qu'elle devient absolue, dans le sens où presque tout le monde préfère conserver de la monnaie plutôt que de détenir de la dette, du fait du taux d'intérêt si bas » (Keynes, 1936, p. 270). En résumé, Keynes a émis la même idée que les quantitativistes selon laquelle : quand il y a crise économique, une relance monétaire s'avère complètement inefficace.

En outre, d'autres critiques ont été amenées à l'endroit du Quantitativisme, entre autres, (i) nombreux sont les économistes, notamment Galand & Grandjean (1996), qui ont souligné que : « le lien qui existe entre la masse monétaire en circulation et le niveau des prix n'est valable qu'à très long terme ; il est instable à court et moyen terme ». En outre, (ii) ce lien s'est considérablement distendu depuis les années 1960 (Christian de Boissieu, 1978). Effectivement, Artus (2022) l'a bien confirmé en soulignant qu' « après la crise de Covid-19, l'explosion de la masse monétaire n'a pas été la cause de l'inflation (à l'exception d'une forte inflation du prix des actifs, notamment financiers – actions cotées et immobilier – dont les prix se stabilisent dès le premier semestre 2022 dans un contexte géopolitique mouvementé et un contexte économique de

<sup>11</sup> Sur la couverture de ce livre paru en 1992, on peut apercevoir une citation de Milton Friedman : « *Monetary theory is like a Japanese garden... an apparent simplicity conceals a sophisticated reality* ». En français, « La théorie monétaire est comme un jardin japonais... une apparente simplicité cache une réalité sophistiquée ». Via ce livre, Friedman précise une fois pour toute que personne n'est à l'abri de l'économie monétaire, c'est-à-dire des effets de sa théorie et de ses pratiques. Il démontre à travers des événements historiques les méfaits qui peuvent résulter d'une mauvaise compréhension du système monétaire<sup>3</sup>

stagflation<sup>12</sup> ». Il se peut encore que (iii) l'inflation soit non monétaire en trouvant son origine dans la hausse de la demande vis-à-vis de l'offre : c'est l'inflation par la demande expliquée essentiellement par une augmentation du prix des produits importés (inflation importée) ou des coûts de production des entreprises (inflation par les coûts).

### 3.2. Modélisation économétrique

Pour tester le lien de causalité entre ces deux principales variables : la quantité de monnaie en circulation M3 (variable causale) et le niveau général des prix P (variable causée), nous avons recours à la **causalité au sens de Granger (1969)** – vu que ce lien est toujours débattu par les économistes. En fait, cette méthode économétrique – de la modélisation VAR – renvoie, non pas au caractère théorique de la causalité (cause-effet) ; mais au caractère prédictif de l'éventuelle cause (hausse de M3) sur l'effet (hausse de P). En effet, Granger (1969) a souligné qu' : « une variable X cause une autre variable Y, si la connaissance des valeurs passées de X rend meilleure la prévision de Y ». Autrement dit, la variable X cause, au sens de Granger, la variable Y si les valeurs passées de X influencent significativement la valeur contemporaine de Y. Sur le plan statistique, réaliser le test de causalité au sens de Granger c'est comme faire un test de significativité globale des coefficients associés aux valeurs passées de la variable causale dans l'équation de la variable causée. Ainsi, le but de notre test économétrique c'est de voir si : **les variables P et M3 retardées (valeurs passées) expliquent (causent) la variable P (valeur contemporaine) et, symétriquement, si les variables M3 et P retardées expliquent la valeur présente de la variable M3** en ayant recours au **test de cointégration de Johansen (1988)** selon les modèles suivants :

$$P_t = a P_t(p) + b M3_t(p) + c + \varepsilon$$

$$M3_t = a M3_t(p) + b P_t(p) + c + \varepsilon$$

Où  $p$  est le nombre de retards pour des séries intégrées de même ordre  $d$ .

$\varepsilon$  est le facteur aléatoire, non observable c'ad les erreurs de mesure et autres facteurs non pris en compte.

Pour atteindre ce but, nous devons franchir différentes étapes de tests économétriques – après avoir élaboré l'étape préliminaire qu'est l'importation des données depuis Excel vers *Eviews* – entre autres :

**Étape 1** : Détermination du nombre de retards des deux variables d'après les critères d'AIC (*Akaike Info Criteria*) et de SC (*Schwartz Criteria*).

**Étape 2** : Tests de stationnarité selon la méthode ADF (*Augmented Dickey Fuller test*) de ces séries retardées pour déterminer les ordres d'intégration des séries non stationnaires.

**Étape 3** : Test de causalité au sens de Granger (1969) pour voir si les valeurs passées de P et de M3 influencent significativement la valeur actuelle de P et vice-versa *via* la modélisation VAR.

**Étape 4** : Test de cointégration de Johansen (1988) pour détecter la relation de longue période entre ces variables et estimation des élasticités de court terme *via* le Modèle à correction d'erreur vectoriel (MCEV) selon Engle et Granger (1987) – si elles sont intégrées de même ordre. Dans le cas contraire, nous procédons par la méthode des Moindres carrés ordinaires (MCO) pour tester la relation de longue période entre ces variables sans décalage.

Ainsi, nous avons collecté sur le site de la Banque mondiale des données pour le cas de Madagascar entre 1993 et 2022 ( $n = 30$ ) sur : l'Indice des prix à la consommation (IPC, 2010 = 100), le taux d'inflation (en %), la masse monétaire M3 (en milliards d'Ariary), le Produit intérieur brut (PIB) réel (en milliards d'Ariary) et la demande globale (en milliards d'Ariary) représentées par le tableau ci-dessous. Tous les traitements des données décrits par les étapes ci-dessus sont faits sur *Eviews*. Les principales variables des tests économétriques sont M3 et IPC, mais les restes des données du

<sup>12</sup> La guerre en Ukraine, depuis son déclenchement le 22 février 2022 jusqu'à maintenant, occasionne une crise de stagflation (stagnation économique et tension inflationniste) dans de nombreux pays dans le monde comme le cas de Madagascar<sup>4</sup>

tableau suivant sont utiles pour les analyses et les discussions.

Années	M3	IPC	PIB	Dde Gble	Infl
1993	296.25	11.2	10430	7630	10.01
1994	451.93	15.5	10420	7630	38.94
1995	525.21	23.1	10600	7720	49.08
1996	609.01	27.7	10830	7870	19.76
1997	735.79	28.9	11230	8240	4.49
1998	781.35	30.7	11670	8730	6.21
1999	931.22	33.7	12210	9100	9.93
2000	1090	37.7	12670	9420	11.86
2001	1350.9	40.7	13520	9500	7.92
2002	1458.4	47.5	11840	9550	16.50
2003	1586.9	46.6	13000	10440	-1
2004	1987.2	53.2	13690	10990	13.96
2005	2031.9	62.9	14340	10980	18.36
2006	2660	69.7	15110	11190	10.77
2007	3226.8	76.9	15970	10470	10.29
2008	3621.7	84.0	17050	11120	9.30
2009	3988	91.5	16370	11400	8.95
2010	4456.8	100	16470	11920	9.25
2011	5211.7	109.5	16730	12190	9.48
2012	5606.3	115.7	17230	12560	5.71
2013	5810.8	122.5	17630	13410	5.83
2014	6437.1	129.9	18220	13060	6.08
2015	7501	139.5	18790	13450	7.40
2016	8887.1	148	19540	13960	6.04
2017	10496	160.7	20310	14120	8.61
2018	11751	174.5	20960	14640	8.59
2019	12571	184.3	21880	15080	5.61
2020	13959	192.1	20320	15410	4.20
2021	15486	203.2	21490	15870	5.81
2022	17615	219.8	22300	16270	8.16

**Tableau 1.** Données utilisées pour tester la théorie quantitative de la monnaie, cas de Madagascar de 1993 à 2022 (source : donnees.banquemondiale.org)

#### 4. Résultats

**Étape 1 :** Détermination du nombre de retards noté  $p$  des deux variables IPC et M3 d'après les critères d'AIC et de SC :

##### 4.1. Nombres de retards des variable IPC et M3

Le nombre de retards qui minimise les deux critères d'AIC et de SC pour la série IPC est  $p = 1$  pour lequel le coefficient est significativement différent de 0, car avec un t-statistique de 5,48652 qui est supérieur au t-lu de 1,96 à 5%. Ainsi, l'IPC de la période en cours est expliquée significativement par l'IPC d'il y a un an auparavant. Globalement, le modèle est significatif, car la statistique de Fisher est très élevée et  $R^2$  est proche de 1 ; selon les résultats issus d'*Eviews*.

Nous avons trouvé aussi  $p = 1$  comme nombre de retards qui minimise les deux critères

d'AIC et de SC pour la série monnaie en circulation M3. A cette valeur, le t-statistique de 7,02477 est supérieur à 1,96 qui est le t-lu à 5%. Cela veut dire alors que la monnaie en circulation d'une année passée influence significativement la monnaie en cours. Enfin, la qualité du modèle est bonne, car d'après les résultats issus d'*EViews* ; le coefficient de détermination est proche de 1.

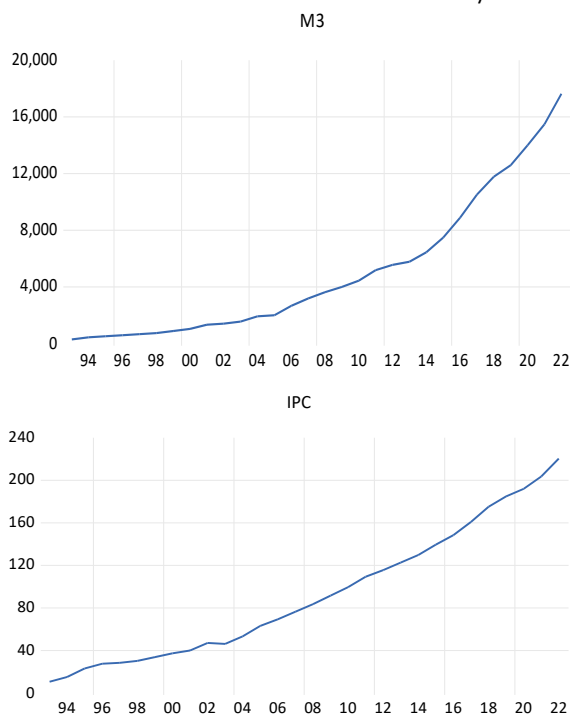
Ces résultats, déterminant les nombres de retards de nos deux variables d'analyse, sont résumés dans le tableau récapitulatif suivant :

Séries temporelles testées	Indice des prix à la consommation IPC	Monnaie en circulation M3
Valeurs minimums d'AIC et de SC retenues	AIC = 4,82 SC = 4,96	AIC = 13,97 SC = 14,12
Valeurs absolues de t-statistiques retenues (>t-lu = 1,96 à 5%)	[5,48652]	[7,02477]
Nombre de retards retenus (décalage en années)	$p = 1$	$p = 1$

**Tableau 2.** Présentation des retards des séries temporelles de notre modèle théorique de 1993 à 2022 (source : Auteur, 2024).

**Étape 2 :** Tests de stationnarité selon la méthode ADF de ces séries retardées pour déterminer les ordres d'intégration des séries non stationnaires.

Avant de procéder à ces tests, nous devons déterminer le modèle à choisir selon les représentations graphiques suivantes des deux variables d'analyse :



**Figure 1.** Évolution des deux séries temporelles M3 et IPC à Madagascar de 1993 à 2022 (source : *EViews*, analyses auteur, 2024).

D'après ces graphiques, nous constatons que les deux variables M3 et IPC ont la même tendance d'évolution durant notre période d'analyse. En fait, elles ont évolué presque d'une façon stable de 1993 à 2004 ; mais à partir de 2005, elles ont enregistré une tendance vers le haut jusqu'à la fin de notre analyse. Ce qui fait que pour tester la stationnarité de ces variables, nous choisissons le modèle avec tendance et constante (*trend and intercept*). Les résultats issus d'EViews sont les suivants pour ces tests de stationnarité :

#### 4.2. Tests de stationnarité des variables IPC (p=1) et M3 (p=1)

En niveau, la série IPC est non stationnaire, car la valeur de t-statistique de 0,712392 est supérieure aux trois valeurs critiques à 1% (-4,309824), 5% (-3,574244) et 10% (-3,221728) ; et que la probabilité calculée de 0,9994 est supérieure à 0,05. Le modèle est moyennement bon, car le coefficient de détermination est égal à 0,59. Ce qui fait que nous acceptons cette régression globale tout en procédant à la première différenciation pour rendre stationnaire la série IPC.

Après différence première, la série IPC est devenue stationnaire, car le t-statistique de -4,714369 est inférieur aux t-critiques lu sur la table à 1%, 5% et 10% ; respectivement de -4,339330 ; -3,587527 et -3,229230. En conclusion, cette série est intégrée d'ordre 1 ou I(1) avec une droite de régression qui s'écrit comme suit :

$$\begin{aligned}
 IPC_t = & -1,214825 D(IPC_t(-1)) + 0,313256 D(IPC_t(-1),2) + 1,387276 + 0,457028@TREND(1993) \\
 & (-4,714369) \quad (1,624257) \quad (1,232915) \quad (4,715094) \\
 & [0,0001] \quad [0,1179] \quad [0,2301] \quad [0,0001] \\
 R^2 = & 0,55 ; R^{2*} = 0,49 \\
 DW = & 2,169993
 \end{aligned}$$

Cette équation souligne que le niveau de prix présent est expliqué significativement par celui d'il y a deux ans passées (avec signe positif), car la p-calculée de 0,1179 est supérieure à la p-lu de 0,05. Ce modèle est moyennement bon, car le coefficient de détermination est évalué à 0,55. Enfin, il y a faible autocorrélation des erreurs, car le Durbin Watson est supérieur à 2.

La série M3, quant à elle, est aussi non stationnaire en niveau, car la valeur de t-statistique de 1,942157 est supérieure aux trois valeurs critiques de 1, 5 et 10% respectivement de -4,323979 ; -3,580622 et -3,225334 et que la probabilité calculée de 1,0000 est supérieure à 0,05. Le modèle est de bonne qualité, car le coefficient de détermination est de 0,88. Les résultats de la première différenciation se présente comme suit :

Cette série est encore non stationnaire après première différenciation, car le t-statistique de -2,295114 est supérieur aux trois valeurs critiques fournies par EViews (de -4,323979 ; -3,580622 et -3,225334) et que la probabilité empirique de 0,4228 est aussi supérieure à 0,05. Ce qui fait que nous devons procéder par une deuxième différenciation.

La série M3 est devenue stationnaire après cette seconde différenciation, car le t-statistique de -5,230754 est inférieure aux valeurs critiques quel que soit le seuil statistique de 1 à 10% (-4,339330 ; -3,587527 et -3,229230). La série M3 est ainsi intégrée d'ordre 2 ou I(2). Le modèle de régression s'écrit comme suit :

$$\begin{aligned}
 M3_t = & -1,113603 D(M3_t((-1),2) - 60,89535 + 8,925187@TREND(1993) \\
 & (-5,230754) \quad (-0,464001) \quad (1,198722) \\
 & [0,0000] \quad [0,6468] \quad [0,2423] \\
 R^2 = & 0,53 ; R^{2*} = 0,49 \\
 DW = & 1,957161
 \end{aligned}$$

Cela signifie que l'évolution de la variable M3 de la période présente est expliquée significativement par celle de M3 retardée de deux ans (car le t-Student de -5,230754 en valeur absolue est supérieure à 1,96). Ce modèle est moyennement bon, car le coefficient de détermination est évalué à 0,53. Enfin, il y a autocorrélation des erreurs, car le Durbin Watson est

inférieur à 2.

Le tableau suivant récapitule tous ces résultats :

Séries temporelles	IPC	M3
Niveau (t-stat comparé à t-lu à 5% et prob comparée à 0,05)	0,712392> -3,574244(0) [0,9994]	1,942157> -3,580622(0) [1,0000]
1ère différence (t-stat comparé à t-lu à 5% et prob comparée à 0,05)	-4,714369< -3,587527(1) [0,0043]	-2,295114> -3,580622(1) [0,4228]
2ème différence (t-stat comparé à t-lu à 5% et prob comparée à 0,05)		-5,230754< -3,587527(2) [0,0013]
Ordre d'intégration $d$	$d = 1$	$d = 2$

**Tableau 3.** Présentation des résultats des tests de stationnarité des séries temporelles du modèle théorique de 1993 à 2022 (source : Auteur, 2024).

D'après ces résultats, nous ne pouvons pas avoir recours au test de cointégration de Johansen (1988) de l'étape 4 – pour vérifier la relation de longue période entre ces séries temporelles – car M3 et IPC ne sont pas intégrées de même ordre qui veut dire qu'elles ne présentent aucun risque de cointégration. Dans ladite étape, nous aurions recours au test de relation de longue période par la méthode MCO. Nous allons procéder, par la suite, au test du lien de causalité entre ces séries retardées (car c'est le principal objectif de notre recherche).

**Étape 3 :** Test de causalité au sens de Granger (1969) pour savoir si les valeurs passées de P et de M3 (retard  $p = 1$ , d'après l'étape 1) influencent significativement la valeur actuelle de P et vice-versa *via* la modélisation VAR. Les résultats suivants sont issus d'*EViews* :

Pairwise Granger Causality Tests			
Date: 03/04/24 Time: 18:10			
Sample: 1993 2022			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
M3 does not Granger Cause IPC	29	0.56624	0.4585
IPC does not Granger Cause M3		0.12886	0.7225

**Tableau 4.** Présentation des résultats de test de causalité au sens de Granger pour les séries temporelles du modèle théorique de 1993 à 2022 (source : *EViews*, Analyses auteur, 2024).

Il en ressort de ce test que les deux variables d'analyse : IPC et M3 ne présentent aucun lien de causalité, car les valeurs de probabilité de 0,4585 et 0,7225 sont supérieures au seuil de 0,05. Ce qui veut dire que nous rejetons l'hypothèse nulle d'existence de causalité entre ces séries. Autrement dit, **à Madagascar de 1993 à 2022, les variables M3 et IPC ne présentent aucun lien de causalité.** Cela veut dire que la série temporelle M3 n'a pas une relation de cause à effet avec la série IPC durant ces trois décennies d'analyse. Fallait-il encore souligner que les mouvements de la variable M3 ne provoquent pas ceux de la variable IPC et inversement. Voilà pourquoi, nombreux sont les économistes qui débattent encore du lien de causalité entre la

quantité de monnaie en circulation M3 et le niveau général des prix IPC. Nous renforçons ainsi le rang de ces chercheurs. Malgré que notre recherche ait montré ces premiers résultats négatifs, cela ne nous empêche pas d'analyser, par la suite, le lien de long terme entre ces deux variables en ayant recours à la méthode des MCO.

**Étape 4 :** Test de la relation de longue période entre IPC et M3 par la méthode des Moindres carrés ordinaires (MCO) selon l'équation suivante :

$$P_t = a M3_t + b + \varepsilon$$

Où a et b sont les paramètres à estimer du modèle.

$\varepsilon$  est le facteur aléatoire, non observable c'est-à-dire les erreurs de mesure et autres facteurs non pris en compte.

En fait, nous ne pouvons pas avoir recours au test de cointégration de Johansen (1988) pour tester la relation de longue période entre ces variables (qui ne présentent aucun lien de causalité), car les deux séries retardées ne présentent aucun risque de cointégration vu qu'elles ne sont pas intégrées de même ordre : l'IPC est une série I(1) tandis que la M3 est une série I(2). Ce qui fait que nous n'avons pas aussi recours à l'estimation du Modèle à correction d'erreur vectoriel (MCEV).

La droite de régression se présente comme suit, d'après le tableau issu d'EViews :

$$P_t = 0,012192 M3_t + 30,47626$$

(24,52988)	(8,655885)
[0,000497]	[3,520871]
R <sup>2</sup> = 0,96 ; R <sup>2*</sup> = 0,95	
DW = 0,119208	

En supposant que « toutes choses étant égales par ailleurs (*ceteris paribus*) », **une hausse de la quantité de monnaie en circulation M3 de 100% induit une augmentation du niveau général des prix de seulement 1,2% (un très faible taux d'inflation, qui reflète vraiment la réalité à Madagascar durant ce cadre d'analyse. Effectivement, en regardant les données sur l'inflation de notre pays dans le tableau 1 ci-dessus, elles ne sont pas du tout galopantes, hormis ceux durant 1994 à 1996 – effet du passage au flottement de l'Ariary – mais aussi de 2002 des suites d'une crise politique ; de 2004 et 2005 faute de la politique de détaxation entreprise par l'État malgache. Ainsi, nous pouvons affirmer que les deux variables varient dans le même sens (positivement, car le t-Student de 24,52988 > 1,96 et la p-critique de 0,000497 < 0,05), mais très peu significativement. Autrement dit, l'inflation causée par la hausse de la masse monétaire n'est pas du tout excessive qui fait que nous ne pouvons pas soutenir qu'à Madagascar, entre 1993 et 2022, l'inflation est d'origine monétaire. La neutralité monétaire n'est pas confirmée. Ainsi, nous rejoignons aussi les théoriciens et économistes qui soutiennent que la théorie quantitative de la monnaie n'est vraiment vérifiée que dans une période de très long terme.**

En résumé, la théorie n'est pas bien confirmée dans le cas de Madagascar, car les données utilisées ne couvrent pas une période suffisamment longue (nous avons utilisé des données de moins de 100 ans). D'ailleurs, ces résultats reflètent la réalité, car le coefficient R<sup>2</sup> avoisine l'unité présageant ainsi une meilleure qualité du modèle. Enfin, une seule hypothèse fondamentale n'est pas vérifiée qu'est l'inexistence de plein-emploi (H1) qui fait qu'une hausse de la masse monétaire s'abat sur les prix, mais faiblement. Le reste des hypothèses sont vérifiées pour notre analyse.

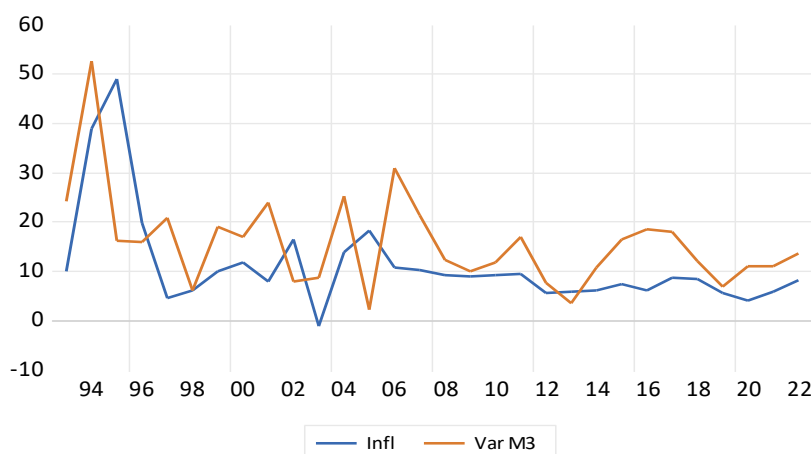
## 5. Conclusion

### 5.1. Discussions

D'après ces résultats de notre recherche, nous avons pu constater que si les données utilisées pour tester la relation entre les deux variables de la théorie quantitative de monnaie : M3 et IPC, ne sont pas d'une très longue période (plus de 100 ans) ; l'influence de M3 sur IPC est très

peu significative ; comme l'a montré nos résultats de recherche. Effectivement, Ronald, dans son travail de recherche, a trouvé aussi la même conclusion en analysant l'impact de M3 sur l'inflation en Haïti de 2000 à 2010 en concluant qu' : « (...) une hausse de 10% de la masse monétaire décalée d'un mois induit une augmentation de l'inflation de 1,1% au mois succédant. (...) Suite à une modification de 1% de la masse monétaire, l'IPC ne réagit que de 0,2% à partir du deuxième mois pour atteindre son *summum* puis les effets disparaissent complètement au septième mois » (Ronald, 2005, p. 81). En gros, cet auteur a trouvé des effets de la hausse de la monnaie sur le niveau des prix très peu significatifs comme ce que nous avons trouvé aussi. Ceux-ci ne peuvent pas amener à conclure que l'inflation est d'origine monétaire. D'ailleurs, l'étude de cet auteur est faite sur seulement 10 ans, moins longue que notre durée d'étude.

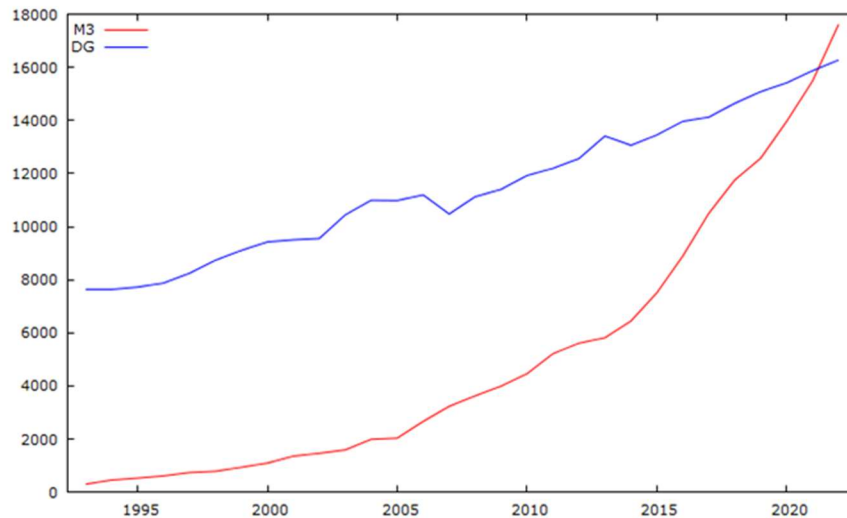
De même, quand les économistes de la Banque centrale de Madagascar, dans leur étude en 2020, a soutenu que les variables prix et monnaie varient dans le même sens, cette conclusion est issue d'une simple constatation *via* l'évolution graphique de ces deux variables durant 39 ans. En fait, ces deux principales variables du quantitatifisme ont varié dans le même sens durant la période d'analyse choisie par ces chercheurs. C'est ce que nous avons vu aussi dans notre analyse en comparant les taux de variations de M3 et de l'IPC selon le graphique suivant :



**Figure 2.** Évolution des taux de croissance de M3 et de l'IPC à Madagascar de 1993 à 2022 (source : EViews, Analyse auteur, 2024).

Ce qui est sûr dans toutes ces analyses, c'est que **l'inflation est expliquée par la hausse de la masse monétaire en circulation (en partie et non pas en totalité), mais aussi par d'autres facteurs** comme : (i) le prix des produits importés. En fait, si un bien importé joue un rôle fondamental dans la production, la hausse de son prix peut avoir un impact inflationniste (c'est le cas de notre pays, vu que Madagascar importe surtout les huiles de pétrole (13,6%), le riz (6,2%), les tissus (2,7%), l'huile de palme (2,6%), les médicaments (2,5%) et le sucre (2 %) (Comtrade, 2021)). En outre, les importations peuvent devenir très chères, faute de la dépréciation de la monnaie nationale, (c'est le cas de l'Ariary, au moins, depuis le flottement généralisé de 1994) occasionnant ainsi une tension inflationniste. C'est ce qu'on appelle inflation importée. Il y a aussi, (ii) la hausse des coûts de production. Une augmentation du prix des biens et services peut occasionner une hausse des coûts de travail et des facteurs de production à son tour. C'est l'inflation par les coûts. Enfin, il peut encore y avoir une (iii) hausse de la demande. Dans ce cas, les prix augmentent, car la demande globale excède l'offre globale. Ce qui fait augmenter la production et ainsi diminuer le taux de chômage. C'est **l'inflation par la demande, qui explique en grande partie la hausse généralisée des prix à Madagascar**, car les variables M3 et Demande globale évoluent parallèlement durant notre période d'analyse : la courbe de la demande se trouve au-dessus de celle de la monnaie (graphique ci-dessous). **Cette tendance d'évolution parallèle signifie que si l'une des variables (M3) augmente,**

**l'autre (DG) augmente aussi, mais beaucoup plus.** Cela veut dire qu'une hausse de la masse monétaire induit une augmentation plus importante de la demande (et ainsi de l'offre : c'est la non-neutralité monétaire que nous allons vérifier économétriquement ci-après). Or, vers la fin de la période d'analyse, les deux courbes se rejoignent (ce n'est pas étonnant, car en regardant les données d'analyse du tableau 1, les deux variables ont à peu près les mêmes valeurs en 2021 et 2022).



**Figure 3.** Évolution des variables M3 et Demande globale à Madagascar de 1993 à 2022 (source : GRETL<sup>13</sup>, Analyse auteur, 2024).

Ainsi, à Madagascar, d'après notre étude, ce n'est pas seulement la quantité de monnaie qui détermine directement le niveau des prix comme l'avait affirmé Claude Ponsard (1959) dans sa revue sur le quantitativisme, mais aussi la demande globale... Voilà pourquoi, cette théorie faisait l'objet de multiples controverses selon les époques, même si elle semble peu préoccuper l'esprit des économistes d'aujourd'hui. En fait, à une certaine époque, cette doctrine avait influencé officiellement la conduite de la politique monétaire des Banques centrales (surtout celles des pays riches) pour limiter l'inflation et peut l'être encore, de nos jours. Mais, la principale difficulté qui réside dans ce sujet passionnant c'est le fait d'admettre que la monnaie soit neutre économiquement. Ce qui fait qu'il est opportun d'utiliser des données d'analyse d'une période raisonnable, comme ce que nous avons utilisé, pour tester la non-neutralité monétaire en utilisant deux variables principales : évolutions de M3 et du PIB en quantité (et ainsi du taux de croissance économique). Nous l'avons testé sur *EViews* et avons obtenu la droite de régression suivante, présentée en Annexe 6 :

$$\begin{aligned}
 \text{PIB}_t &= 0,712610 \text{ M3}_t + 12\,123,47 \\
 &\quad (13,71414) \quad (32,93715) \\
 &\quad [0,0000] \quad [0,0000] \\
 R^2 &= 0,87 ; R^{2*} = 0,86 \\
 DW &= 0,280613
 \end{aligned}$$

En supposant que toutes choses étant égales par ailleurs, une augmentation de la variable M3 de 100% induit une hausse de la variable PIB de 71,26%. Autrement dit, c'est le taux de croissance économique induit par une politique monétaire expansionniste définie par la BCM. Dans ce cas, **durant la période de 1993 à 2022, la non-neutralité monétaire est vérifiée.** D'ailleurs,

<sup>13</sup> Nous avons eu recours exceptionnellement à ce logiciel, car sa représentation graphique montre le point de croisement entre ces variables vers la fin de la période d'analyse alors qu'*EViews*, le principal logiciel utilisé dans l'analyse, n'a pas du tout montré ce point de rencontre

la série M3 – ayant un coefficient positif de 0,712610 – explique significativement la série PIB, car le t-Student de 13,71414 est supérieur à 1,96. On peut dire encore que **la croissance économique induite par ladite politique monétaire est plus qu'efficace, car non seulement elle est à double chiffre, mais aussi très élevée**. Ce qui fait que la Banque centrale de Madagascar, pour booster la croissance économique, peut conduire une politique monétaire excessive à plus ou moins moyen terme, mais qui doit avoir un effet important sur la demande globale. Enfin, une seule hypothèse d'analyse n'était pas vérifiée : celle qui prône le plein-emploi, mais les restes sont vérifiées.

## 5.2. Recommandations

Suite à cette étude, quelques recommandations sont faites pour améliorer la recherche future. D'abord, pour vérifier la théorie quantitative de la monnaie, il est préférable d'utiliser des données sur très longue période (plus de 100 ans). Ensuite, pour les données à court et moyen terme, il est conseillé d'opter pour une analyse de la non-neutralité monétaire (lien entre M3 et PIB), car « le lien de court terme entre M3 et IPC est difficile à prouver » (Banque de France, 1989), et « ledit lien est instable à court et moyen terme » (OFCE, 2006). Enfin, une intervention de la Banque centrale est nécessaire pour conduire une politique monétaire expansionniste à moyen terme, car elle est bénéfique pour l'économie à condition que la quantité de la demande globale excède celle de l'agrégat de monnaie M3 (comme le cas de Madagascar de 1993 à 2022). En fait, Milton Friedman a prouvé ce résultat, dans une analyse d'un siècle, en soulignant qu'« une chute de la masse monétaire peut être néfaste pour l'économie ».

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# THE IMPACT OF NETWORK READINESS INDEX INDICATORS ON THE AGRICULTURAL SECTOR

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**Abstract.** This study explores the impact of the Network Readiness Index (NRI) on the agricultural sector, with a particular focus on upper middle-income, lower middle-income and low income countries. While previous research has examined the relationship between digital infrastructure and overall economic development, this paper is among the first to quantitatively analyze the connection between specific NRI sub-indicators and agricultural productivity. Using regression analysis, the study finds that variables such as internet domain registration, online access to financial accounts, mobile application development, and government online services significantly influence GDP per capita (PPP). Furthermore, rural digital payment adoption and mobile app development were found to have a positive effect on the value added per agricultural worker. These findings underscore the importance of targeted digital transformation policies for enhancing agricultural productivity and suggest that incorporating NRI metrics into agricultural policy design can support more effective rural development strategies.

**Keywords:** digitalization, Network Readiness Index, agriculture, ICT, mobile applications, rural economy, regression analysis, digital infrastructure, economic development, policy design.

In the modern world, digitalization has become a key driver of economic growth, enhancing the competitiveness, efficiency, and resilience of various economic sectors. This process is particularly relevant for countries with developing digital infrastructure, where the adoption of digital technologies can significantly influence overall economic development and sectoral productivity.

One of the tools used to assess the level of digitalization and its impact on the economy is the Network Readiness Index (NRI). The NRI measures a country's ability to leverage digital technologies for growth and sustainable development. It includes four key dimensions: technology, people, governance, and impact (Portulans Institute, 2020).

In academic literature, the NRI is widely used to evaluate the influence of digitalization on economic development. In 2016, Russian researchers adapted the index to assess the level of digitalization across federal districts, enabling its application in analyzing regional development. According to L. Allakhverdiyeva (2022), the NRI has a positive impact on economic growth, including GDP per capita, trade volume, and export performance.

In the context of this study, ICT skills—understood as the population's ability to effectively use digital tools and the Internet (Fataliyeva G., 2025) — are of particular importance when analyzing the agricultural sector's capacity to benefit from digitalization. Since the Network Readiness Index includes indicators reflecting human capital and digital competencies, ICT skills serve as a critical intermediary factor linking technological infrastructure to actual economic performance in rural and agricultural contexts.

In general, it should be noted that at the international level, the relevance of the NRI as a digital diagnostic tool has also been confirmed through statistical analyses. For example,

Tokmergenova and Dobos (2024) applied principal component and cluster analysis to NRI sub-indices, revealing internal correlations and the importance of specific indicators in explaining digital maturity.

Meanwhile, research on digitalization in agriculture often focuses on specific ICT solutions, such as precision farming systems, LPWAN and 5G technologies, mobile applications for farmers, and climate-smart services (Mohamed Rafi et al., 2025; Lombardo et al., 2021; CGIAR, 2024). However, these studies tend to examine the effects of digitalization on the agricultural sector in a fragmented manner, centered around particular technologies.

It is worth noting that academic literature lacks direct studies correlating NRI indicators with agricultural sector performance. Most connections are made indirectly through ICT infrastructure maturity, policy support, and user skills, but no quantitative analysis of the NRI's impact on agriculture, forestry, and fisheries productivity has yet been conducted.

This study aims to fill that gap. It analyzes the influence of digitalization, as measured by selected NRI sub-indices, on both overall economic development and the agricultural sector. Special attention is given to the following indicators:

- Percentage of businesses with a website
- Internet domain registration
- Digital payment usage gap in rural areas
- Investment in high technology
- Total software expenditure (% of GDP)
- Online access to financial accounts
- Mobile application development
- Prices of mobile equipment
- Government online service index.

To empirically assess the role of digitalization in economic transformation, a regression analysis was carried out using the selected Network Readiness Index sub-indicators as independent variables. The objective is to evaluate their impact on overall economic development as well as on the economic performance of the agricultural sector.

**Table 1. Regression analysis between selected sub-indices of the Networked Readiness Index and GDP per capita by PPP, value added per worker in agriculture, forestry and fisheries (upper middle-income, lower middle-income and low income countries, 2022)**

Metrics	GDP per capita (PPP)	Value added per worker (agriculture, forestry, and fisheries)		
Multiple R	0.9	0.7		
R-squared	0,75	0.51		
Adjusted R-squared	0.7	0.4		
Standard Error	5273.99	5535.96		
Observations	50	50		
F Significance	1.40E-09	0.00067		

Variable	Coefficient (GDP)	P-value	Coefficient (Agriculture)	P-value
Y-Intercept	-33,075.48	0.0000027	-18,517.7	0.00581
Business websites (X <sub>1</sub> )	-36.43	0.46967	35.83	0.49798
Domain registration (X <sub>2</sub> )	<b>159.87</b>	<b>0.01125</b>	85.58	0.18289
Digital payments (rural) (X <sub>3</sub> )	4.72	0.91894	<b>104.83</b>	<b>0.03616</b>
High-tech investment (X <sub>4</sub> )	9.94	0.86358	79.66	0.19419
Software expenditure (X <sub>5</sub> )	-116.66	0.20030	-40.55	0.66860
Online financial access (X <sub>6</sub> )	<b>179.99</b>	<b>0.01524</b>	30.77	0.68189
Mobile app development (X <sub>7</sub> )	<b>416.03</b>	<b>0.00081</b>	<b>261.09</b>	<b>0.0364</b>
Mobile equipment prices (X <sub>8</sub> )	145.31	0.05262	53.51	0.48753
E-government services index (X <sub>9</sub> )	<b>167.58</b>	<b>0.01449</b>	-102.40	0.14461

Source: compiled by the author based on data from [2] and [8]

The regression results indicate that the selected NRI indicators for countries with varying income levels explain up to 75% of the variance in GDP per capita ( $R^2 = 0.75$ ). The model is statistically significant (F-significance  $< 0.05$ ). Notably, domain registration ( $p = 0.01$ ), online financial access ( $p = 0.02$ ), mobile app development ( $p = 0.00$ ), and the government online service index ( $p = 0.01$ ) all show a significant positive influence on GDP per capita (PPP). These results suggest that countries with higher digitalization levels, as reflected in these indicators, also tend to have higher levels of economic development.

In the agricultural sector model, the  $R^2$  value of 0.51 shows that the selected digital indicators explain 51% of the variation in value added per worker. The F-statistic ( $p < 0.05$ ) confirms the model's overall adequacy. Among the selected variables, the digital payment usage gap in rural areas ( $p = 0.03616$ ) and mobile app development per capita ( $p = 0.0364$ ) exhibit positive impacts on productivity in agriculture, forestry, and fisheries.

This implies that expanding mobile app development could play an essential role in improving agricultural labor productivity. Such applications provide farmers with access to key information including weather forecasts, smart farming techniques, resource management, and market opportunities—ultimately helping increase efficiency and reduce costs.

The conducted regression analysis shows that digitalization positively affects macroeconomic development, especially through variables such as domain registration, financial access, mobile app development, and digital government services.

In the agricultural sector, two variables stood out:

1. Digital payments in rural areas
2. Mobile application development

These findings underscore the importance of mobile digital solutions and financial inclusion in improving productivity in agriculture.

Overall, the results highlight the need for continued digital transformation of agriculture and the importance of integrating NRI indicators into agricultural policy frameworks. This study presents one of the first attempts to quantitatively link NRI sub-indices with agricultural sector outcomes, laying the groundwork for more in-depth analysis and targeted policy interventions in the future.

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# Restoration of Cultural Heritage and Strategies for Creating a Diplomatic Image in Azerbaijan's Post-Conflict Territories

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**Abstract:** Following the 2020 Patriotic War, a large-scale reconstruction and rehabilitation process has been launched in Azerbaijan's territories liberated from occupation. One of the main directions of this process is the restoration and international promotion of cultural heritage sites that were either destroyed or severely damaged. This article analyzes the measures undertaken in this area, the challenges encountered, and the strategies employed by Azerbaijan to build a diplomatic image based on cultural heritage. Relying on both local and international legal instruments, ongoing projects, and diplomatic initiatives, the research highlights the strategic importance of cultural heritage during the post-conflict phase. The article also examines opportunities for cooperation with UNESCO, initiatives in cultural diplomacy through international media and the diaspora, and the geopolitical utilization of restored monuments in Karabakh. The findings indicate that cultural heritage serves not only for the restoration of national identity but also as an effective tool for conveying messages to the international community.

**Keywords:** post-conflict territories, cultural heritage, cultural diplomacy, UNESCO, diplomatic image.

## Introduction

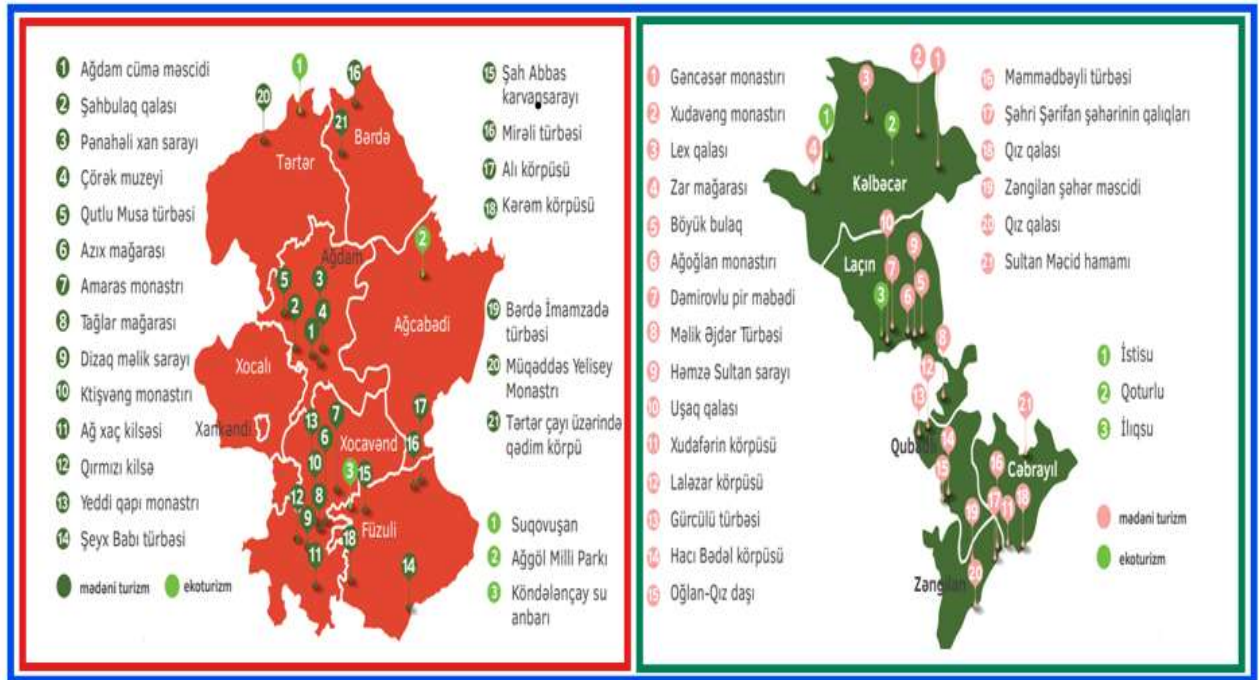
The territories of the Republic of Azerbaijan that are internationally recognized remained under occupation for nearly thirty years, resulting not only in the loss of human resources and economic potential but also in the severe damage to its cultural and historical heritage. In the Karabakh region and surrounding areas, mosques, temples, cemeteries, museums, and other cultural heritage sites were systematically destroyed or desecrated. The 44-day war in 2020, which led to the liberation of these lands, paved the way for Azerbaijan to initiate not only economic but also cultural revival policies in the region. The restoration of cultural heritage is not merely a process of reconstruction—it is also a reaffirmation of national identity and a form of diplomatic messaging directed at the international community. This article aims to examine the strategies implemented by Azerbaijan for the restoration of cultural heritage in its post-conflict territories, to assess the role of these strategies in shaping the country's diplomatic image, and to analyze how this process is reflected within the framework of international law. The subject will be studied within the interdisciplinary contexts of cultural studies, political science, and international relations.

## Main Part

The process of restoring cultural heritage in Azerbaijan's post-conflict territories carries symbolic, practical, and diplomatic significance. The reconstruction of religious and secular monuments that were destroyed or desecrated, along with the restoration of their original historical appearance, is important not only for the revival of Azerbaijan's national and cultural

identity but also for introducing this heritage to the international community. The “Great Return” concept launched by President Ilham Aliyev in 2021 provided a strategic framework for these efforts. The declaration of the city of Shusha as the cultural capital and the hosting of international events there serve as tangible embodiments of this strategy. The Azerbaijani state views the restoration of cultural heritage not only as a response to domestic needs but also as a soft power tool for building its international image. This approach is particularly visible in cooperation initiatives with UNESCO and in the utilization of international media platforms. Collaborations with international organizations such as UNESCO, ICESCO, and others are of strategic importance in this regard. Documents submitted to support the international recognition of Azerbaijan’s cultural heritage, international reports on the restoration process, and the organization of international events all serve as effective instruments for shaping a diplomatic image. Restoration of cultural heritage is not merely a matter of cultural-historical relevance; it also represents a form of soft power politics. As American political scientist Joseph Nye famously stated, soft power is the ability of a country to influence others through its attractive culture and values [4].

**Figure 1. Description of Historical and Cultural Monuments in the Karabakh and Eastern Zangezur Economic Regions**



Source: <https://ereforms.gov.az/files/review/pdf/az/50106b9302c648fb32645cc9493f2dad.pdf>

The restoration of cultural heritage in Azerbaijan’s post-conflict territories requires a multifaceted approach that integrates legal, technical, and diplomatic dimensions. In the initial phase, inventory and documentation activities were carried out to map and assess the historical significance of cultural heritage sites that had been destroyed or severely damaged. These efforts were conducted by the Ministry of Culture of the Republic of Azerbaijan and other relevant institutions, with potential cooperation with international organizations also evaluated at this stage. The declaration of the city of Shusha as the “Cultural Capital of Azerbaijan” in 2021 represents a symbolic embodiment of this strategy. Shusha holds a prominent place in Azerbaijan’s historical and cultural memory and is also presented to international audiences as one of the country’s most renowned cultural centers. Events held in Shusha, such as the “Kharibulbul” Music Festival, the “Vagif Poetry Days,” international theater festivals, and other cultural programs, have contributed to enhancing Azerbaijan’s diplomatic image by showcasing

the cultural heritage of Karabakh to the world. The music festivals, poetry events, and international exhibitions held in Shusha and Aghdam are not only cultural gatherings but also platforms for conveying geopolitical messages. Prior to its devastation, Aghdam was a vibrant cultural hub. During the occupation, the city was completely destroyed, with mosques, cultural centers, and theaters reduced to ruins. The restoration of the Aghdam Juma Mosque located in the city center, the urban planning efforts based on cultural heritage, and the reconstruction of historical monuments all demonstrate the Azerbaijani state's commitment to this field. Through these initiatives, Azerbaijan has advanced the ideas of regional stability, intercultural dialogue, and multiculturalism, thereby strengthening its diplomatic standing. A review of international practices reveals that other countries have also employed cultural heritage restoration as a tool of diplomacy in similar contexts. For example, the reconstruction of the Mostar Bridge in Bosnia and Herzegovina after the war was carried out in cooperation with UNESCO and the European Union, and it became a symbol of reconciliation and unity in the Balkans [1]. Similarly, the restoration of the Al-Nuri Mosque in Mosul, Iraq—financed by the United Arab Emirates and technically supported by UNESCO—was regarded as a significant diplomatic gesture toward preserving Islamic cultural heritage [2].

The establishment of the Kigali Genocide Memorial Center in Rwanda after the 1994 genocide served as a strategic step not only for preserving collective memory but also for reshaping the country's image on the international stage [3]. Such examples demonstrate that the restoration of cultural heritage is considered a strategic resource not only for fostering internal public consciousness but also for international diplomacy. Drawing on these global experiences, Azerbaijan presents the restoration of its cultural heritage not merely as a local reconstruction effort but as a means of integration into the global system of values. In this context, the restoration of monuments in the liberated territories and their promotion through international events carry both political and humanitarian messages. Moreover, Azerbaijan has expanded mechanisms for international cooperation in this process. The country's initiatives in this domain have garnered international attention. Within the framework of cooperation with UNESCO, Azerbaijan has been working toward the inclusion of several cultural heritage sites in the organization's World Heritage List. The deployment of a UNESCO technical mission to Karabakh and Eastern Zangezur plays a crucial role in assessing the current state of restoration of the region's historical and religious monuments at the international level. This also underscores Azerbaijan's commitment to transparency and adherence to international standards. All these activities contribute to shaping Azerbaijan's global image as a modern, tolerant country that respects cultural and religious diversity. Visits by representatives of international organizations, excursions organized by diaspora initiatives, and the production of documentary films play an important role in conveying the realities of Azerbaijan to the global community. This strategy can be considered an effective example of cultural diplomacy. Through the universal language of culture, music, and art, Azerbaijan addresses international audiences and communicates the realities of Karabakh. In the post-conflict period, this approach occupies a central place in Azerbaijan's soft power toolkit. Thus, the restoration of historical and cultural monuments in Karabakh is not only the reconstruction of physical spaces but also the rebuilding of national spirit and international credibility.

### Conclusion

The restoration of cultural heritage in Azerbaijan's post-conflict territories is a process of significance not only at the local and national levels but also within the international context. These efforts contribute to the revival of national cultural identity while simultaneously shaping the image of Azerbaijan as a modern, tolerant, and culturally respectful nation in the eyes of the international community. As demonstrated throughout the article, the restoration of cultural heritage has become one of the key pillars of diplomatic image-building. The strategies

implemented in the Karabakh and Eastern Zangezur regions not only enhance Azerbaijan's soft power both regionally and globally but also ensure the revival of national and spiritual values. In this regard, continuity, transparency, and international cooperation will become increasingly important in the future.

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# STRATEGIC MANAGEMENT OF AN ORGANIZATION IN THE CONTEXT OF THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES

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**Abstract.** In the era of rapid technological advancement, artificial intelligence (AI) is emerging as a pivotal force in the transformation of strategic management in organizations. This research aims to explore the influence of AI on strategic planning, evaluation, and decision-making processes across diverse industries.

The study employs a combination of analytical and comparative methods, including case studies and SWOT analysis, to comprehensively assess the impact of AI on management practices. Through an examination of theoretical frameworks and real-world examples, such as Amazon, Alibaba, and Siemens, the research identifies the key benefits of AI implementation, including enhanced forecasting accuracy, streamlined business processes, and improved strategic adaptability.

However, the study also highlights the main obstacles, including the high implementation costs, the shortage of qualified personnel, and ethical considerations. The findings of the SWOT analysis demonstrate that the successful implementation of AI into strategic management necessitates a structured approach, a high level of digital preparedness, and a willingness to embrace organizational change. The research emphasizes the importance of striking a balance between technological advancement and the cultivation of human capital, which is essential for long-term business success in the era of digital transformation.

**Keywords:** artificial intelligence, strategic management, digital transformation, business model, adaptability

**Introduction.** Against the backdrop of the rapid advancement of digital technologies and the growing impact of artificial intelligence (AI), the strategic management of organizations is undergoing a profound transformation[1]. AI is reshaping established management approaches, transforming business models, and facilitating the transition to more agile and intelligent strategies.

In this context, organizations are not only required to implement technological solutions, but also to reevaluate their long-term objectives and methods for achieving them.

The significance of this research is underscored by the fact that AI is emerging as a pivotal factor in enhancing competitiveness, enabling automation, data analysis, forecasting, and improving the precision of management decisions. However, without a strategic approach to AI implementation, there is a risk of inconsistencies in business processes and a loss of management agility.

The novelty of this research lies in its ability to identify the transformative changes in strategic management brought about by AI technologies, as well as in developing contemporary models of adaptive planning that take into account the unique characteristics of the digital environment and technological risks.

The significance of this work is evident in its potential for practical application, with the results of the research being applicable to enhance the effectiveness of strategic management in organizations across various sectors. The findings and recommendations derived from this study will be of value to both researchers and practitioners in the fields of digital transformation, strategic management, and corporate development.

The objective of this research is to examine the influence of artificial intelligence technologies on the strategic management of organizations and to devise approaches for their integration into management practices, with the aim of enhancing resilience and efficiency in the digital economy.

**Literature review.** The incorporation of artificial intelligence into strategic management is a topic extensively discussed in the academic literature. Researchers highlight the substantial influence AI has on planning, analysis, and decision-making within organizations, necessitating a shift in managerial mindset.

In their work, Keding C. focusing on digital platforms and emerging technologies, explore how AI and automation are reshaping the logic of strategic management[2]. They argue that digital technologies are fundamentally altering not only operational processes but also the essence of competition, making agility and adaptability crucial elements of a successful strategy.

Zhang C. in his article explore the influence of technology, particularly artificial intelligence, on the development of "intelligent" products and services[3]. The authors argue that strategic management in this new context necessitates a reevaluation of conventional value chains. He highlight that the incorporation of AI enables a more precise alignment of strategy with customer preferences and market dynamics, while also empowering companies to provide more customized and groundbreaking solutions.

The Aderibigbe A. O. explores the intricacies of incorporating artificial intelligence into the strategic planning of businesses in developing nations[4]. He emphasizes that the primary obstacle is the absence of digital expertise and the inadequate integration of AI into management processes. However, according to his findings, successful organizations do not rely on AI as a replacement for human decision-makers, but rather use it as a means to improve strategic analysis and reduce uncertainty in decision-making.

Moharrak M., Nguyen N. P., Mogaji E. delves into the influence of AI on the management culture and strategic trajectory of domestic enterprises.[5] In their research, he emphasizes the necessity for establishing institutional frameworks to facilitate the integration of AI into strategic management, encompassing the development of national digital strategies and professional development programs for managers.

Potluri R. M., Mukashev Y. B., Bulatbek K. concludes that AI can substantially enhance the competitiveness of Kazakhstani companies, provided that there is a comprehensive digital transformation of the entire management system[6].

The prevailing consensus in the scholarly discourse is that AI technologies not only augment but fundamentally alter approaches to strategic management. The success of organizations in the future will be contingent upon their capacity to seamlessly incorporate AI into core management processes, ensuring flexibility, adaptability, and resilience in the face of digital transformation.

**Materials and methods.** During the study of strategic management in organizations, three methods were employed. Firstly, an analytical and comparative approach was used to compare various theoretical models and practical examples of strategic management with the introduction

of artificial intelligence (AI). This allowed us to identify differences in the use of digital solutions between traditional and innovative organizations. Secondly, we conducted a case study analysis of organizations that had successfully implemented digital transformation, providing a deeper understanding of how AI is implemented and its impact on management effectiveness. Thirdly, a SWOT analysis was conducted, which allowed us to identify strengths, weaknesses, external opportunities, and threats related to the integration of AI technologies into strategic management processes. This approach provided a comprehensive evaluation of the internal resources of organizations and external factors influencing the success of digital transformation.

### **Results and discussion.**

To begin with, the analytical and comparative approach revealed that companies that incorporate AI into their strategic management approach exhibit a greater capacity for adaptation to external changes and enjoy advantages in data analysis, forecasting, and process automation.

A comparison of conventional and digital methods has demonstrated that organizations that actively adopt AI are developing more agile and customized strategies that can swiftly respond to market demands[7].

Secondly, the use of case studies made it possible to use specific examples, such as Amazon, Alibaba, and Siemens, to trace how AI affects long-term strategic planning. We found that the key to success lies not only in the availability of technology but also in a digital culture, focus on employee training, and willingness to review corporate strategies for flexibility and innovation.

Here are some concrete examples of how AI is used in strategic management through the case study method, based on the analysis of well-known companies:

#### **1. Amazon**

The company actively utilizes artificial intelligence technologies for strategic supply chain management, customer experience personalization, and demand forecasting. An AI-based demand forecasting system helps Amazon effectively manage logistics, reduce costs, and minimize delivery times[8]. This gives Amazon a strategic advantage and strengthens its position as a leader in the e-commerce industry.

#### **2. Alibaba**

Alibaba utilizes AI to analyze consumer behavior strategically, automate marketing efforts, and scale digital platforms. The CityBrain system, developed by Alibaba Cloud, demonstrates how AI can be applied not only in commerce but also in urban planning, such as managing traffic, security, and infrastructure. This expands Alibaba's business beyond commerce and into urban strategy[9].

#### **3. Siemens**

- Siemens employs AI in various aspects of strategic planning and management. They use AI to optimize production processes, improve product quality, and enhance customer service. AI-powered systems help Siemens make informed decisions and stay ahead of the competition.

Siemens integrates AI into its strategic management of production processes and digital twin technology, enabling the simulation, testing, and optimization of products and production lines in a virtual environment[10]. This helps to shorten the development cycle, reduce costs, and promote innovative development. The company's digitalization strategy also includes training for employees, the introduction of data culture, and sustainable transformation of business models.

Using SWOT analysis the strengths of AI include improved accuracy of management decisions, swift analysis, and cost savings. However, weaknesses include high implementation costs and a lack of skilled personnel. Opportunities include the discovery of new market segments and enhanced customer experience, while threats include cybersecurity risks and potential resistance to change among staff. These findings support the need for a comprehensive approach to strategy formulation in the context of digital transformation (table 1).

Table 1. SWOT analysis

Strengths	Weaknesses
– Increased accuracy of managerial decision-making	– High costs of implementing and maintaining AI
– Rapid processing of large volumes of data	– Lack of qualified AI specialists
– Automation of routine management processes	– Need for restructuring corporate culture and internal processes
– Improved strategic planning and scenario modeling	– Dependence on external technology providers
Opportunities	Threats
– Entry into new market niches through AI-driven solutions	– Cybersecurity risks and potential data breaches
– Higher level of product and service personalization	– Possible resistance from employees and management
– Increased effectiveness of strategic monitoring and evaluation	– Ethical and legal risks associated with AI implementation
– Development of new business models based on digital platforms	– Rapid technological obsolescence and need for continuous investment

Source compiled by the author [11-12]

The use of the analytical, comparative, and case study methods, as well as SWOT analysis, allowed for a comprehensive assessment of the impact of AI technologies on organizational strategic management. It was found that AI contributes to increased efficiency and adaptability in strategic decision-making, but it also requires a significant transformation of internal processes and the digital readiness of companies. Real-life examples from Amazon, Alibaba, and Siemens demonstrated the practical benefits of AI in strategic planning. SWOT analysis identified both key advantages and potential risks associated with AI adoption. Successful integration of AI into strategic management can be achieved through a systematic approach, stable digital infrastructure, and a developed management culture. The results of this study indicate that AI has evolved from a purely technological tool to an integral part of organizational strategic thinking. The use of AI has the potential to improve the accuracy of forecasts, automate decision-making, and tailor strategic approaches in various industries. However, relying solely on technological advantages is not enough to ensure success. It is essential to develop a strong organizational culture, invest in the digital skills of employees, and establish ethical standards for interacting with AI. Additionally, it is crucial to systematically assess risks, from cybersecurity threats to the ethical and legal implications of automated solutions.

The discussion highlights the need for a balanced approach in strategic management when incorporating AI into business processes. This includes a focus on both technological innovation and human factors, as well as the flexibility to adapt business models to new circumstances.

**Conclusion.** The study has demonstrated that AI technologies are increasingly influencing the strategic management of companies. The incorporation of AI enhances the precision of management decisions, expedites the analysis and forecasting processes, and fosters the ability to adapt strategies to rapidly evolving environmental conditions.

The examination of theoretical literature, real-world examples, and the outcomes of SWOT analysis revealed that the successful implementation of AI necessitates not only technological

preparedness but also a reconfiguration of management procedures, the cultivation of digital skills among employees, and the overcoming of internal organizational obstacles.

Artificial intelligence can greatly enhance the efficiency of strategic planning and the resilience of a business in the context of digital transformation. However, its implementation is not without its obstacles, including cybersecurity, ethical considerations, and the need for ongoing investment in technological advancements and employee training. Therefore, strategic management in the age of AI necessitates a comprehensive, adaptable, and forward-looking approach that prioritizes both technological capabilities and human potential.

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# THE DEVELOPMENT OF THE TOURISM AND SERVICES SECTOR ALONG THE MIDDLE CORRIDOR

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**Summary:** *The article examines the role of the infrastructure of international transport corridors in the development of the tourism sector, in particular, the positive impact of the opening of the Zangezur corridor on the development of the tourism and services sector is explored. In the course of research, the article analyzes the current state of the tourism sector and the importance of public-private partnership mechanisms that will be used to develop tourism in territories liberated from occupation.*

**Key words:** *liberated territories, road transport infrastructure, Zangezur corridor, tourism sector.*

The infrastructure of international transport corridors plays a significant role in the development of the tourism industry. The study of international experience and analysis of scientific research indicate that transport infrastructure facilitates easy access to tourism destinations and enhances business activity in the region, which in turn positively impacts the living standards of the local population. [4]. Some researchers emphasize that transport infrastructure not only plays a crucial role in expanding existing tourism activities but also facilitates the development of new tourism sectors in the region, thereby promoting the attraction of tourists to the country [3].

As is well known, the opening of the Zangezur corridor will enable access from Nakhchivan to Turkey and further to a broader geographic region, thereby facilitating the integration of our country into the North-South, East-West corridors as well as the Middle Corridor. This development presents new opportunities for all regional countries. Accordingly, the advancement of tourism and service sectors along the corridor is of strategic significance for our nation.

One of the main reasons for the significant interest shown by tourists in Azerbaijan is the country's favorable climatic conditions, the abundance of historical and cultural monuments, and the presence of valuable mineral springs. However, the mere existence of tourism resources is not sufficient to ensure the effective functioning of tourism activities. This can also be explained by the fact that many tourists consider a country unsuitable for travel if it lacks modern hotel infrastructure or, for example, adequate transportation facilities.

**Table 1. Key Indicators of the Tourism Sector**

	2015	2016	2017	2018	2019	2020	2021	2022
Number of persons employed in tourism-related industries	49 449	43 477	46 837	53 222	58 972	49 019	53 717	63 109
Volume of value added generated in tourism-related sectors (million manats)	2 437,3	2 746,1	3 151,2	3 405,5	3 704,9	1 386,7	1 939,7	3917,8
Share of value added generated in tourism-related sectors in the country's GDP (percent)	4,5	4,3	4,5	4,3	4,5	1,9	2,1	2,9
Volume of investments in tourism-related sectors (million manats)	1 063,9	363,0	267,3	229,7	133,7	45,8	242,4	99,3

**Source:** *Tourism in Azerbaijan*, State Statistical Committee of the Republic of Azerbaijan [1]

As shown in the table, the decline in the volume of investments made in tourism-related sectors over the indicated years has led to a 35.5% decrease in the share of value added generated by the tourism sector in the country's GDP in comparison with the period of 2015–2019, despite a temporary increase in 2020 and 2021. Nevertheless, the number of employees in the tourism sector increased by 27% compared to 2015.

It should be noted that the increase in the number of employees in the tourism sector, alongside the decrease in the share of value added generated in tourism-related sectors within the country's GDP, may indicate the existence of several potential issues within the tourism industry. These issues may include the following:

- **Low labor productivity:** An increase in the number of employees without a corresponding rise in added value may indicate low labor productivity in the tourism sector. This could be attributed to inefficient business processes, insufficient utilization of technology, or other factors that hinder productivity growth;
- **Low profitability of enterprises in this sector:** This may be related to intense competition, inadequate demand for the provided services, or other factors that could reduce profit margins within the sector;
- **Inefficient use of resources:** It may be advisable to reconsider management and resource allocation strategies to enhance efficiency;
- **Problems related to the quality of services:** Investments may be required in staff training, improved service standards, and infrastructure development;
- **Insufficient variety of products and services:** The development of new and unique offerings can be a key factor in increasing added value.

Overall improvement of the situation may require a comprehensive analysis and implementation of measures such as optimizing business processes, increasing labor productivity,

enhancing the quality of services, attracting tourists, and developing more innovative products to increase added value in the GDP.

The development of public-private partnership projects in the tourism sector plays a particularly important role in addressing the aforementioned problems. It should be noted that, in the practice of Azerbaijani tourism, there are still relatively few structures operating effectively within the public-private partnership system. However, the necessity of utilizing this progressive form of cooperation between the state and the private sector has been recognized as one of the priority directions.

Our research indicates that although the tourism industry in Azerbaijan lags somewhat behind leading countries, it possesses all the necessary capacities to employ public-private partnership mechanisms to enhance its competitiveness in the global tourism services market.

The successful development of public-private partnerships (PPPs) in tourism critically depends on the existence of a stable business environment and the ability to minimize participation risks in tourism entrepreneurship. Additionally, the preparation of a scientifically grounded strategy for the planning and financing of tourism and tourism-related entrepreneurship plays a key role in advancing such partnerships [5]. Indeed, as demonstrated by international experience, public-private partnerships in the tourism sector evolve on the basis of long-term forecasting and the application of regression models. These approaches aim to ensure high growth rates in socio-economic indicators that reflect the volume, quality, and efficiency of tourism activities.

Guided by the aforementioned directions, let us now examine the current situation in our country.

According to official statistics, the total volume of investments in the national economy demonstrated a steadily increasing trend from the year 2000 up until 2018 (Table 1). However, in 2020, compared to the years 2018–2019, there was a decline in investments from all sources: total investments decreased by 13%, foreign investments by 25.6%, and domestic investments by 1.6%.

**Table 2. Investments Directed into the Economy**

	2000	2005	2010	2015	2017	2018	2020
Investment Inflows from All Sources (taking foreign investments into account)							
Million manat	1289,8	6733,4	14118,9	20057,4	24462,5	25877,0	22484,0
Foreign Investments							
Million manat	829,5	4628,5	6619,7	10998,9	15697,3	14002,1	10413,2
Domestic Investments							
Million manat	460,3	2104,9	7499,2	9058,5	8765,2	11874,9	12070,8

Source: State Statistics Committee of Azerbaijan

**Table 3. Distribution of Preferential Loans by Tourism and Service Sectors of the Economy**

Sectors of the Economy	2008		2010		2013		2020		2021	
	Number of Projects	Amount of loan	Number of projects	Amount of loan	Number of projects	Amount of loan	Number of projects	Amount of loan	Number of projects	Amount of loan
Development of Tourism	38	11,2	3	2,8	5	3,2	7	0,7	9	4,1
To the development of the sector	51	1,2	14	22,7	7	7,5	6	1.6	3	3,3

**Source:** The table was prepared by the authors based on the reports of the Entrepreneurship Development Fund of the Ministry of Economy of the Republic of Azerbaijan for the respective years [2].

It should be noted that one of the strategic approaches aimed at creating synergy between these sectors to improve the tourism experience and stimulate economic growth is the integration of service sectors with tourism [6]. The development of projects that unite the tourism and service sectors is of particular importance in this regard. Such initiatives include the creation and support of thematic events such as festivals, fairs, and concerts, which help attract attention and enhance the region's appeal; as well as digital technologies and applications, including the development of mobile programs and platforms that provide tourists with real-time information about locations and services, and the establishment of cooperation with local companies.

The integration of services and tourism can generate mutual benefits for both parties, enhance the quality of the tourism experience, and contribute to the region's economic development.

The development of the tourism and service sectors can overall contribute to the creation of new jobs in the region. This includes not only those employed directly in the tourism sector but also workers engaged in various services related to servicing tourists.

It is well known that the successful development of tourism along the Middle Corridor also requires attention to security issues, tourism management, and the preservation of the natural and cultural environment. To achieve a positive impact of international transport corridors on tourism in the territories liberated from occupation, a balanced and sustainable development strategy is especially needed. Various public-private partnership mechanisms can be utilized to develop tourism in these areas. Some applicable mechanisms include: infrastructure investments, management and operations, marketing and promotion, training and education, as well as the preservation of cultural and natural heritage.

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# The Future of Employees and the Transformational Role of Human Resources in the Job Market: Challenges, Strategies, and Personal Brand Development

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## Abstract

The corporate world is in constant transformation, driven by factors such as globalization, technological advances, and changes in social expectations. This paper explores the essential characteristics of future employees, the impact of current challenges such as artificial intelligence (AI) and remote work on Human Resources (HR), and the growing importance of building a personal brand in professional development. Analyzing the required skills, the challenges HR faces, and strategies to increase visibility in the market, the paper concludes that HR professionals must position themselves as strategic and innovative agents. Furthermore, it emphasizes the need to adapt to the new dynamics of work and develop a solid personal brand to ensure relevance and leadership in the labor market.

**Keywords:** future employees, Human Resources, artificial intelligence, globalization, personal brand, remote work.

## Introduction

The future of work is being shaped by a series of disruptive factors, including technological innovations, changing employee needs, and new social dynamics. The evolution of organizational environments demands that employees adapt to an increasingly agile, digital, and globalized world. Moreover, Human Resources (HR) professionals face significant challenges as they attempt to align organizational needs with changes in the workforce. This paper aims to discuss the essential characteristics of future employees, the impact of global challenges such as AI and remote work on HR, and ways to increase the visibility of this strategic area, focusing on personal brand development.

## Literature Review

The literature on the future of employees and the impacts of new technologies and globalization in the labor market highlights the need for adaptive skills and continuous learning. Studies suggest that in the future, companies will need employees with strong problem-solving skills, critical thinking, emotional intelligence, and digital literacy (Santos, 2022). Furthermore, organizations will require greater self-management capabilities and the ability to work in digital and multicultural environments (Costa et al., 2021). Additionally, Armstrong (2020) emphasizes that adaptability and the ability to manage complex tasks are fundamental to future job success, especially in rapidly changing industries.

Regarding the role of Human Resources, the literature clearly states that emerging technologies, such as artificial intelligence (AI), are transforming recruitment, selection, and talent management, but also pose ethical challenges (Silva & Pereira, 2023). The increasing reliance on AI for HR

functions has raised concerns regarding transparency and algorithmic biases (Davenport & Ronanki, 2022). Globalization, on the other hand, requires HR to develop inclusive and tailored strategies for managing multicultural and remote teams (Martins, 2022). According to Ulrich and Dulebohn (2020), HR's ability to lead in such complex environments will be crucial for organizational success.

Finally, building a personal brand is seen as a key strategy for HR professionals to stand out in the market and take on a leadership role in organizational transformation (Souza, 2021). In line with this, Groysberg and Abrahams (2019) discuss how personal branding can enhance an HR professional's influence within their organization and the broader industry.

### **Methodology**

This study is based on a qualitative approach, analyzing current literature on the characteristics of future employees, challenges faced by HR, and the importance of personal brand building in professional development. The research was conducted through a literature review of academic articles, books, and reports from specialized consultancies in the fields of human resource management, technology, and the future of work.

### **Results**

The analysis of emerging trends indicates that future employees will be more flexible and focused on continuous learning. Skills such as critical thinking, the ability to creatively solve complex problems, and digital fluency will be crucial for professional success (Santos, 2022). Additionally, the ability to work in digital and multicultural environments will be increasingly valued, with a focus on empathy and effective communication (Costa et al., 2021). According to Koster and Schedl (2021), AI will not only automate tasks but also provide employees with data-driven insights, allowing them to work more efficiently and creatively.

In terms of Human Resources, current challenges include adapting to rapid technological changes in recruitment processes, the use of AI, and the need for inclusive policies in a globalized and remote context. Personalizing the employee experience, focusing on well-being, and managing cultural and gender diversity are seen as strategic priorities for HR (Silva & Pereira, 2023). Moreover, Becker and Huselid (2020) argue that HR must be proactive in preparing employees for the roles of tomorrow through continuous upskilling and reskilling programs.

Building a strong personal brand emerges as one of the most effective ways for HR professionals to gain visibility and position themselves as leaders in transformation within organizations. Authenticity, consistent communication, and continuous skill development are key elements of this process (Souza, 2021). According to Sherman (2021), a well-crafted personal brand increases a professional's credibility and influence in both internal and external networks.

### **Discussion**

The results show that the future employee will need to be more adaptable, proactive, and possess a diverse skill set, including digital competencies, emotional intelligence, and the ability to work in hybrid and multicultural environments. This transformation requires organizations to prepare for upskilling and reskilling programs, as well as more robust inclusion and diversity policies (Cappelli, 2020). Furthermore, the increasing reliance on AI and other digital tools will necessitate a focus on ethical issues such as data privacy and algorithmic fairness (Silva & Pereira, 2023). As AI becomes more integrated into HR practices, transparency and ethical considerations will remain critical (Davenport & Ronanki, 2022).

For Human Resources, the integration of new technologies, such as artificial intelligence, represents an opportunity to optimize processes but also presents ethical and social challenges. Transparency in the use of these resources and addressing potential algorithmic biases are key

issues for the future of talent management. Increasing HR's visibility in the market will be achieved through greater participation in discussions about the future of work and a more strategic role in organizational development (Ulrich & Dulebohn, 2020).

Personal branding, in turn, emerges as an essential tool for HR professionals to differentiate themselves and become influential. By investing in continuous development and building an authentic and strategic presence, HR professionals can ensure their relevance in an increasingly competitive market. As highlighted by Van der Merwe and Beukes (2021), an HR professional's personal brand can have a significant impact on the overall employer brand and talent attraction.

## Conclusion

The future of employees will be characterized by a dynamic work environment where adaptability, continuous learning, and digital skills will be critical to success. Human Resources will play a crucial role in preparing organizations for these new challenges by leveraging emerging technologies and promoting an inclusive and collaborative culture (Cappelli, 2020).

Building a solid personal brand will be one of the key factors for HR professionals to stand out in the market and take on a leadership role in organizational transformation. By adopting a strategic approach focused on continuous development and authenticity, HR professionals can actively contribute to the creation of more innovative, ethical, and sustainable workplaces.

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## Technical Sciences

# The Impact of Urban Development on the Air Quality of Almaty City

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### Abstract

This study explores the impact of urban development on air quality in Almaty over the past decade. The research combined survey data from residents with expert interviews and secondary data analysis to determine that air pollution stems mainly from rising vehicle traffic, uncontrolled construction activities and weak environmental regulations. The study shows that people across the city are worried about air quality, while showing that current policies fail to work effectively, and urban planning structures need improvement. Experts explain how high-rise buildings disrupt natural air circulation patterns and emphasize the urgent need for green zones. The research demonstrates how sustainable integrated planning methods must be implemented to address the worsening air quality crisis in the city and provides solutions that can benefit other rapidly developing urban areas.

*Keywords:* urbanization, air quality, Almaty, Kazakhstan, environmental pollution, vehicle emissions, urban planning, construction impact, public perception, high-rise buildings, wind circulation, green infrastructure, environmental policy, government regulation, ecological sustainability, urban density, air pollution sources.

### INTRODUCTION

#### Hook:

According to the Almaty Air Initiative, one year in Almaty is equivalent to smoking 487 cigarettes, which provides a vivid picture of the air pollution situation in the city. Before its current pollution status, Almaty was known for its pristine mountain air and panoramic views, but now stands among the most polluted Central Asian cities. During the winter months, smog covers the city skyline for extensive periods, reaching up to weeks, while the normally visible mountains fade into obscurity behind the polluted air. The poor air quality that negatively affects residential areas has turned into a normal condition, which generates more health dangers and decreases the quality of life. Urban development continues at a quick pace, and so does the magnitude of environmental destruction it generates.

#### Background (Statement of the Problem, Perspectives):

During the last 20 years, Almaty has faced an accelerating rate of urbanization through increased population growth, together with the expansion of personal vehicles and uncontrolled construction activities. The quick expansion of developments exceeded environmental regulation systems, which resulted in major deterioration of air quality throughout the city. The location of Almaty in a mountain basin creates a pollution trap because it prevents natural ventilation from entering the area. Economic and social development are commonly linked to urban development, although environmental consequences must remain within our awareness. The research evaluates the effects of urban growth on Almaty's air quality through interviews with city inhabitants and environmental professionals, and government officials.

**Research Aim:**

This research aims to study the effects of urban development on Almaty's air quality over the previous ten years. It seeks to determine how transportation, construction, and population growth have contributed to the problem. The research also aims to evaluate the effectiveness of current environmental regulations.

**Research Objectives:**

1. To evaluate population growth and urban density effects on atmospheric quality.
2. To examine transportation infrastructure development and its impact on rising vehicle usage on air pollution levels.
3. To assess the effects of urban development projects and construction activities on wind circulation and atmospheric pollution.
4. To investigate how well existing environmental laws and rules function to control air quality problems.

**Hypothesis:**

The study hypothesizes that the rapid urban development of Almaty, which is characterized by population growth, increased vehicular traffic, and high-density construction, has significantly contributed to the deterioration of air quality, primarily due to insufficient environmental planning and ineffective policy enforcement.

**The Object of the Research:**

This study examines the urban development process happening in Almaty.

**The Subject of the Research:**

This research investigates how urban development affects air pollution in Almaty through its impact on transportation systems, construction activities and environmental control measures.

**Scientific Novelty and Theoretical Significance of the Research:**

The research contributes to environmental knowledge by integrating survey data with expert interviews and secondary data sources to establish a comprehensive understanding of urban development effects on air quality. This research expands previous studies by exploring both emission quantities and infrastructure while delivering theoretical findings about post-Soviet city environmental degradation during urbanization.

**The Practical Significance of the Research:**

This research provides useful information to urban planners, policymakers, environmental agencies and academic institutions. By identifying pollution origins and structural causes, this study develops implementable recommendations that direct sustainable urban development for Almaty and comparable cities worldwide. Future environmental policy development and public awareness campaigns about pollution reduction can use this research as their starting point to enhance urban life quality.

## LITERATURE REVIEW

Air pollution is one of the most urgent problems in large cities, usually caused by urbanization and industrialization. The World Health Organization identifies air pollution as one of the leading environmental risks to health, which leads to millions of deaths worldwide (Temirbekov et al., 2023). In the case of Almaty, Kazakhstan's largest and ex-capital city, urbanization has emerged as a major contributor to significant environmental challenges in air quality degradation. Almaty was ranked 208<sup>th</sup> out of 80000 cities by the level of air pollution (Forbes Kazakhstan, 2022). Almaty's unique geographical location exacerbates the impact of urbanization on air quality. Over the last 10 years, as the population of Almaty city proliferated and the urbanization level reached its highest point, the air quality decreased hand in hand. The significance of investigating air quality in Almaty lies in its implications for residents' health and its potential to inform policy and urban planning in rapidly developing urban centers. Existing

literature reveals several critical themes as major contributors to this issue and the ways to address it. This literature review aims to investigate existing literature to determine key factors influencing air quality in Almaty and find the correlation between the relationship of air pollution and the urbanization process in Almaty city over the last decade.

The sources of air pollution in Almaty city are deeply intertwined with the city's rapid urbanization. Most researchers agree that vehicle emissions are the most significant contributor to decreased air quality. As the population increased and the city expanded, the demand for transportation surged, too. According to Kobegenova et al. (2020), over 540 thousand vehicles are registered in Almaty. Currently, every fourth of Almaty residents owns a private car (Daryo, 2024). Galushko (2024) also states that Almaty city releases 189,012 tons of pollutants annually, of which 60% are from vehicles and 27.5% are from industries. These findings showcase that, indeed, aging and largely unregulated vehicles are a pivotal problem that significantly degrades air quality in Almaty, leading to higher concentrations of pollutants such as nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>2.5</sub>). The content of nitrogen dioxide in Almaty exceeded the maximum permissible concentration by 2.2 times, sulfur dioxide - by 1.2 times, and carbon monoxide exceeded by 1.4 times (Kobegenova et al., 2020). Bekbossinova & Niyazbekov (2024) demonstrated almost the same results: a 10% increase in GRP correlates with a 5% escalation in pollutant concentrations. The biggest average PM<sub>2.5</sub> concentrations of Almaty were at 42 µg/m<sup>3</sup>, which surpassed permissible norms by 20%. Kalikhan (2023) mentioned that this exposure shortens life expectancies and makes people more vulnerable to several diseases, such as increased rates of chronic obstructive pulmonary disease (COPD), strokes, ischemic heart disease, and lung cancer. Temirbekov et al. (2023) claim that in several cities of Kazakhstan exceeded concentration of PM<sub>2.5</sub> caused 8134 cases of premature death of adult people each year in 2015–2017. Additionally, industrial activities, particularly from coal-fired power plants, exacerbate the air quality crisis as they emit harmful particulates and gases that linger in the environment due to the city's geographical location, which traps cold air and pollution within its valleys (Forbes Kazakhstan, 2022). According to Temirbekov et al. (2023), thermal power plants burn about 3.7 million tons of low-grade coal with high ash contents (39–40%) annually.

Poor urban planning played a crucial role in the degradation of air quality. Almaty City, with its unique landscape, requires elaborate and deeply considered urban planning. However, inadequate infrastructure and poor regulations only exacerbated the ongoing situation and set the stage for air pollution. In Almaty, to meet the interests of developers, trees are being cut down, wind circulation is being disrupted, and air pollution is increasing accordingly (Trotsenko, 2022). Although a lot of activists are fighting against illegal construction, the government does not listen to them. Saltanat Tashimova, an eco-activist, stated that multi-story buildings are the main reason for the deterioration of air quality (Trotsenko, 2022). This type of building is strictly not recommended for Almaty. However, construction often goes without state acceptance, proper technical control, and the participation of seismologists and emergency staff. Only as part of the implementation of the Nurly Zher state program in 2021, 66 multi-story buildings with 3065 apartments, with a total area of 239.7 thousand square meters, were commissioned (Trotsenko, 2022). Pokrovsky (2024) highlights that, at present, the city does not have essential resources for the advancement of landscape gardening and landscaping; nearly all choices are based not on scientific principles but rather on situational cases. Urban landscaping projects often lack efficiency and public input. For example, poor selection of plants and inadequate maintenance reduce sustainability (Pokrovsky, 2024).

Researchers believe that the most effective solution for addressing the problem of air pollution in Almaty is to enhance green zones and balance growth with sustainability. A conducted survey among the residents of Almaty demonstrated that 56% of respondents are assured that an increase in green areas and parks will help reduce pollution levels (Air Org, n.d.). Other crucial

factors for reducing harmful emissions are sustainable urban planning, clean energy policies, and public awareness (Bekbossinova & Niyazbekov, 2024). The ongoing projects like increasing green zones, public transportation upgrades, and transitioning to renewable energy aim to combat pollution. It is planned for spring 2025 to plant 4 thousand trees, 7 thousand square meters of hedges and flower beds, and 300 thousand square meters of herbs along Sairan (Almaty TV, 2024). Almaty aims to increase its green spaces to cover 30% of the city's area by 2030, and the number of private vehicles is targeted to be reduced by 25% through public transport improvements (Abdirayim, 2023). Almaty allocated 10.77 billion KZT in 2024 for ecological projects, including tree planting and air quality monitoring (Galushko, 2024). However, not enough budget is allocated for alleviating air pollution in Almaty, even if it is one of the most urgent problems in this city, which negatively affects the health of many residents. For example, according to the document "On the budget of the city of Almaty for 2021-2023", 2,429,193,000 tenge was allocated at the local level for measures to improve the environment and develop a green economy, that is, 809,731,000 tenge per year, which is 604,269,000 tenge less than in 2020 (Forbes Kazakhstan, 2022). Although air pollution is getting worse each year, the government is effectively ignoring this issue.

In conclusion, studies consistently document a significant correlation between urban growth and a decline in air quality in Almaty. A comprehensive examination of the existing body of research revealed several key findings, primarily regarding the sources of pollution in Almaty, such as vehicular emissions, population surges, construction endeavors, and increased industrial activity. It is worth noting that pollutants, including particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub>), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>) concentrations, have hit worrisome levels that bring about serious health concerns to people residing in the city. Policies and measures to address these problems, like better public transport, an increased number of green areas, and stricter regulatory measures have started to yield results. But this intervention is important if we want the change to be general and lasting. Cooperation among government departments, community members, and civil society organizations could boost awareness of the public and encourage positive behavior. Also, Almaty City's urban science should primarily consider the correct and competent development of the city's urban planning taking into consideration its landscape and geographic position details. Ultimately, the requirements for Almaty that should be considered in urban planning still require a lot of research. It is crucial for ensuring a healthier urban environment and safeguarding the well-being of its inhabitants for generations to come.

## METHODS

### Study design

In this study, to investigate the impact of urban development on air quality in Almaty city over the last decade, three research methods were implemented, which include survey, interview, and secondary data analysis. The combination of both qualitative and quantitative methods ensures a comprehensive insight into the issue from diverse perspectives. This approach is suitable because air quality is influenced by an abundance of factors, like urban planning, transportation, industrial activities, and policy decisions, and these data collection methods helped to explore each of the factors. Quantitative data was derived from survey responses collected from the residents of Almaty city and secondary air pollution data obtained from governmental and environmental sources. The survey method is highly effective as it allows the gathering of quantitative information from a large sample, such as residents' perceptions and experiences regarding air quality. The obtained data was also effective for generalization for a broad population of Almaty city. Secondary data analysis offers objective statistical evidence on air pollution trends and policy impacts that give insight into the correlation between air quality changes and increased vehicle usage. Qualitative data was collected by conducting interviews with three people with various specialties connected to the research issue. Interviews with experts

from different fields provide detailed information and professional opinions about the role of transportation, urban planning, and industrial development in air pollution from diverse aspects.

### **Sample/Participants**

This study involves diverse groups to ensure a versatile perspective on the issue. The research will take place within the population of Almaty.

First, the survey was taken from a random sample of 100 residents of Almaty city, regardless of their age and gender, to represent the huge population of Almaty, make it more generalizable, ensure representation of citizens from various districts, and collect various perspectives. Respondents of the survey were strictly required to be current residents of Almaty to guarantee the accuracy and validity of the results. The sample size of the survey is sufficient to ensure reliable results, cover most of the population of Almaty, and gather a broad sample of responses.

The interview was conducted with three professionals with expertise in different fields: Tairzhan Khutkuliev, an architect and designer; Ishnazarov Bolat Ramatdinovich, the director of Kapstroygrupp-T LLP, a construction company; and Ilyanikh Marina Olegovna, the head specialist of the Department of Environmental Regulation of Almaty region. Interviews offer more detailed qualitative insights into the core reasons for the deteriorating air quality and do not require a large sample, so this specific number of participants was chosen.

The final data source comprises secondary data obtained from government reports, environmental agency publications, and academic studies on air pollution trends in Almaty.

Since the study does not involve vulnerable groups, formal approval was not required. However, informed consent was obtained from all participants to ensure ethical compliance and voluntary participation.

### **Materials/Tools**

For the survey method, Google Forms was used to create and distribute the structured survey and social media such as WhatsApp, Instagram, and Telegram to reach the broad target audience easily and quickly. These instruments were beneficial for both the research process and the participants. They helped to save time and resources, and an online survey made it possible for participants to respond at any comfortable time and place and keep their identity anonymous.

Interviews were conducted either in person or online through platforms like Zoom, Google Meets, or Teams, depending on the preference and availability of the interviewees. In-person interviews took place in a café or house to create a comfortable environment for the participant. Additionally, materials such as pen, paper, and voice recorders were used to document the responses of the interviewees for later analysis. Recording the whole conversation will increase the reliability of the research and provide evidence.

Additionally, secondary data sources, including environmental reports and air quality monitoring data taken from the internet, were analyzed to assess long-term trends and policy impacts through the MS Excel program. These instruments have been chosen for their reliability in capturing both statistical trends and personal insights into air pollution in Almaty.

### **Procedure**

The research was conducted systematically. The first step in implementing the survey method was to create a structured survey in Google Forms consisting of 12 organized, clear, and concise questions addressing the participants' perceptions of air quality, health effects, attitude to urban infrastructure, and their habits in vehicle usage and checking the air quality. Then, the survey was distributed to the audience through Instagram stories, WhatsApp, and Telegram chats, thus effectively reaching 100 people. After collecting responses, the quantitative data was analyzed through the statistics in Google Forms and the Excel program. These descriptive statistics helped to identify trends and patterns, generalize them, and apply them to the population of Almaty city.

For the interview, firstly, structured guides for the conversation and five open-ended questions were prepared for each of them. Some of the interviews took place in a café, and others online through the Zoom platform, lasted for about 30 minutes, and were recorded with the consent for later analysis. All conversations were transcribed to the written format, and personal opinions were investigated.

Then, secondary data was collected from governmental and environmental agencies, with a focus on identifying air quality trends over ten years and correlating them with urban development indicators. Lastly, the collected quantitative and qualitative data was thoroughly analyzed to answer all the sub-questions and objectives of the research topic.

### Ethical consideration

All the participants of the study were fully informed about the study’s purpose and their rights before participation, and their consent was obtained, written or verbally. The survey was anonymous, so the identity and responses of the participants will not be revealed to maintain confidentiality. Participation in the study was entirely voluntary and not forced. Participants were also allowed to withdraw from the study at any stage. The interviews and focus group discussions were recorded with the consent of all the respondents. To protect the collected data, audio recordings, and survey responses, they were securely stored and used strictly for research purposes. This will ensure participant safety and compliance with ethical standards.

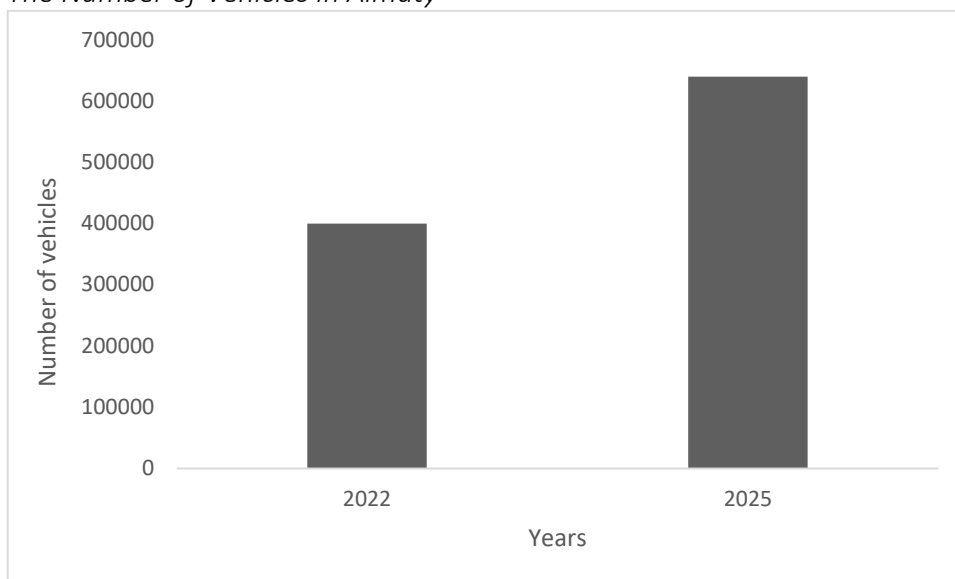
## RESULTS

### The Interviews

Interviews with experts showed the most significant causes of air pollution, challenges, and solutions in construction, architecture, and urban design. As per Ilianykh Marina Olegovna, head specialist of the Department of Environmental Regulation, air pollution in Almaty has increased considerably over the last decade, the major contributors being vehicle exhausts, industrial processes, and wasteful heating systems in the private sector. As depicted in Figure 1, the number of automobiles in the city has risen from 400,000 to 664,000, with yet another stream of vehicles pouring in daily, the total reaching well over a million.

**Figure 1**

*The Number of Vehicles in Almaty*



Both Ishnazarov and Ilianykh emphasized that construction work is one of the principal sources of air pollution due to dust, emissions from construction machinery, and burning of high-carbon-content fuels. All three experts underscored the role of high-rise buildings in contributing to poor air quality. Architect and urban planner Tairzhan Khutkuliev explained that new buildings

fail to consider wind patterns, therefore leading to inadequate air circulation and more lingering smog. In previous urban planning practices, he said, buildings were designed to align with natural wind flow; now they often stand in the way. Similarly, Ishnazarov Bolat Ramatdinovich, the Kapstroygrupp-T LLP director, proposed limiting high-rise buildings and creating more strict policies for building positions based on current wind patterns.

Ilinykh explained various environmental regulations aimed at reducing pollution: a new urban planning regulation, effective until 2040, mandates that streets and buildings align with wind patterns to improve air circulation. However, Ishnazarov revealed that the building companies are normally unable to fulfill the requirements because it is costly for them to implement green technology and materials. Additionally, Khutkuliev revealed that the architects are pressured by investors who prioritize returns on investments over green architecture.

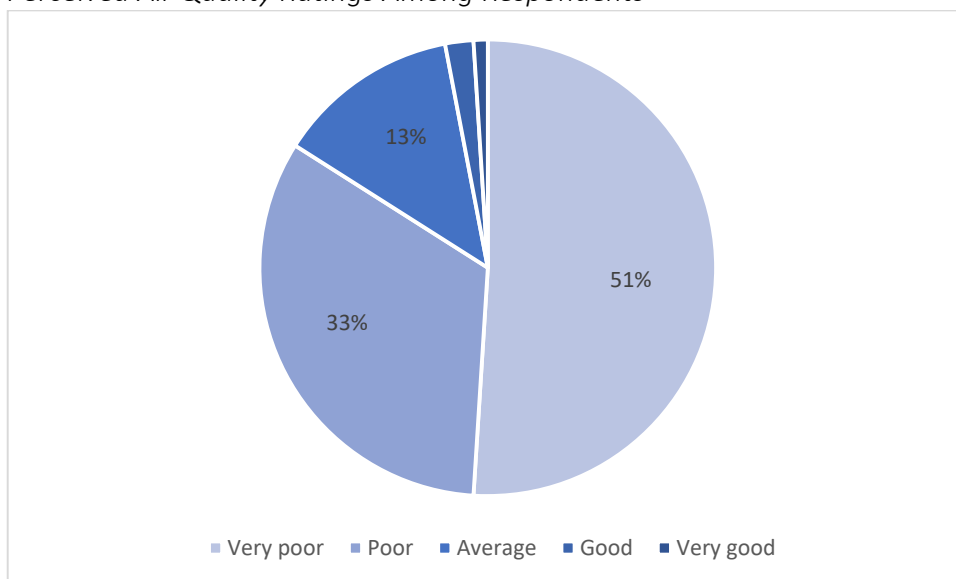
The professionals agreed that more green spaces were required to mitigate air pollution in Almaty. Khutkuliev emphasized that 50% of the city area should be occupied by facilities, 20% should be pedestrian zones and at least 30% should be green areas.

### The Survey

A survey was conducted among 86 residents of Almaty to assess public attitude, awareness, and potential solutions to air pollution. The majority of the respondents assessed the quality of air in Almaty as poor. As shown in Figure 2, a large majority of the respondents provided low grades when asked to score their perception of air quality. Specifically, 51.2% of the respondents ranked the air quality as very poor, whereas 32.6% considered it a little bit better but poor.

**Figure 2**

*Perceived Air Quality Ratings Among Respondents*

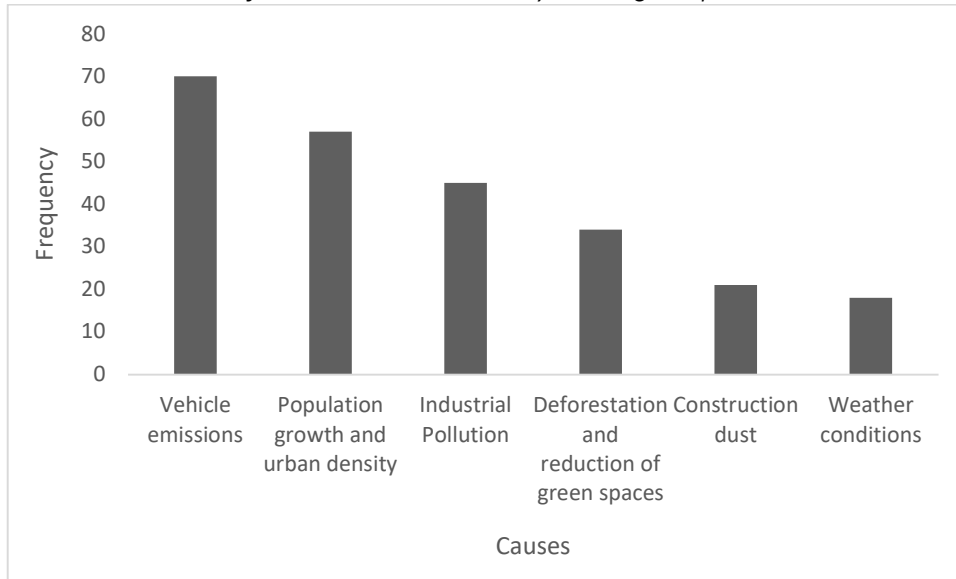


Concerning health issues, the study revealed that 83.7% of the respondents had already experienced respiratory symptoms. Regarding government policies, merely 2.3% of the respondents are satisfied with the current government effort to improve air quality. The majority of them concurred on the expansion of green spaces, emissions control on vehicles, and enlargement of environmentally friendly transportation as the proposed solutions.

Additionally, as indicated in Figure 3, most respondents identified vehicle emissions as the primary source of air pollution, followed by industrial emissions and urban development. 90.7% of the respondents admitted that urbanization has been a significant contributor to poor air quality.

**Figure 3**

*Perceived Causes of Air Pollution in Almaty Among Respondents*

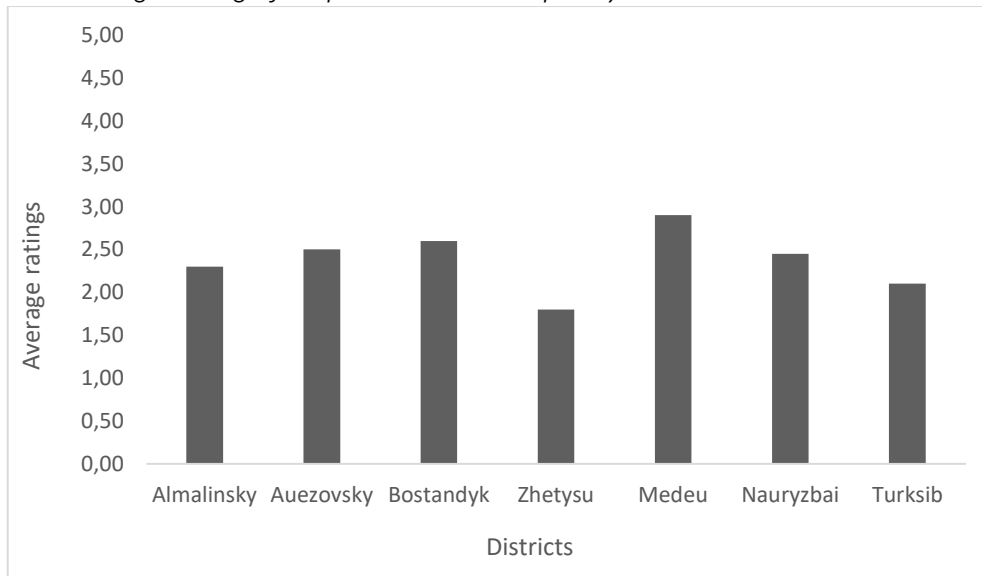


Note: N=86

Respondents were asked to rate the air quality in a district in which they live on a scale of 1-5. As shown in Figure 4, it was revealed that the district Medeu received the highest average rankings, while the district Zhetysu had the lowest ones. However, all districts of Almaty were rated between 2-3, with slight correlations.

**Figure 4**

*The average rating of respondents on air quality in each district*



Note: Ratings are measured on the Likert scale of 1-5.

**Secondary Data Analysis**

Almaty City exhibits high pollution levels due to economic growth and urbanization (Bekbossinova & Niyazbekov, 2024). Factors such as industrial output, seasonal heating demands, and unfavorable climatic conditions trap pollutants and worsen air quality issues. Bekbossinova and Niyazbekov (2024) highlight that Almaty surpassed the WHO-recommended limit and reached a peak PM10 concentration of 82 mg/m<sup>3</sup> in 2020, as shown in Table 1. Abaiuly (2021) assumes that the growth in the number of vehicles and the production of building materials are the main

reasons for PM10 emissions. Gasoline in Kazakhstan has an insufficient octane number and does not comply with European standards, which leads to air pollution.

Additionally, Bekturganova and Kireyeva (2024) also noted that increased CO2 emissions are caused by the growth of the urban population, leading to an increased level of energy consumption.

Another important factor might be Almaty's inversion layer, which is contributing to Almaty's stagnant atmospheric conditions. This layer prevents air exchange, thus leaving entire urban residential areas poorly ventilated and in a zone of high environmental risk (Dedova et al., 2024).

Aiman et al. notes highlight construction dust as the main polluting factor in Almaty. In January-June 2024, the volume of construction works increased by 8.6% and amounted to 2748.2 billion tenge across Kazakhstan, which is due to works on construction and repair of residential buildings (22.4%) and structures (by 15.6%).

To mitigate air pollution issues, conservation areas and parks around large agglomerations must be created, which will help to reduce CO2 emissions. Many complex problems related to infrastructure, ecology, and the attractiveness of the urban environment should be solved based on the concept of a "20-minute walking distance" (Sattarov et al., 2023).

**Table 1**

*Average Concentrations of Major Pollutants in Almaty ( $\mu\text{g}/\text{m}^3$ )*

Pollutant	WHO Standard	2020
PM10	20	82
NO2	40	60
CO	10000	6000

*Note: Adapted from The Impact of Urbanization on Air Quality in Largest Cities of Kazakhstan by A. Bekbossinova & A. Niyazbekov, 2024, Eurasian Journal of Economic and Business Studies, 68(3), 66–81.*

## DISCUSSION

This study shows that Almaty's urban growth has caused a severe deterioration of air quality over the last ten years. An analysis confirms the hypothesis that increased population density, transportation infrastructure expansion, poorly regulated construction, and inadequate environmental policy implementation have substantially contributed to rising levels of air pollution in Almaty. These findings expand the understanding of how urbanization affects environmental conditions and validate the findings from the literature review.

The study data show that transportation produces the most significant pollution in Almaty. The survey and interview data indicate that motor vehicle exhaust emissions are the primary pollution source. The survey results showed that 90% or more of the participants identified transportation along with urbanization as the primary causes of deteriorating air quality. According to Galushko (2024) and Daryo (2024), the number of private vehicles has increased exponentially. Ilianykh Marina Olegovna established vehicle emissions as the leading cause of pollution since the city added more than 600,000 cars to its streets in recent years. The study shows that expanding cities without sufficient transportation reform will lead to severe deterioration of environmental conditions. The survey results match expert interview findings, which show that people strongly favor eco-friendly public transportation systems.

The survey results show that Almalinsky and Medeu districts, where development is higher, have better air quality than Zhetysu and Turksib districts, which are industrial and peripheral. The findings suggest that high urban density by itself does not automatically lead to poor air quality since other factors, such as unregulated development industrial groupings and limited green

areas, play greater roles. Population growth creates infrastructure challenges, but pollution levels increase primarily because of insufficient planning and regulatory oversight. Bektorganova and Kireyeva (2024) established that their study linked CO<sub>2</sub> emissions to both urban population growth and energy consumption increases. Their research also demonstrated that specific sustainable urban strategies, such as district heating combined with green roofs and public transportation systems, help reduce these negative effects.

The interviews with experts underscored how urban planning has failed to integrate environmental considerations. Architect Tairzhan Khutkuliev and construction director Ishnazarov Bolat highlighted the disruption of natural wind patterns by high-rise buildings as a major factor in the persistence of smog. The high-density developments have changed the city's "wind rose" which limited natural ventilation and allowed air pollutants to stagnate. This view is in line with Trotsenko's (2022) findings that the main cause of the deterioration of air circulation and thermal inversion events is the poor design of compact residential areas. These insights emphasize that architecture and planning play a crucial role in sustaining or disrupting urban ecosystems. The establishment of new city regulations that will align streets and buildings with wind directions until 2040 presents a vital solution to this problem. The enforcement of these regulations shows inconsistent performance, and developers continue to choose economic benefits instead of long-term environmental health according to interview findings.

A significant discovery indicates environmental policies fail to achieve their objectives. Air quality improvement measures implemented by the government do not satisfy more than 2.3% of survey participants. The information gathered through interviews shows strong skepticism about this issue. The interviewees, including Ilianykh, mentioned multiple policy measures like electrified public transport and green zoning, yet the architects and engineers doubted their ability to be executed properly. The financial constraints faced by construction companies prevent them from following eco-friendly guidelines, thus impairing regulatory effectiveness, according to Ishnazarov. The Forbes Kazakhstan (2022) article underlined that Almaty's ecological budget showed both poor funding levels and contradictory trends with increasing pollution in the city.

The implications of these findings are substantial. Research confirms academic work claiming unregulated urban expansion in developing cities creates serious environmental issues especially when market-based initiatives operate without environmental protection standards. However, this study contributes original insights by triangulating perspectives from residents, experts, and secondary data to present a holistic picture of Almaty's environmental crisis. The study extends previous research by analyzing both pollution statistics and legal frameworks together with community attitudes and professional opinions to understand pollution origins and governance failures that sustain them. The study demonstrates that sustainability requires coordination between urban development, environmental science, and public administration fields.

The research reveals multiple workable solutions among the findings. The survey results showed that most participants backed the growth of green areas together with better public transit systems and stricter emission standards. The expert opinions gathered through interviews advocated for sustainable urban development by implementing pedestrian-friendly city planning including wind corridors in zoning regulations and selecting sustainable construction materials. The proposed recommendations align with global urban sustainability patterns and demonstrate both professional and community support for major city transformation. The development of Almaty could draw inspiration from international models which include Copenhagen's bicycle infrastructure and Seoul's river corridor restoration projects.

Nevertheless, several limitations must be acknowledged. The survey research involved 86 participants who represented diverse backgrounds, yet their number might not have captured the complete range of experiences among city residents. Professional interests may affect expert

opinions during interviews because the qualitative research method introduces subjective elements. The analysis of secondary data from official publications and government reports faced two limitations some datasets were outdated and did not provide detailed geographic information. The research findings remain valid despite these study restrictions, which indicate that future research should utilize larger participant numbers of longitudinal study designs and spatial analysis tools to create more precise pollution distribution maps of the city.

Further studies need to investigate the extended consequences of recent policy changes including the 2040 urban regulation plan. Research should assess the impact of different approaches to solve the problem of air pollution, such as electric public transport and low-emission building codes. Research should examine different public engagement approaches to encourage environmentally responsible actions among citizens.

### **CONCLUSION AND FURTHER RESEARCH**

In conclusion, this research studied the effects urban development has had on Almaty's air quality throughout the last ten years. This aim was pursued through a combination of secondary data analysis, expert interviews, and a survey of residents. The research results demonstrate that urban development through expanded transportation infrastructure unregulated dense construction and insufficient environmental policy enforcement have severely harmed air quality in Almaty. Research results show strong evidence that transportation emissions create the most significant source of pollution while high-rise development disrupts natural air circulation patterns and environmental policies lack sufficient implementation. Residents supported our findings through their feedback which showed their dissatisfaction with current government actions and their belief that traffic and construction activities are the main sources of air pollution. Expert interviews confirmed that financial and administrative challenges hinder the effective application of sustainable practices. The results demonstrate that the city needs better regulations and strategic urban planning along with environmentally responsible construction practices as an urgent requirement. The research findings have high practical value because they can be applied to rapidly expanding cities worldwide that experience identical environmental challenges. The solution to the air pollution crisis demands a comprehensive method that combines urban planning with policy development and public engagement to create sustainable and healthier urban areas.

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# AI-Driven Cybersecurity for Kazakhstan's Marketing Data Protection: Threats, Challenges, and Solutions

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## Abstract

**Purpose** – The objective of this paper is to examine and analyze the function of AI-driven cybersecurity solutions in safeguarding marketing data in Kazakhstan. As dependence on digital marketing grows, firms see heightened cyber attacks aimed at sensitive information.

**Design/methodology/approach** – A critical review of the literature is conducted, followed by a discussion of the existing cybersecurity infrastructure for marketing data in Kazakhstan. Analytical research into AI-based technologies and applicability in comparable markets is conducted. Statistical information and expert interviews provide a basis for assessing potential solutions specific to Kazakhstan.

**Findings** – The research determines that while AI-driven systems provide effective solutions towards finding and preventing cyber attacks, difficulties arise in the form of low consumption rates and unavailability of skilled professionals in AI as well as cybersecurity domains. Moreover, marketing data in Kazakhstan is extremely susceptible to internal and external threats owing to poor security measures.

**Research constraints** – The study is constrained by the unavailability of localized data on AI-driven cybersecurity solutions applicable to Kazakhstan. Additional empirical research would be required to measure the far-reaching effects of such initiatives.

**Originality/value** – The article emphasizes the increasing significance of AI in cyber security and provides customized advice for the marketing industry in Kazakhstan, bridging the gap in local research.

**Keywords:** AI-driven Cybersecurity, Marketing data protection, Cyber attacks, Data privacy, AI solutions, Fraud prevention, Risk management, Kazakhstan.

## Introduction

Digitalization of companies in Kazakhstan has very deeply transformed the marketing environment, with companies becoming more dependent on customer information to guide strategy. The transformation has the promise of more precise advertising, although it presents immense cybersecurity threats. Marketing information containing financial and personal data has become a target for hacking (Iskakov & Karimov, 2021). While reliance on cyber infrastructure improves, vulnerabilities within Kazakhstan's marketing sector grow. Kazakhstan's cyber infrastructure has developed considerably over the past decade, with more and more companies embracing online services and e-commerce. The growth in cyber attacks has made known vulnerabilities, particularly in data protection from marketing. Traditional cybersecurity such as firewalls and antivirus software cannot match the rise in complexity of attacks. This makes marketing information extremely exposed, especially in an economy as rapidly digitizing as Kazakhstan's. The growth of artificial intelligence (AI) in cyber defense offers one possible solution. AI-based technologies use machine learning algorithms, pattern detection, and real-time threat

identification to identify and disrupt cyber attacks. In marketing firms processing enormous data sets every day, AI provides a significant boost in data defense capacity (Kossanov, 2020). In spite of such a promise, the implementation of AI-based cybersecurity solutions in Kazakhstan is also minimal. Enterprises lack the budget or human resources to fit such sophisticated systems, and therefore their marketing data is exposed. With the rapid advancement of digitization in Kazakhstan, data protection in marketing is crucial in ensuring customer confidence and corporate stability. AI-powered cybersecurity embodies a novel paradigm to combat these issues; yet, more needs to be done with regard to its adoption and application in Kazakhstan.

The defense of marketing data is a top priority for business survival and consumer confidence. Cybersecurity is more critical with the expansion of the digital economy of Kazakhstan, particularly in those sectors that involve large amounts of data, such as marketing (Linkov, 2019). Conventional security methods are not adequate to cope with the velocity and sophistication of contemporary cyber attacks. Thus, AI-powered cybersecurity solutions are essential to protect the marketing sector from looming threats. This study is legitimate due to the increasing vulnerability to cyberattacks in Kazakhstan and the absence of adequate studies on the use of AI in cybersecurity, particularly in marketing. Foreign research emphasizes the advantages of AI in cybersecurity; nevertheless, there already exists an insufficient number of studies addressing the specific case of Kazakhstan. The digital infrastructure and legal environment in the country offer specific challenges that need special solutions. The study addresses the given limitations, thus contributing to current knowledge. Artificial intelligence has been highly effective in handling cyber attacks and thereby providing capabilities that are superior to conventional methods. AI can recognize and counter attacks more efficiently than human-controlled security systems by analyzing large sets of data in real-time. AI-based technologies could significantly improve data security in Kazakhstan's marketing industry, which stores sensitive customer information. However, AI-based solution adoption in the nation is sluggish because of various issues, such as an inadequate level of technical knowledge, its high expense, and poor awareness of AI advantages. This study addresses the adoption challenges of AI-based cybersecurity in Kazakhstan. While AI has significant potential, various hurdles are facing its extensive use, such as an insufficient level of cybersecurity and AI knowledge and poor financial resources (Gupta & Srinivasan, 2021). Secondly, the regulatory framework in Kazakhstan is unstable, giving rise to uncertainty for those companies that desire to adopt new technology. Mitigating such challenges is crucial to the digital security of the country. This research is significant in determining the use of AI in the marketing data security in Kazakhstan. An escalating threat landscape, alongside the inefficiency of conventional cybersecurity measures, testifies to the need for AI-based solutions. This study seeks to assist governments and organizations in making appropriate cybersecurity plans by emphasizing targeted threats to marketing information and providing realistic solutions. The study enhances the security of valuable marketing information and facilitate the development of Kazakhstan's digital economy. The aim of this paper is to explore and examine the use of AI-based cybersecurity measures in safeguarding marketing information in Kazakhstan.

### **Literature review**

A growing reliance on information has been a side effect of digitalization spreading in various business domains across the world, most notably in marketing. Enterprises have become victims of cyberattacks owing to their internet reliance, particularly those operating in developing countries like Kazakhstan. Since marketing sectors deal with enormous volumes of customer information, and the information might include personal, behavioral, or financial information, they are a great target for cybercriminals (Johnson, 2021). The sophistication of cyberattacks has increased in synchronization with the development of technology, rendering traditional means of cybersecurity useless when confronting the attacks that are predominantly common nowadays

(Basu & Sharma, 2020). It has become clear that artificial intelligence (AI) is a game-changer in the field of cybersecurity.

Artificial intelligence-powered cybersecurity systems are able to identify and clear threats more effectively than systems used by humans (Zhang, 2020). This is done using machine learning (ML), deep learning, and natural language processing (NLP). According to Kim (2019), artificial intelligence technology is able to identify patterns and deviations in real time and this can be utilized for the detection of unique threats. This is as opposed to conventional systems that make use of pre-established rules as well as signature-based detection. Artificial intelligence has been established through studies to not only enhance detection levels, but also substantially lower response times, and as such, represents a central component of current-day cybersecurity architectures (Srinivasan, 2020). According to Asad and Pereira (2021), artificial intelligence-based security products are becoming popular with industries handling sensitive data, such as the healthcare and finance industry. In terms of protecting large amounts of personal and financial data, these industries, as well as those in marketing, are faced with handling this kind of information.

Marketing data is increasingly helpful, not just for the businesses that are in need of improving their marketing but also for the hackers who are intent on taking advantage of the data. Marketing databases, according to the hypothesis by Bhatia and Kumar (2021), are generally susceptible to attacks because they have a lot of different and many pieces of data in them. This data includes individual names, addresses, and purchasing behavior, all of which can be used for identity theft and other malicious endeavors. Additionally, Smith (2020) describes a need to use artificial intelligence in proactive cybersecurity. Artificial intelligence software can predict and disable threats before they cause major damage, in contrast to the traditional systems, which respond to problems once they have already taken place. This forward-thinking ability is critical in the field of marketing, as it is always gathering, processing, and storing information. As cited by Gupta (2021), companies that employ AI-based solutions in their cyber defense processes report both a decrease in the frequency of data breaches experienced and a decrease in recovery time from an attack. In cybersecurity matters, marketing departments tend to be ignored even as they are one of the areas within an organization that generate the most data. Marketing activities, ranging from social media interactions and consumer surveys to web analysis and customer relationship management (CRM) software, are responsible for acquiring most of the consumer data a firm accumulates (Barney, 1991; Becker, 1993; Boon et al., 2018). As noted by Watson (2021), the online marketing environment provides hackers with several points of entry to access, which makes it a soft spot that can be attacked. An attack on marketing can result in the release of personally identifiable information (PII), which can cause not only economic loss but also harm to a firm's reputation. According to the research results of Farooq (2020), marketing data is typically preserved in cloud environments, and this brings new challenges to the security of the data. Cloud storage, as it provides elasticity and convenience, also presents new kinds of cyber threats such as account hijacking and cloud misconfigurations (Kaur, 2020). More specifically, marketing teams have come to depend on third-party applications such as email marketing applications, customer relationship management (CRM) software, and analytics. Consequently, the likelihood of data compromise is increased in the event that these services are breached. Smith (2020) research emphasizes the fact that marketing teams do not often possess the necessary cybersecurity training to protect the data that they deal with. As a result of this, human mistake is the most common reason for data breaches.

Phishing attacks and misconfigures are instances of human failure. Such threats, however, can be minimized by artificial intelligence-based systems by monitoring and examining user activity to identify deviations. To prevent future security breaches, artificial intelligence can, for instance, recognize suspicious login attempts or abnormal data access patterns, which can trigger automatic

responses. There are a number of obstacles that emerging countries like Kazakhstan must overcome to successfully integrate AI-driven cybersecurity solutions, despite the widespread acceptance of these solutions throughout the world. It has been observed by Nurgaliyev (2022) and Kossanov (2020) that Kazakhstan's cybersecurity infrastructure is still in the process of developing. This nation is still susceptible to cyberattacks owing to obsolete systems and a lack of specialized expertise in artificial intelligence and cybersecurity (Abdiyev, 2020). Though great progress has been achieved in recent years to increase data protection, the country is still vulnerable to cyberattacks. Liu (2022) draws attention to the financial obstacles that stand in the way of the implementation of artificial intelligence, especially for small and medium-sized businesses (SMEs), which are the foundation of Kazakhstan's economy. It is challenging for small and medium-sized enterprises (SMEs) to incorporate these technologies into their operations because of the high costs associated with installing AI-driven solutions and the need for additional technical skills. These obstacles are even more obvious in the marketing industry, which is characterized by the fact that businesses often work with restricted resources (Kim, 2019).

Moreover, the problem is made more complicated by the fact that Kazakhstan does not have an explicit regulatory framework for artificial intelligence-based cybersecurity solutions. Although the government has enacted data protection legislation, i.e., the Law on Personal Data and its Protection (Law No. 94-V), the legal infrastructure is yet to catch up with the changing landscape of the technology world (Iskakov, 2021). Firms are hesitant to invest in the artificial intelligence technology owing to existing legislative uncertainty since they fear the legal consequences or regulatory challenges (Amponsah-Tawiah & Mensah, 2021; Carter et al., 2019). Artificial intelligence-based cybersecurity technologies have been effectively applied on a global scale in various other sectors, like marketing. In safeguarding their customers' data and ensuring conformity to rigid data protection laws, for instance, the General Data Protection Regulation (GDPR), organisations within industrialised economies such as the United States of America and Europe are increasingly turning to artificial intelligence (AI) (Jones, 2019). Based on the research conducted by Pereira and Santos (2021), companies that utilized AI for security experienced a reduction of thirty percent in the number of data breaches that happened compared to those that were solely dependent on traditional security methods.

Customer trust towards AI-based cybersecurity technology can be improved as well. Wang and Zhang (2020) in a study found that customers are more willing to interact with companies that have robust data protection policies in place within their organization. Artificial intelligence-based solutions offer a competitive advantage in marketing, where consumer trust is a key factor for the long-term success of a brand and the loyalty of customers. The technologies guarantee the safety of consumer information. As Asad (2021) has pointed out, companies that invest in artificial intelligence for cybersecurity are more likely to stay current with global data protection laws, which allow them to avoid both expensive fines and reputational harm.

AI predictability is one of the most powerful benefits that AI offers the field of cybersecurity. Through machine learning algorithms, AI is capable of anticipating future attacks by using real-time data analysis compared to conventional security systems that use past data to detect threats (Goh, 2020). This is of utmost significance in sectors like marketing, where cyber attacks keep changing and getting more sophisticated. Artificial intelligence solutions, as reported by Bhatia (2021), are able to detect infinitesimal trends within data that can mark the onset of a possible attack. This provides firms with the opportunity to strengthen their defenses before the attack actually begins. The incident response process can be enhanced through artificial intelligence, alongside the detection of threats. Kaur and Singh (2020) opine that AI systems are capable of responding automatically to low-level attacks like phishing, which leaves human security teams free to focus on more complex problems. This degree of automation is especially valuable to marketing departments, which do not often have the resources and capability necessary to

effectively counter cybersecurity threats. Specifically, the principles of cyber resilience and cyber death chain model form the pillars of the theoretical foundation for these studies. Linkov (2019) defines cyber resilience as an organization's capability to stay alive during cyberattacks and maintain a level of functioning despite them. Cyber resilience is a part of cybersecurity. Due to the immense amount of sensitive information handled by marketing teams, cyber resilience is a very important concept in relation to marketing. A firm's cyber resilience can be improved with the help of artificial intelligence-based cybersecurity solutions. These systems include real-time monitoring, early warning, and threat mitigation in an automated fashion. Hutchins (2019) developed a concept known as the cyber death chain that describes the steps to a cyberattack from the first reconnaissance and through to termination of the intrusion.

Artificial intelligence also plays a critical role in various of the steps that take place in the process of reconnaissance and exploitation phases of the cyber kill chain. According to Kim (2019), artificial intelligence can break the cyber death chain and halt attackers from advancing through an attack's stages. This occurs by analyzing data patterns and identifying anomalies.

### **Hypotheses Selected**

Taking into consideration the existing body of research as well as the theoretical framework, the following hypotheses have been developed:

#### **Hypothesis 1:**

- $H_0$ : The risk of marketing data intrusions in Kazakhstan is not substantially reduced by AI-driven cybersecurity systems.
- $H_1$ : The risk of marketing data intrusions in Kazakhstan is substantially reduced by AI-driven cybersecurity systems.

#### **Hypothesis 2:**

- $H_0$ : The implementation of AI-driven cybersecurity measures does not result in cost-effective solutions for marketing data protection in Kazakhstan.
- $H_1$ : The implementation of AI-driven cybersecurity measures in Kazakhstan results in cost-effective solutions for data protection marketing.

#### **Hypothesis 3:**

- $H_0$ : The adoption and efficacy of AI-driven cybersecurity in the marketing sector are not substantially influenced by the regulatory environment in Kazakhstan.
- $H_1$ : The adoption and efficacy of AI-driven cybersecurity in the marketing sector are significantly influenced by the regulatory environment in Kazakhstan.

### **Research Methodology**

#### **Research Design**

This research is an exploratory and quantitative study that concentrates on AI-driven cybersecurity solutions for marketing data security in Kazakhstan. The purpose of the research is to examine the integration of artificial intelligence into cybersecurity mechanisms for averting the emergence of new marketing data threats. The research exploratory in nature seeks to evaluate the potential of AI technologies in enhancing data protection practices and gaining insight into Kazakhstan's current cybersecurity landscape. Quantitative data was collected to evaluate how effective AI-based solutions are, their rates of adoption by users, security enhancement, and the actual results. The goal of the study is to provide a detailed analysis of the cybersecurity status in marketing data management as it currently stands and how AI solutions can potentially contribute, thereby providing actionable intelligence for business organizations, government agencies, and AI technology providers.

#### **Participants and data collection**

Primary and secondary sources of data was employed in this research. Interviews, questionnaires, and focus group discussions with the stakeholders such as the marketing executives, IT security

professionals, and policymakers who handle data protection were conducted to get primary data. Such direct perceptions give valuable information regarding the issues and feelings concerning cybersecurity solutions that are AI-based. Secondary data were retrieved from existing literature, official documents, and industry reports, and provided a theoretical framework and case studies to put the findings into a broader, international context. The research is well grounded for its analysis by blending primary and secondary data.

#### **Measurement and data analysis**

Observational study, ethnographic study, and focus group discussions were all applied in tandem. Observational study provided insight into the manner in which AI technologies and common marketing data protection approaches converge. Ethnographic study provided an experiential insight into organizational practices and challenges associated with adopting AI. Stakeholders' experiences and perceptions of AI-based cybersecurity solutions were the subject of debate in focus groups. Quantitative data was collected through survey research, targeting at least 200 participants who belonged to various industries engaged in data security and marketing. In order to determine the efficacy of AI-based solutions in safeguarding marketing data, behavioral studies simulated actual intrusions. Questionnaires with structured questions, interview schedules, and focus group discussion guides were the main tools that were employed within the study, respectively. To gather information about the application of artificial intelligence and cybersecurity procedures, questionnaires were utilized. Nevertheless, qualitative methods such as interviews and focus groups were utilized to gain a thorough understanding of the experiences and opinions of stakeholders. It can also be possible for behavior research to take advantage of technology tools and instruments to gauge the reaction of subjects to simulated attacks. Sample plan seeks to provide assurances that the data collected are representative of the concerned population.

The sampling unit consisted of professionals who are employed in government positions related to data protection, IT security, and marketing. These individuals have first-hand experience and information about marketing AI technologies and data security. A minimum of 200 respondents were required for this study. The statistical generalizability of the study and the power to generalize the findings to the broader fields of marketing and cybersecurity in Kazakhstan warrant this sample size. The sample was obtained using a stratified random sampling method to ensure it was representative of various regions of Kazakhstan, industries, and sizes of companies. Sampling is conducted by stratification of the population by major characteristics, including industry type and geographic location, and then random selection of participants from every stratum. This makes the sample representative of the population and minimizes the possibility of sampling bias. Various methods of contact were employed during the study to solicit participants. They comprise on-line communication, face-to-face interviews, telephone calls, and correspondence. Surveys were emailed so that a proper spread of participants are reached. Depending on the place and time at the participants' disposal, face-to-face interviews and group discussions were conducted face-to-face or through video conferencing modes. Telephone follow-ups were utilized to induce participation and clarify any queries regarding participation in the survey or interviewing process. The study guarantees a higher rate of response as well as an expanded number of data through the use of multiple contact methods. The study focuses on the market protection data sector in Kazakhstan, here being artificial intelligence-based cyber solutions. The research examines the existing cybersecurity practices, artificial intelligence application challenges, and how various industries may gain from implementing AI in their data protection strategies. Apart from this, it discusses a comprehensive overview of the cybersecurity environment in Kazakhstan by comparing Kazakhstan's practices with international practices by way of comparison. We made an analysis of qualitative as well as quantitative data. The demographic information, artificial intelligence adoption, and the improvements in security were

all explained using descriptive statistics. The worth of artificial intelligence was evaluated by using inferential statistics, such as regression analysis, to determine the relationship between cybersecurity and AI. Qualitative information collected through interviews and focus groups was subjected to thematic analysis, which helped to identify the most significant themes and patterns that are related to perceptions and experience of stakeholders.

## Results and Discussion

### Demographic Profile of the Subjects

Vital background to the meaning of results is provided by the demographic description of the participants. The demographic details of 410 participants based on their experience, education, gender, and age were analyzed. Demographics have an essential role in determining the generalizability and range of the sample to the research. The questionnaire was initially administered in Russian and then translated into the English language to be made accessible to a wider population while maintaining similarity in terms of purpose and meaning.

Table 1: Demographic Profile of the respondents (N=410)

Demographic Characteristic	Category	Frequency	Percentage (%)
<b>Age Range</b>	18-25 years	82	20%
	26-35 years	226	55%
	36-45 years	61	15%
	46+ years	41	10%
<b>Gender</b>	Male	213	52%
	Female	197	48%
<b>Education Level</b>	IT, Engineering, Cybersecurity	279	68%
	Marketing, Business	131	32%
<b>Job Role</b>	Technical Staff	180	44%
	Marketing Professionals	120	29%
	Managers/Leaders	70	17%
	Others	40	10%
<b>Years of Experience</b>	Less than 5 years	123	30%
	5-10 years	164	40%
	11-15 years	82	20%
	More than 15 years	41	10%

### Reliability and validity tests

The team carried out several tests to guarantee the correctness and dependability of the gathered information. The measuring instrument's reliability indicates its consistency, while validity ensures that the questionnaire accurately measures the intended variables.

Table 2: Reliability Test (Cronbach's Alpha)

Variable	Cronbach's Alpha
AI adoption in cybersecurity	0.85
Perceived effectiveness of AI	0.82
Challenges in implementation	0.79
Overall questionnaire	0.84

All the Cronbach's Alpha values of all variables are high, indicating that there is consistent internal consistency. A value more than 0.7 is usually deemed to be acceptable, and in this particular case, the questionnaire can be relied upon to provide insights into the cybersecurity situation in marketing businesses that are artificial intelligence-based.

Table 3: Validity Test (Factor Analysis)

Factor	Factor Loading
AI technology adoption	0.83
Perceived benefits of AI	0.80
Organizational challenges	0.75
AI in cybersecurity management	0.77

The large magnitude of the factor loadings of the survey questions in excess of 0.7 indicates that the questions are good measures for the concepts that they aim to measure. The validity of the questionnaire was supported by the high magnitude scored by the questions that used the incorporation of artificial intelligence and its application to cybersecurity.

### Testing of Hypotheses

The objective of this research is to establish the correlation between AI-based cybersecurity technology and some of the factors in marketing firms through hypothesis testing. Three hypotheses were subjected to testing. The first hypothesis established whether AI technology has a fundamental impact on raising cybersecurity levels in marketing firms. The second hypothesis established whether marketing company size is a factor in difficulties when implementing AI-based cybersecurity. Lastly, the third hypothesis examined whether the utility of AI in terms of cybersecurity relies on technical proficiency in an organization. These relationships are quantified

and conclusions regarding the acceptance or rejection of every hypothesis are drawn with statistical tests, like regression and chi-square tests.

Table 4: Testing of Hypotheses

Null Hypothesis ( $H_0$ )	Alternative Hypothesis ( $H_1$ )	Test Conducted	P-value	Decision
AI technologies do not significantly enhance the cybersecurity measures in marketing firms.	AI technologies significantly enhance the cybersecurity measures in marketing firms.	Regression Analysis	0.03	Reject $H_0$ , Accept $H_1$
Challenges in implementing AI-driven cybersecurity technologies are not significantly related to the size of the marketing firm.	Challenges in implementing AI-driven cybersecurity technologies are significantly related to the size of the marketing firm.	Chi-Square Test	0.04	Reject $H_0$ , Accept $H_1$
The effectiveness of AI in cybersecurity is not significantly influenced by the level of technical expertise within the organization.	The effectiveness of AI in cybersecurity is significantly influenced by the level of technical expertise within the organization.	Chi-Square Test	0.01	Reject $H_0$ , Accept $H_1$

The objective of Hypothesis 1 was to determine whether AI technologies improve cybersecurity controls in marketing firms. The alternative hypothesis ( $H_1$ ) was that AI technologies greatly enhance cybersecurity, while the null hypothesis ( $H_0$ ) was no impact. The p-value of 0.03, which is less than the 0.05 level, resulted in the rejection of  $H_0$  in the regression test. This finding verifies that AI application notably improves cybersecurity success because there is a positive correlation between AI usage and improved security outcomes.

Hypothesis 2 tested whether the problems associated with the implementation of AI-driven cybersecurity practices are influenced by the size of a firm. The null hypothesis ( $H_0$ ) presumed no significant impact of firm size, whereas  $H_1$  predicted a significant relationship. The chi-square test statistic reported a p-value of 0.04, meaning that the problems encountered are significantly connected to the firm size. Complexity and scope of AI solutions are more significant problems for larger firms, particularly those with more than 200 employees. Thus,  $H_0$  is rejected while  $H_1$  is accepted, indicating that larger firms have a greater number of implementation problems.

Hypothesis 3 examined whether the efficacy of AI-driven cybersecurity technologies is influenced by the level of technical proficiency. The null hypothesis ( $H_0$ ) presumed no effect, whereas  $H_1$  presumed a notable influence. The chi-square test revealed the p-value of 0.01, which was well below the 0.05 threshold. This suggests that technical experience is an important factor in how effective AI cybersecurity products are. Those firms with a greater degree of technical experience reported AI to be more effective, particularly those with over five years of experience. Hence,  $H_0$

is rejected, but  $H_1$  is accepted, thereby establishing technical experience instrumental for effective use of AI. In summary, AI technologies greatly improve the implementation of cybersecurity in marketing firms, with larger firms having greater challenges. Furthermore, firms with a higher level of technical capability demonstrate higher effectiveness in implementing AI-driven cybersecurity solutions. These insights are important to marketing organizations that have an interest in leveraging AI technologies to enhance their cybersecurity.

### Discussion

The questionnaires were initially carried out in Russian and thereafter translated into English so that it could be availed to a wider population but still remain consistent in purpose and meaning. The questionnaires were administered in 410 respondents to ensure that the sample size was sufficient to measure the effect of AI-based cybersecurity technologies on marketing firms. Compared to results in research that has been conducted in other countries like the United States of America, our findings have some similarities and differences. In the United States, there has been research that has established a robust connection between the implementation of AI in cybersecurity and the improvement of security practices. Several US companies have ventured big time into AI technologies because of the government's support and the extra funding. Contrary to this, our research conducted in Kazakhstan reveals that challenges for marketing agencies, particularly those that are larger in size, are stronger even though the use of AI is increasing. This disparity may be attributed to factors such as Kazakhstan's lesser access to highly skilled experts and its delayed establishment of digital infrastructure in relation to the United States.

Moreover, our results in respect to technical competence importance are congruent with global trends, such as those in the United States. Organisations in this country with greater technical competence have improved performances from AI-powered cybersecurity tools. Low technical competence organisations in Kazakhstan (0-2 years) had less effective AI implementation. This indicates that, although technical proficiency is a key factor on a global scale, the shortage of professional experts in Kazakhstan may be higher, and this impact can have consequences for the success of AI-powered cybersecurity tools. Despite the similarity of our findings with those of the United States, the degree of infrastructure, resources, and expertise that distinguish Kazakhstan from the more advanced countries impregnates the ways in which companies in Kazakhstan address challenges and apply AI technologies. These results provide Kazakhstani marketing firms with helpful data that will enable them to ride out the challenges and utilize the capabilities of AI to a greater extent for cybersecurity.

### Managerial Implications

The results of this research on AI-driven cybersecurity implementation in marketing companies have considerable implications for different stakeholders: organizational management, IT personnel, marketing managers, employees, consumers, and regulatory authorities. An assessment of these implications can assist managers in formulating strategies to facilitate successful adoption and enhance the potential benefits of AI in strengthening cybersecurity controls. Organizational executives must consider AI adoption a strategic initiative. The research brings to the forefront that AI success is inextricably linked with the technical competence of an organization. Executives must invest in employee up skilling, promote a culture of innovation, and ensure investment in AI technology along with training programs. Besides, executives in larger firms must prioritize ordered, scalable deployment, while smaller firms can pursue more evolutionary strategies. Organizational leadership is required to align AI implementation with the firm's long-term objectives.

IT departments are responsible for the technical implementation of AI-driven cybersecurity tools. The literature indicates that firms with higher technical competence achieve successful integration of AI technology. IT managers must give high priority to continuous training and development to keep employees abreast of AI developments. Coordination with other departments must be achieved to enable seamless integration with current systems. Managers must understand scalability and integration issues, especially in large organizations, to facilitate efficient AI adoption. Marketing teams, while not directly participating in AI deployment, are important in communicating the benefits of AI-driven cybersecurity to clients. Utilizing AI to ensure data security safeguards sensitive customer information and contributes to increased customer trust. Marketing units must collaborate with IT to combine AI technology with systems like CRM systems and inform consumers about the company's data security initiatives. The coordination enables marketing firms to harmonize client interaction initiatives with cybersecurity initiatives.

Employees who deal with sensitive consumer information are directly affected by AI-driven cybersecurity solutions. The research demonstrates that the absence of technical skill can compromise the effectiveness of these kinds of technologies. Managers need to invest in training employees to effectively use AI products and ensure that they understand their responsibility to safeguard consumer information. Workers must view AI as a tool to enhance their work rather than a replacement, calling for clear communication and an emphasis on skills development.

Customers benefit from enhanced cybersecurity measures since artificial intelligence technology protects their personal and financial data. Through the utilization of AI-powered security technologies, businesses demonstrate an aggressive approach to data security, thus inspiring trust. Managers must inform consumers of the part played by AI in data security, emphasizing the company's efforts to safeguard their information. Being open about the influence of AI on cybersecurity will keep building consumer loyalty and trust.

Regulatory agencies make organizations adhere to data protection regulations. With AI being used more in cybersecurity, managers must remain informed about the legislative environment to facilitate AI technology compliance with data protection regulations.

## Conclusion

By addressing the growing threats to individual consumer data, AI-driven cybersecurity has the potential to reshape marketing firms in Kazakhstan. The study illustrates how AI technologies increase security measures via live threat detection, predictive analytics, and pattern recognition. Nevertheless, the technology's mass usage requires investments in cross-functional organization, regulatory harmonization, and training programs. Businesses must focus on providing their employees with the technical capabilities needed for proper utilization of these technologies, thus minimizing risks and maximizing benefits. Also, in order to promote the use of AI and foster public confidence in data protection systems, policymakers should implement open regulatory frameworks. Stakeholders can make a secure and resilient marketing environment through the creation of an inclusive innovation ecosystem, funding distribution, and knowledge sharing. The investigation is restricted by numerous variables, regardless of its contributions.

Sample size and structure are the primary constraints; although statistically valid, they may not accurately represent the vast diversity of marketing firms in Kazakhstan. Underrepresented are small firms and those with weak digital infrastructure. In addition, the research primarily presents the existing situation with AI implementation and may not represent the real dynamic changes that are the aftermath of emerging or evolving cyber threats. There may be inherent biases in introducing the data by using self-reported data from survey and interview responses because respondents' perceptions may not necessarily correspond to true implementations. The study's scope on the marketing sector also makes it impossible to attain a broader perspective regarding

the impact of AI across sectors, hence curbing generalizability. Future studies may take some directions to better comprehend and widen the scope of AI-driven cybersecurity in Kazakhstan. A cross-sectoral comparison of adoption trends would provide a macro view of AI's role in safeguarding diverse data ecosystems. Long-term research on the long-term impact of AI solutions on the resilience of marketing firms against cyber threats may provide important insights into sustainability and scalability. An examination of the unique challenges facing small and medium-sized enterprises (SMEs) in implementing AI technologies could assist in pinpointing pragmatic solutions applicable to scarce-resource environments. In addition, the ethical implications of AI adoption, particularly on data protection and machine-based decision-making, must be studied in depth. Lastly, comparative cross-national studies between Kazakhstan's progress and other emerging economies may reveal best practices and policy interventions for the establishment of a capable AI-based cybersecurity framework.

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# CISCO ACI КАК ИННОВАЦИОННЫЙ ПОДХОД К ИТ-АРХИТЕКТУРЕ: теоретический аспект

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*Ключевые слова:* ИТ архитектура, Cisco ACI, центр обработки данных, инфраструктура, инновации, проект, кибербезопасность

## ВВЕДЕНИЕ

В настоящее время в период изменений в обществе, экономике, бизнесе и жизни, постпандемийный период, усиления цифровизации Казахстана, финансовый сектор особо нуждается в скорости, гибкости, бесперебойности сервиса, наличия интерфейсов с критериями повышенного удобства и комфорта (Pazarbasioglu et al., 2020) [1], с упором на кибербезопасность. Эту систему обеспечивает грамотная ИТ архитектура финансовых учреждений, и роль их возрастает с повышением мошенничества в сети Интернет, роли искусственного интеллекта (AI) и его прогресса. Основу архитектуры составляют центры обработки данных, как физических, так и юридических лиц, они ведут обработку, хранение, управление большими объемами данными в реальном времени и с акцентом на конфиденциальность.

Сегодня в условиях цифровизации, высоких требований и ожиданий клиентов, конкуренции на рынке, банковские учреждения заботятся не только об удобстве для клиентов, но и воспринимают репутационные риски, связанные с надежностью и безопасностью данных. Недавний инцидент в июне 2025 г. где «утекли 16,3 миллиона записей с персональными данными жителей Казахстана» (Дарибай, 2025)[2], свидетельствует о том, что от эффективности ИТ-инфраструктуры финансовых учреждений, от ее производительности, надежности и безопасности зависит многое, это и финансовые потери, и временные простои, утечка данных, доверие клиентов и последствия юридического характера.

Пандемия и ее последствия привели к резкому развитию цифрового банкинга, увеличению мобильных платежей, расширению номенклатуры и ассортимента банковских онлайн услуг, а они в свою очередь привели к повышению требований устойчивости центров обработки данных, и они с каждым днем повышаются и напрямую связаны с ненасыщенным банковским рынком, ростом транзакций с одной стороны, а с другой – геометрической прогрессией развития ИИ.

В этих условиях именно выбор ИТ-инфраструктуры (Aderemi et al., 2024)[3] становится самым важным условием, требованием для финансового центра, поскольку она должна обладать следующими критериями, быть: актуальной, инновационной, современной, надежной, безопасной, бесперебойной, гибкой и быстрой, но при этом устойчивой, поскольку геополитика, темпы инфляции, мировой экономический кризис, волатильность

валют заставляют тщательно проводить мониторинг инструментов, подходов и возможностей для архитектуры- центров обслуживания больших данных.

#### ЛИТЕРАТУРНЫЙ ОБЗОР

Сегодня современной архитектурой центра обработки данных служит технология Cisco Application Centric Infrastructure (ACI) (<https://www.cisco.com/>), которая основана на анализе современных потребностей в IT среде, сама структура является сетевой, направлена на автоматизацию и упрощение, обладает гибкостью, усиливает безопасность и включает возможность масштабирования сети. Главным «ядром» сетевой инфраструктуры служит центральный пульт – контроллер политик приложений (APIC), функционал которого является централизованное управление через унифицированный интерфейс в центре обработки данных, причем от сетевых подключений до политик безопасности. Именно оно делает структуру автоматизированной, исключая риск ошибок ручного труда.

Как выше отмечали, для финансовых учреждений важным и необходимым условием является охрана персональных данных клиентов, и быстрота отражения киберугроз. В своей научной работе (Hassan & Ahmed, 2023) [4] подчеркивали, что требуется разработка и внедрение обязательных динамических стратегий безопасности в финансовых учреждениях, поскольку риски с каждым днем возрастают, это и мошенничество, утечка данных и многое другое. Cisco же включает в себя микросегментацию, иными словами, безопасность путем потенциальной возможности изолировать и/или ограничить путем горизонтального перемещения угроз. Фактически грамотное управление архитектурой позволяет соблюдать стандарты в финансовой отрасли, такие как GDPR (Общий регламент по защите данных для граждан ЕС на территории Казахстана), защиты данных- стандарт безопасности данных индустрии платежных карт (PCI DSS) для операций с платежными картами.

(Ogborigbo et al., 2024) [5] в своей работе утверждают, что конкуренция будет увеличиваться в финансовом секторе и в борьбе критически важно быть готовым к изменениям и модернизации центра обработки данных, а в условиях цифровизации (Ahmadi, 2021) [6] это неотъемлемый путь, причем регулярного характера и учреждения будут искать альтернативы с целью поиска именно преимущества. А Cisco ACI предлагает комплексное системное решение, где одной из самых ценных характеристик в программно-определяемых сетях (SDN) - это универсальная способность («всеядность») как традиционных, так и современных облачных или контейнерных приложений. Эта способность быстро, гибко, качественно интегрировать новые техники и технологии соответственно анализу потребностей и бизнес решений, так, например, версию 2900 легко заменить на 8200 L, причем без особых простоев и необходимости обучения работников, при этом процессные характеристики существенно могут быть улучшены и быть более эффективными.

По мнению (Olaiya et al., 2024) [7] в современной конкурентной борьбе финансовые учреждения, у которых функционально ограниченная масштабируемость в традиционных центрах обработки данных (ЦОД) могут существенно уступать, поскольку не могут быстро реагировать на рыночные изменения, им трудно адаптироваться к условиям нарастающей цифровизации, поскольку операционная деятельность не всегда работает эффективно. Это может быть обусловлено тем, что инфраструктуры проектируются зачастую на статистически заданных аппаратных ресурсах, в которые не включена гибкость к изменяющемуся объему. А общеизвестно, что любое масштабирование основано на управленческих решениях по закупкам нового оборудования, модернизации сетей с целью расширения трафика и мощности, а это значительные расходы, время, технические простои, которые замедляют и приносят свои ограничения по техническому прогрессу в организации, и благодаря им сложно внедрять инновационные проекты. Усложняет подход в виду того, что закупки

оборудования, программного обеспечения на протяжении n-периода производились у различных поставщиков, а это различный сетевой интерфейс коммуникаций (протокола), управления и обслуживание. Несомненно, повышается уровень сложности, поскольку применяются смекалка, опыт, человеческий потенциал в решении задач, разработки, настройки, мониторинга, корректировки, запуска.

Постпандемийный период является временем изменений, вызовов по гибкости и скорости, и финансовый сектор не является исключением, а наоборот сферой трансформаций, поскольку не только корпоративные клиенты, а именно физические лица имеют повышенные ожидания как к качеству финансовых услуг, так и удобству, навигации интерфейсов. Ключевым аспектом, по мнению (Park & Kim, 2020)[8], за которым тянется прибыль, количество потребителей, их лояльность, репутация и ранкинг учреждения, и многое другое является наличие внедренной гибкой, отзывчивой, комфортной инфраструктуры ЦОД, поскольку кроме существующих продуктов необходимо внедрение новых финансовых продуктов, масштабирование сервисов и интеграция новых технологий. Если же требуется перенастройка среды традиционных ЦОД, это требует осмысления, усилий, времени, что приводит к упущенным возможностям, выгоды и отложенным стартом вывода новых продуктов и их линейки на рынок. В исследовании авторов (Ameyaw, Idemudia, & Iyelolu, 2024) [9] выделено, что потребители нуждаются в бесперебойном обслуживании, ожидают высокий сервис мобильного сервиса, учитывая, что они могут и работают из любой точки мира, а задача финансовых учреждений предоставлять передовые цифровые решения с выводом на рынок уникальных услуг, а это возможно с адаптивной и устойчивой инфраструктурой.

Ключевыми компонентами являются:

✓ API- контроллер инфраструктуры политик приложений, это центральная точка управления и контроля, определяющая порядок взаимодействия приложения в сети, при этом админы могут определять политику, изменять на основе аналитики;

✓ коммутаторы Cisco Nexus серии 9000, обеспечивают физическую инфраструктуру с высокопроизводительными возможностями коммутации с малой задержкой, необходимыми для операций с большими объёмами данных финансовых учреждений;

✓ инфраструктура на основе политик, которая обеспечивает абстракцию и автоматизацию сетевых конфигураций.

Почему же Cisco (ACI) является инновационным решением в финансовых учреждениях? Выделим самые важные аспекты в решении сетевой архитектуры, преимущества, построенные на удовлетворенности требований современных ЦОД:

- имеет централизованное управление, направленное в том числе на снижение трудозатрат и эксплуатационных расходов, связанных с обслуживанием сети;

- модель разработана с фокусом на приложения, ее сетевых ресурсов и способов управления, предназначена для решения сложных задач;

- эффективность и снижение затрат на оборудование, применяет принципы программно-определяемых сетей, максимально эффективно использует существующее оборудование, потенциально снижая потребность в дополнительных физических ресурсах;

- комплексная система безопасности и автоматизация. В архитектуре подчинено все строгим нормативным требованиям к защите данных потребителей, обеспечению целостности финансовых транзакций. Постоянный мониторинг, гарантии по утечке данных, соблюдение политик безопасности;

- ее масштабируемость, экономическая выгода с конфигурацией под потребности, без ненужных дополнительных ресурсов- гибкость и эффективность.

Таким образом, Cisco ACI архитектурная конструкция (Maloo & Nikolov, 2022)[10] обеспечивающая унифицированный и согласованный подход к управлению сетевыми

ресурсами, имеет преимущества (Ahmadi, 2021)[6] как технологии следующего поколения, направленное на повышение эффективности работы за счет автоматизации и централизованного управления, возможности предоставления улучшенного клиентского опыта, является надежной и безопасной инфраструктурой, при этом предоставляя экономию средств за счет эффективного использования ресурсов, обладает гибкостью, безопасностью и масштабируемостью.

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## Philological Sciences

# Comparative analysis of the agreement of the auxiliary verbs “avoir” and “être” according to gender and quantity

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### Abstract

In the grammar of the French language, the similarities and differences in the agreement of the Participe Passe forms in terms of gender and quantity in the complex forms formed using different tense forms of the verbs avoir and etre are thoroughly analyzed. Thus, while the Participe Passe forms of verbs formed with the verb avoir in these tenses do not agree with the subject to which they belong in terms of gender and quantity, the agreement of the Participe Passe forms of verbs formed with the verb etre in terms of gender and quantity is once again confirmed.

**Açar sözlər:** pronominal verbs, gender category, agreement, quantity

In the grammar of the French language, in the formation of complex tenses, as a rule, various tenses of the auxiliary verbs “avoir” and “être” and the Participe Passé forms of the main verb being conjugated are used. The presence of the gender category in the French language results in certain differences in the formation of these tense forms [1]. Thus, in this case, the fact that the Participe Passé form of the verb in complex tenses formed with the auxiliary verb “avoir” remains constant in terms of gender and quantity with the subject to which it belongs [3]. In general, most verbs in the French language are formed in these tenses by using the auxiliary verb “avoir” in various tenses [4]. The fact that the participe passé forms of the verb in complex tenses formed with the verb avoir do not agree in terms of gender and quantity with the subject to which they belong is confirmed in the following example [14];

Parler – parlé I group verb, Passé composé

J`ai parlé

Tu as parlé

Il (elle) a parlé

Nous avons parlé

Vous avez parlé

Ils (elles) ont parlé

For example: Mes parents ont parlé de leurs voyages eu France.

- Mənim valideynlərim Fransaya etdikləri səyahətlərindən danışdılar.

Finir – fini. II group verb, Plus – que – parfait

J`avais fini

Tu avais fini

Il (elle) avait fini

Nous avions fini

Vous aviez fini

Ils (elle) avaient fini

For example: Dès que les étudiantes avaient fini leurs exercices, le professeur leurs a posé beaucoup de questions.

- Tələbə qızlar çalışmalarını qurtaran kimi, müəllim onlara çoxlu suallar verdi.

Apprendre – appris. III group verb, plus-que-partait

J`avais appris

Tu avais appris

Il (elle) avait appris

Nous avions appris

Vous aviez appris

Ils (elles) avaient appris

Məs: Aujourd`hui tous les étudiants avaient bien appris la leçon

- Bugün bütün tələbələr dərsi yaxşı öyrənmişdilər.

As can be seen from all the examples given above, it is once again confirmed that the Participe Passê forms of the verbs conjugated with “avoir” in the French language do not agree with the subject to which they belong in terms of gender and quantity [2].

We previously noted in the research that in the construction of the complex tenses, the verb “être” is used in addition to the verb “avoir” [5]. However, unlike the complex tenses formed with the verb “avoir”, the Participe Passê forms of the verbs conjugated with “être” in the complex tenses agree with the subject to which they belong in terms of gender and quantity [6]. In addition to all this, I would like to note that in the complex tenses formed with the verb “être” in the French language, only 18 verbs whose names are listed below and all pronominal verbs are used;

Aller, partir, sortir, arriver, venir, devenir, Passer, rentrer, entrer, rester, descendre, monter, tomber, mourir, naître, revenir, retourner, décéder.

Pronominal verbs: se coucher, se lever, s`intéresser, s`habiller, se diriger, se reposer, se raser və s.

When we view the following examples to discover all of the above, they are fully confirmed. For example: Entrer – entré I group verb, Passé composé

Je suis entré(e)

Tu es entré(e)

Il est entré

Elle est entré

Nous sommes entré(e)s

Vous êtes entré(e)s

Ils sont entré(s)

Elles sont entrées

Hier les filles sont allées au cinéma avec leurs amies.

- Dünən qızlar rəfiqələri ilə kinoya getdilər.

Sortir-sorti. III group verb, Plus-que-pafait

J`étais sorti(e)

tu étais sorti(e)

il étais sorti

elle étais sortie

nous étais sorti(e)s

vous étiez sorti(e)s

ils étaient sortis

elles étaient sorties

Les garçons et les filles de notre groupe étaient déjà sortis du cinéma

- Qrupumuzun oğlanları və qızları artıq kinodan çıxmışdılar.

Hier soir ma mère s'est couchée très

Pronominal verb se lever – se levé passé composé

Je me suis levé(e)

tu t'es levé(e)

Il s'est levé(e)

Elle s'est levée

Nous nous sommes levé(e)s

Vous vous êtes levé(e)s

Ils se sont levés

Elles se sont levées

Hier soir ma mère s'est couchée très tard, mais demain matin elle s'est levée très tôt pour préparer bien notre petit déjeuner.

- Dünən axşam anam çox gec yatdı, lakin kiçik səhər yeməyimizi yaxşı hazırlamaq üçün çox tez qalxdı.

One of the complex tenses used in French is the Passé antérieur [7]. In accordance with the general rule, the verbs “avoir” and “être” are used in the formation of this tense. Here, too, the Participe Passé forms of the verbs conjugated with the verb “être” agree with the subject to which they belong in terms of gender and quantity [13]. In this case, the verbs “avoir” and “être” are conjugated in the Passé simple tense and the Participe Passé form of the main verb is added to them [8]. However, I would like to point out that this form of the past tense is never used in colloquial speech, but is used only in tenses and literary works [9]. When we pay attention to the following examples, the formation and use of the Passé antérieur, which is one of the complex tenses, is confirmed [10].

Prendre – pris. III group verb, Passé antérieur

J'eus pris

Tu eus pris

Il(elle) eut pris

Nous eumes pris

Vous eutes pris

Ils eurent pris

Dès qu'ils eurent pris leur petit déjeuner, leur père les a invité pour visiter le musée d'histoire

- Kiçik səhər yeməyini yeyib qurtaran kimi ataları onları tarix muzeyinə getməyə dəvət etdi.

Partir – parti. III group verb, Passé antérieur.

Je fus parti(e)

Tu fus parti(e)

Il fut parti

Elle fut partie

Nous fûmes parti(e)s

Vous fûtes parti(e)s

Ils furent partis

Elles furent parties

Quand ils furent partis pour Bakou, ils ont entendu cette mauvaise nouvelle inattendue.

- Onlar Bakıya gedən zaman bu pis gözlənilməz xəbəri eşitdilər.

In all the examples given above, the various differences in the agreement of the Participe Passé forms of verbs used in complex tenses, which are formed by the conjugation of the auxiliary

verbs “avoir” and “être” in different tenses, with the subjects to which they belong, according to gender and quantity, are once again confirmed [11], [12].

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# Name as a cognitive category in the English linguistic worldview

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## INTRODUCTION

This project sets out to explore the cognitive underpinnings involved in naming a person in the English language, as well as to investigate the semantic, word-formative, and discursive characteristics inherent in such terms of reference. The concept of “name” stands among the most fundamental ontological categories, on par in importance with categories such as “time,” “space,” and “movement.” Consequently, analyzing how culturally influenced interpretations of a person extend not only to one’s perception of the surrounding world but also to self-awareness is of considerable pertinence.

The present work addresses two varieties of lexical items. The first type includes undifferentiated designations of a person terms that do not convey the referent’s age, gender, intellectual capacity, social standing, professional role, or any other particular qualities, while simultaneously representing a highly abstract notion of a name in modern English-speaking linguistic culture. The second type comprises novel (both established and occasional) lexical items signifying “person.” Even though these newer units are more specialized to some extent, they remain free of explicit gender, age, or occupational markers and have entered the English lexicon in recent decades. Special emphasis is placed on the most contemporary designations that have not yet been documented in leading lexicographic sources. By employing a wide-ranging cognitive-discursive lens to examine this linguistic material, it becomes possible to identify the cognitive processes behind name naming and to trace how linguistic creativity brings new forms into being.

**The significance of this project** is founded on the overarching anthropocentric focus of modern linguistics, in which language is regarded at once as the product and the instrument of name cognitive processes. Hence, data pertaining to the object of cognition the name assume particular significance and merit continued elaboration. Investigating name designations is further validated by the axiological role of this notion in English linguistic culture, previously only partially explored. A comprehensive work of the “name” concept thus allows for an elucidation of the value paradigms that characterize English-speaking communities.

Similarly vital is the examination of the linguistic data from the standpoint of the cognitive-discursive framework, which seeks to uncover parallels between conceptual structures and their linguistic expression, while also probing the network of associations these units form when used in real discourse settings. Another element warranting attention is a deeper inquiry into the differentiation of synonyms, in which both the cognitive processes that give rise to the meanings of these terms and the discursive attributes of these lexical units are contrasted and juxtaposed.

Through this method, it is feasible to gain a more extensive understanding of their semantics both shared and unique aspects and, in turn of their usage.

**The theoretical and methodological** underpinnings of this project draw on the contributions of both national and international experts in the fields of cognitive linguistics.

A further innovative aspect is seen in the utilization of present-day information technologies, notably the methods of corpus analysis, which have made it feasible to engage in a granular examination of how name-naming terms function discursively, grounded in corpus data. Through this methodology, it becomes possible to determine how frequently such words are used, the collocations they enter into, and the particular kinds of discourse they are typically associated with. The study of neologisms also integrates data from open-access online dictionaries, which capture linguistic inventiveness both quickly and thoroughly.

The overarching objective of this project is to reconstruct how the conceptual category “name” is organized within the modern English linguistic and cultural milieu. This is achieved through a multifaceted examination of English lexical elements that refer to “name” without indicating gender, age, or occupational status, all of which mirror the respective conceptual content.

In pursuit of this central aim, the work addresses several key tasks:

1. **Selection of Lexical Material**

First, a range of English nouns that denote a person without specifying gender, age, or occupational role must be identified. Subsequently, a specialized corpus of example usages will be compiled.

2. **Systematization of the Material**

The collected linguistic data are then arranged according to both semantic and word-formation considerations. Additionally, the status of these lexical items within modern English is factored into their categorization.

3. **Semantic and Cognitive Modeling**

A comprehensive semantic inquiry of the chosen lexemes is conducted to discern the ways in which they convey the fundamental notion of a person. Based on these findings, cognitive models of these lexical items are constructed to capture the core meaning of name identity.

4. **Investigation of Cognitive Mechanisms**

A crucial part of the work involves pinpointing and explicating the cognitive mechanisms that drive the creation of innovative person-designating terms in present-day English.

5. **Development of a Unified Conceptual Model**

Using the above analyses, an overarching conceptual framework of “name” is proposed, illustrating the organizational structure of this concept at a highly generalized level.

6. **Discursive Analysis**

Finally, the discursive properties of the chosen lexical items are examined, focusing on how these terms appear and function in various discourse categories.

Reflecting the specified project focus and the outlined objectives, the investigation proceeds through several stages, each of which incorporates particular methodological approaches. The rationale behind the selected work techniques and the structure for presenting the results is, in part, shaped by the cognitive-discursive approach adopted for this project.

In the initial data-gathering phase, specific methodological strategies were employed. A thorough sampling of authoritative explanatory and synonym dictionaries served to locate the primary-nomination lexemes. In parallel, the stepwise identification method was implemented to single out secondary-nomination items. Once the central semantic category of “person” was pinpointed using the best-known and most widely accepted synonyms a set of markers (i.e., identifiers) was determined to include within the overall lexical-semantic group. Among these indicators of “name” in dictionary definitions are such elements as *person*, *someone*, and *one*.

In the subsequent step, various analytical procedures were undertaken to examine and group the material. Techniques of word-formation analysis, definitional analysis, etymological analysis, and contextual inquiry (with components of componential analysis) were all employed. These methods facilitated both the classification and the organization of the linguistic data, as well as a quantitative overview. To deepen the semantic description of each unit, the inference method was applied, enabling the extraction of implicit details woven into the discourse. After inferring these nuanced layers of meaning, the findings were subjected to confirmation by means of the substitution method. This cross-checking helped ensure that the interpretation of each lexical unit was accurate and comprehensive.

## 1 A COGNITIVE APPROACH TO SEMANTIC WORK

At the present juncture in linguistic scholarship, numerous methodological perspectives are brought to bear on analyzing language data. The guiding work paradigm and the specific techniques used for selecting, processing, and reporting findings hinge upon the chosen theoretical framework.

When it comes to semantics, academic inquiry nowadays largely operates within two main paradigms: the classical model and the cognitive model. The classical paradigm referred to in some studies as the systemic-structural or pre-cognitive paradigm concentrates on pinpointing and describing the semantic traits of lexical items at various linguistic levels with the aim of systematically categorizing them. Z. D. Popova and I. A. Sternin explain that, in this paradigm, the main priority is exploring the entire suite of meanings conveyed by linguistic signs in a particular language that is, charting out the language's semantic space [1; 40]. This semantic space is not regarded as merely a compilation of discrete meanings and features, but rather as "a multifaceted system shaped by the intersections and overlaps of numerous and varied structural groupings, 'packed' into chains, cycles, branching tree-like formations, and fields with central and peripheral zones" [1; 62].

Within this systemic-structural framework, linguistic material can be categorized according to multiple criteria: lexical meaning and its components, how linguistic elements operate in context, their environments and collocational tendencies, stylistic affiliation, the motivation behind meaning, or the mechanisms driving semantic shifts along with any relevant etymological insights. Such analytical procedures make it feasible to both classify lexical items and distinguish their meanings and usage variations via methods of comparison and contrast.

However, as time went on, researchers realized that a language's lexical system extends beyond merely the sum of its constituent parts and the interconnections among them. Contemporary scholarship increasingly interprets earlier taxonomies and depictions of semantic elements, together with analyses of lexical units within related conceptual spheres, as portions of a "linguistic worldview." In other words, this linguistic worldview represents how specific segments of objective reality are reflected linguistically. The studies of Yu. D. Apresyan, B. A. Serebryannikov, V. A. Plungyan, E. V. Uryson, N. D. Arutyunova, and O. N. Seliverstova, among others, have contributed significantly to this perspective. Inquiries into the linguistic worldview aim to pinpoint how the objects and concepts found in reality are interconnected with the linguistic signs that name them, achieved through systematic linguistic description and comparisons with their real-world referents.

Introducing notions such as the "linguistic worldview" or the "naïve worldview" marked a gradual shift away from the former practice of separately examining linguistic phenomena (the word and its meaning) and extralinguistic phenomena (the significatum and referent) within the linguistic meaning model introduced by Ogden and Richards [2]. This shift led to a more holistic

inquiry into semantic properties of language in conjunction with the knowledge they encode regarding the relevant fragment of reality. As E. G. Belyaevskaya notes, the strictly structural stance on semantics eventually encountered questions that it could not effectively resolve. This situation set the stage for new ways of looking at linguistic phenomena, including the field of semantics [3].

In response to the heightened formalism of structural semantics, the cognitive approach to linguistics and to semantic studies more specifically—has come to the forefront. As I. K. Arkhipov observes, eventually “the exclusive concentration on ‘lexico-semantic fields’ or ‘word families’ was no longer sufficient for many linguists, which led to the notion of an as-yet-unverbalized intellectual space” [4; 36]. Cognitive linguistics emerged in the United States in the 1980s as a distinct line of linguistic inquiry, although key ideas had been circulating earlier. N. Chomsky played a major role in shaping this school by demonstrating how language is rooted in mental knowledge, activated in processes of speech production and in the transformation from “deep” structures to “surface” structures. These insights spurred the development of transformational grammar, later serving as a cornerstone of the cognitive method in grammatical work.

It was largely scholars focusing on grammatical phenomena who first adopted ideas from cognitive science, shining a spotlight on the cognitive underpinnings of syntactic organization. This focus yielded the typological school, work into discourse-based grammar and studies of grammaticalization the way in which grammatical forms evolve out of lexical items by E. Traugott and B. Heine.

In the cognitive-linguistic viewpoint, grammatical structure which unites linguistic meaning with conceptual processes displays deep connections to semantic theory. Contemporary linguistics indeed encompasses a variety of schools and perspectives that uphold key cognitive principles while differing in their analytical tools and specialized terminology.

In the view of O. K. Irishkanova, current explorations undertaken by foreign linguists increasingly indicate a move away from rigidly delineated conceptual structures toward more fluid and adaptive models [5]. Scholars now commonly include such constructs as conceptual blends in G. Fauconnier and M. Turner’s theory of conceptual integration, the usage-based framework advanced by M. Tomasello, as well as the conceptual matrices proposed in the works of R. Langacker, W. Croft, A. Cruz, V. Evans, and other experts in this field.

A considerable number of these cognitive theories focus primarily on the nature and organization of conceptual entities or models, treating them as the fundamental ways in which names formulate and store knowledge and experience. Researchers who embrace this line of thought generally start their analyses by detailing the features of conceptual constructs and then go on to illustrate the ways these constructs surface in linguistic usage. By contrast, the English tradition in cognitive linguistics adopts a somewhat different route: rather than beginning with a preconceived conceptual scheme, English linguists systematically uncover mental structures by examining a wide spectrum of linguistic data. In doing so, they rely on multifaceted language evidence, which many argue yields more reliable and empirically grounded results.

Within the English school of cognitive linguistics which cultivates the view that language and thought are intimately connected language is seen as an active force in comprehending the external world. This process works through categorization and conceptualization, and in turn exerts an influence on how lexical meanings take shape. Unlike the structuralist perspective, which tends to treat “language forms as self-contained units,” the cognitive approach seeks to understand them “in light of how speakers employ these forms to reflect their perception of reality”. From this vantage point, dissecting the semantics of lexical items offers a gateway to reconstructing mental representations that come into being through name cognition. Here, linguistic signs function somewhat like a “key” that grants access to stores of knowledge within name consciousness, operating as a methodological tool for unveiling cognitive frameworks. V. G.

Gak underlines that a word's lexical meaning constitutes the conceptual substance of that word, which is capable of conveying and preserving in the mind the image or concept of a real entity or phenomenon [6; 78]. Consequently, investigating conceptualization cannot proceed in isolation from linguistic semantics, given that the vast majority of concepts those "abstract, idealized semantic constructs" achieve an anchor in language through the semantic layers of particular words.

By contrast, for thinkers working under the banner of cognitive linguistics, the bond between concepts and language is more immediate and reciprocal, giving rise to a dynamic interplay: conceptual knowledge is expressed through linguistic forms, and at the same time, language itself can subtly impact the nature of the conceptual content it conveys. V. A. Maslova maintains that within the cognitive paradigm, two contrasting views exist regarding the essence of concepts [7].

In the present work the second view is adopted. We understand a concept to be "an operative unit of theoretical and/or everyday knowledge, in which the name experience of interacting with reality is both comprehended and stored". Z. D. Popova and I. A. Sternin likewise describe a concept as "a discrete mental formation a key building block of name cognitive encoding with a definable internal organization; it arises from the cognitive efforts of both individuals and society as a whole, conveying extensive encyclopedic information about an object or phenomenon, as well as how these are perceived and evaluated in the collective mind" [1; 34]. Perhaps the most succinct encapsulation of the notion of a concept appears in the *Short Dictionary of Cognitive Terms*, which calls a concept "an operationally significant content unit of memory, of the mental lexicon, of the conceptual system, of the "language of the brain" (*lingua mentalis*), and ultimately of the entire worldview that finds its reflection in name consciousness".

Consistent with this perspective on what constitutes a concept, E. S. Kubryakova describes the cognitive-discursive approach, which she characterizes as aiming "not merely to establish a link between each linguistic form and its cognitive counterpart a conceptual or cognitive schema (thereby illuminating how a form's meaning or content can be explained through a certain mental structure, framework of knowledge, or belief system), but also to clarify why this particular 'packaging' is selected or crafted to convey the intended meaning". In other words, the cognitive modeling process is intrinsically bound up with analyzing both the discursive features of the text and the specific ways in which a given linguistic unit operates in actual speech usage. As Kubryakova emphasizes, "no linguistic phenomenon can be claimed to be fully described and elucidated unless it is studied at the crossroads of cognition and communication" [8; 16]. This very line of thought underlies the methodology of the present investigation when exploring the semantics of the units under review.

The theoretical positions outlined above all strive to reconstruct the mental frameworks that govern name behavior and thought processes. Irrespective of the specific school of thought or methodological orientation adopted by the researcher, once the conceptual elements have been extracted, the logical follow-up is to present these findings as an overarching cognitive model. In the subsequent section, the most prevalent techniques used to model conceptual content will be discussed. In alignment with the goals of this project, particular attention will be given to models that emerge from semantic analysis.

### 1.1 Semantic studies of name-nominating units

In light of the current name-centered orientation in scholarly inquiry overall and in the field of linguistics in particular, the issue of how people are embodied and represented in language has taken on noteworthy importance. Over the last several decades, no fewer than 35 projects and similar work endeavors have been produced predominantly based on English-language data (and

occasionally in conjunction with data from other languages) that investigate various dimensions and attributes of both societies collectively and individuals personally. The scope of topics examined in these works, along with the nature of the linguistic material and the range of methodological approaches, is highly heterogeneous.

In summarizing the principal lines of inquiry in this field, A. I. Gelyaeva underscores the following:

“Within the anthropological paradigm of linguistics, which has expanded considerably in recent decades under the aegis of cognitive science, there has been intense study of the linguistic worldview, along with its articulation through linguistic units at multiple levels. Other focal areas include metaphor, phraseology, axiology, word formation, lexicography, linguoculturology, ethnology, and gender studies approached from a cultural perspective. The analysis of cultural concepts is also a notable component of this project agenda” [9; 18].

With specific regard to English, multiple investigations delve into multifaceted dimensions of name life, encompassing physical conditions, spiritual or inner life, and the ways people connect with nature. Scholars have also explored individual personality traits, a person’s intellectual facets, the implications of age, as well as professional roles and gender distinctions.

Researchers have drawn on varying sorts of linguistic material in these studies. While a large proportion of this work has been synchronic in nature, there are fewer diachronic investigations. The analyses have addressed both single-word items especially those grouped around synonymous sets of nouns and adjectives and more elaborate formations, notably compound words and phraseological expressions. A considerable amount of attention has been devoted to how English phraseology portrays names, whether by focusing on phraseology as a coherent lexical-semantic field or by describing it as a constituent or layer within a more extensive conceptual model. Considerable effort has also been invested in looking at anthropocentric euphemisms, along with nomination patterns that involve animal or plant names (zoonyms and phytonyms). A number of these studies further highlight language usage tied to specialized functional domains or particular genre-stylistic categories, including everyday colloquial language or internet-based jargon.

Nevertheless, there remains a gap in the literature: none of the aforementioned works have undertaken a detailed inquiry into how the most universal notion of the name understood as both a biological species and a holistic personality appears in language when one disregards specific factors such as gender, age, or professional attributes. Yet it is precisely these all-encompassing designations that can illuminate the intricate processes underlying collective and individual interpretations of what it means to be name and how individuals fit into the broader environment.

Each of these studies tackles its linguistic material through a variety of paradigms and conceptual lenses. Those adhering to a traditional systemic-structural orientation typically organize and categorize name-referencing vocabulary based on its meaning components and other semantic measures. By employing componential analysis, they isolate and describe the semantic traits embedded in the studied lexemes. Ultimately, the outcomes of such classification strategies are frequently presented either as sets of synonyms or as lexical-semantic fields—witness, for instance, how I. N. Luzenina categorizes the “physical state of a name” [10], or how L. B. Yabzhanova explores the “intellectual characteristics of a person” in a phraseosemantic field, identifying microfields and subgroups [11]. Investigations structured in this manner are largely semasiological, examining the ways in which English captures the notion of nameity and its various properties at a particular stage in the language’s historical development. Works that adopt an onomasiological viewpoint investigating how speakers name an existing notion rather than mapping how an existing term unfolds in meaning are relatively less common.

Hence, within the systemic-structural paradigm, multiple dimensions have been delineated to thematically arrange the comprehensive category of terms denoting a name. Such dimensions

can include, among others, “occupation”, “affiliation with a particular social group”, “engagement in specific activities”, “national identity”, “geographic residence”, “personal or internal attributes”, “style of interpersonal interaction”, “social status”, “economic position”, “age”, “marital standing”, “outward appearance” and “kinship ties”.

A notable thread of inquiry has concentrated on how different languages encode the culturally specific image of the name. In the majority of such comparative studies, the English linguistic worldview is juxtaposed with Kazakh cultural notions. Among the numerous linguistic phenomena under examination, phraseological expressions frequently emerge as the most illustrative and evocative repositories of culturally marked meanings. One principal direction in linguocultural analysis is the identification of the structure and evolution of stereotypes encoded in language.

Thus far, however, investigators have primarily tackled smaller components of the overarching concept of “name” or what Yu. S. Stepanov refers to as micro-concepts. Consequently, several domains remain relatively uncharted.

First, under the cognitive paradigm, no extensive exploration has yet mapped out the conceptual scaffolding behind English words denoting names. In the present discussion, “words denoting names” refers to those lexemes signifying a person without specifying age, gender, occupation, or other particular details unlike, for instance, the lexemes child, adult, old man or old woman, man, woman, or person engaged in a specific profession, or one possessing certain character traits or intellectual capacities. These narrower categories have been addressed in prior investigations. Moreover, previous work frequently gravitated toward figurative or phraseological representations of names and how they appear in texts from different time periods and styles, rather than focusing on neutral, single-word designations of names that do not rely on imagery.

Second, an examination of work on how people are named reveals that new coinages reflecting evolving perceptions of nameity are only sporadically studied. Typically, such attention concentrates on specific thematic clusters or structural groupings of already conventional words (for instance, internet slang or terms based on animal or plant imagery). What is lacking is a comprehensive account of how entirely fresh conceptualizations of names arise. Furthermore, no integrated study has delved into occasionalisms innovative but temporary linguistic formations denoting names in English from the angle of creative processes in naming.

An examination of prior scholarship on English lexical items that denote “name” reveals that an especially significant component of this semantic domain has been largely overlooked. Specifically, this refers to those lexemes expressing a generalized notion of “name” as a living being distinct from everything else, yet without indicating gender, age, social status, or any other particular traits. By investigating the semantics of these units, one can uncover and characterize the conceptual structure undergirding the English-language conception of a person understood as one of the pivotal cultural signposts. The discussion in this chapter addresses this topic in detail.

The following analysis zeroes in on the most semantically and functionally broad lexical items that serve as exponents of the concept *name* in English. These units capture the idea of a person on a highly abstract level, consolidating and reflecting the results of name-centered cognition while integrating them into core conceptual attributes.

For ease of reference, these words are grouped under the umbrella label *undifferentiated name designations*. The phrase *undifferentiated designation* warrants clarification: this term signifies that the word’s semantic range lacks any narrowing elements tied to specific parameters such as gender markers, distinct age categories, professional roles, or various individual characteristics (including appearance, psychology, intellectual level, and so forth). Put differently, this chapter focuses on a selection of English words meaning “name,” which generally exhibit a stylistically neutral flavor, contain minimal or nonexistent connotative overtones, and, crucially,

do not encode explicit gender or age information. Among such lexemes are *names*, *person*, *individual*, *man*, and *personality*, as well as a number of well-established secondary terms.

These lexical items have been investigated both independently (via dictionary-based definitions) and through their contexts in multiple discourse types. To bolster the reliability of the conclusions drawn, around 1,600 wide-ranging contextual examples were surveyed. All findings emerged from the principle of recurrence—namely, the repeated recurrence of a specific meaning or semantic component across a substantial array of instances. To support principal claims, the project provides illustrative textual excerpts along with Kazakh translations. Moreover, presenting the material in this manner assists in an in-depth grasp of how lexical items are used in discourse and, as a result, ensures a more faithful interpretation of their meaning in textual realizations.

Before moving into a detailed discussion of these words, a few points call for clarification.

First, a majority of the words in question display polysemy. For instance, the *Concise English Dictionary* assigns the following meanings to *man*: “name, namekind, adult male, servant or worker, employee, vassal, private soldier, individual who exhibits typically masculine traits, husband or male cohabitant acting in a husbandly capacity.” Similarly, *personality* in the *High School Dictionary* is defined as “the condition of being a person; individual existence; the set of qualities making up a person’s character; in contemporary usage: a person known within a certain domain; as well as rude or belittling statements about someone’s physical traits, habits, etc.” Since the present work concentrates on the *name* sense devoid of gender, age, professional, or other differentiating elements, only contexts that realize this generalized meaning are taken into account.

Second, to make it easier to explain the identified meanings and semantic components, the Kazakh word *amay* will serve as a reference point. The Kazakh lexeme *amay* carries multiple denotations paired with culturally distinctive connotations and associations. It is therefore essential to note that here *amay* is employed in its broadest sense meaning “a living being possessing the ability to think and speak” and functions as a terminological equivalent with purely referential content. Such a strategy is aimed at preventing possible misinterpretations caused by dissimilarities between the semantic frameworks of English and the intermediary language.

From an examination of the table, one can discern various notable features of the semantic system encompassing “undifferentiated name designations” in English:

1. *Paired Contrasting Characteristics*. There is an evident contrast between the biological essence of a person as a species and the individual’s social role within a community, the distinction between singular and plural references, and the opposition of “classification” versus “individualization.”

2. *Clearly Articulated Social Components*. Each synonym in this group exhibits semantic components including “possession of rights and responsibilities,” “membership in a social group”, “carrier of the sociocultural identity of a given community” and “social importance”.

3. *Biological vs. Sociocultural Dimensions*. In English linguistic awareness, a person is perceivable either as a species representative, defined by or as a socially active participant endowed with culturally salient traits (*person*). Significantly, these two dimensions biological and social are sharply differentiated in the English worldview.

4. *Classification vs. Individualization*. In all of the examined words (*name*, *man*, *person*, *individual*, *personality*), these components provide further avenues for nuanced distinctions: identifying a person as belonging to a particular collective or, conversely, marking the person out as separate from that group. Although these facets do not introduce entirely new conceptual content, they function as a key principle for differentiating synonyms such as *person* and *man*.

5. *English vs. Kazakh Patterns of Expression*. Even a cursory comparison of the English and Russian systems of name designations reveals notable divergences. For instance, English

appears to emphasize “membership in society” and “being a bearer of a community’s cultural traits” more explicitly. In particular, one of the lexical-semantic variations of the word *man* frames the individual as a member of a cultural and social collective, governed by its unique norms, practices, and worldview. The shift of the traditional meaning of *man* as a “gender-neutral being” to the contemporary meaning “male adult” exemplifies the dynamic evolution inherent in the conceptualization of names an evolution typically uncommon in core axiological categories.

6. *Specialization in Polysemy.* Findings also suggest that, in English, the components “possessing rights and responsibilities” and “social significance” have branched out into distinct senses of polysemous words (*individual* and *personality*, respectively). This path of representation illustrates that the fundamental concept of “individual” can develop a specialized nuance by foregrounding a particular attribute.

## 1.2 The development dynamics of representations about names

An examination of the conceptual framework underlying undifferentiated English language designations for a name demonstrates distinct conceptual components that correspond to discrete linguistic signs. The most prominent cognitive elements within this framework include: “a name as a biological species,” “a name as an active participant in society,” “singularity and individuality,” “a bearer of a particular culture,” “a subject possessing rights and duties,” and “a recognized public figure.”

Identifying these mental constructs through their linguistic reflections leads to a model of how common-sense knowledge conceptualizes a name. A vital question then arises: how closely do the structures captured by the semantics of these linguistic units correspond to scientific perspectives on name nature? As has been previously noted, answering this question necessitates looking outside the boundaries of linguistics specifically, at how these ideas are interpreted in the scientific worldview, and, more precisely, in philosophical anthropology, known for its inclusive and synthesizing character [12].

Since antiquity, philosophical inquiry has given central attention to understanding what a name is and how names fit into the cosmos. In ancient Eastern philosophies, the name was not yet regarded as an autonomous value in itself. A defining hallmark of early Eastern thought was the way individuality appeared “dissolved,” fully subsumed under a larger whole: an individual was respected not as a solitary entity but as a component within an overarching unity [13; 87]. Moreover, in certain Indian philosophical systems, the boundary between names, animals, and divine beings was blurred and changeable. Comparable notions were also present in Ancient Egyptian civilization, in the classical world, and in other early societies. Yet even at that time, fundamental name features physiological, intellectual, and psychological were recognized. Some philosophers emphasized the necessity of differentiating names from animals [13; 32]. When mapped onto the conceptual structure of English name designations, these ancient ideas correspond to the “biological species *Homo sapiens*” component, primarily conveyed by *name*. Moreover, their imprint is evident in the semantic profile of *man*, a word that encapsulates the view of names as culture-bearers for a specific community a characteristic notion in ancient civilizations.

Later, in the Middle Ages, understanding of name nature shifted to a certain extent, though its core aspects remained much the same: “In the Middle Ages, a name was primarily conceived as part of the divine world order” [13; 85]. Thinkers of this era concentrated on the interplay between name and divine essences. This worldview found a linguistic echo in the ways *name* opposes name entities to divine ones. Concurrently, medieval philosophers gave significant prominence to name interior spirituality, arguably diminishing emphasis on external or intellectual

aspects. For example, Saint Augustine believed that rather than the power of reason, it is the soul that fundamentally defines what it means to be name; in his view, the soul is the central determinant of one's essential nature. In his seminal work, *Confessions*, Aurelius Augustine notably pioneered the inclusion of psychological attributes in the philosophical depiction of namekind [14].

With the onset of the Renaissance, which was closely tied to nameist thought, anthropocentrism came to the forefront, giving rise to a clearer notion of the name as a "personality" who is of value to culture and society. In this period, names increasingly saw themselves as distinct from other life forms, from nature, and at times even from the divine realm. Giovanni Pico della Mirandola, in *Oration on the Dignity of Man*, formulated the concept of a name as a unique creature, endowed with self-awareness, freedom to choose, and creative powers [13; 105]. The notion of names as inherently significant an idea blossoming in Renaissance-era scholarship appears in the folk-linguistic consciousness of English speakers in the meaning of the word *person*. Over an extended historical arc, the concept of name self-sufficiency solidified further, which is discernible in the conceptual structures associated with *personality*, understood as "a figure of substantial importance or public renown."

Another line of thought presented vividly by Thomas Hobbes, a philosopher of the Early Modern era posited the individual as essentially separate from society, existing in an original state of solitude. People unite and consent to reduce some of their personal freedoms for the sake of founding a commonwealth or state, yet each person remains an independent entity [16; 213]. Within the semantics of English name designations, the idea of "singularity and individuality" aligns with the word *individual*.

Summarizing the comparison between the conceptual schema for "name" and the philosophical-anthropological perspective on name nature, it is evident that scientific-philosophical interpretations are generally more detailed and specialized than the more streamlined portrayals in language. Linguistic representation compresses and retains only the most culturally pivotal features emerging from the collective process of name cognition. It is well known that within a linguistic worldview, only those insights deemed extremely relevant to a given culture, and thus surviving over centuries in the language, are preserved. Therefore, the portrayals of names embedded in English terminology do not contradict the findings of scientific philosophy but express them in a more condensed and aggregate fashion. Moreover, the scientific worldview tends to be broadly shared across multiple cultures, whereas the linguistic worldview, serving as a medium for national modes of thought, may diverge in its extent of alignment with scientific paradigms. The project detailed here indicates that, in the context of English, a fairly strong and evident correspondence emerges.

One way to chart the evolution of a linguistic worldview is by investigating etymologies examining the historical roots of words that name a name being in the English language.

Among the earliest such terms is *man*, whose origins trace back to the Proto-Germanic language and, more broadly, to the Indo-European family, as indicated by correspondences in both other Germanic and several non-Germanic Indo-European tongues. In Old English, *who* meant "name" in the general sense, lacking any specific reference to gender; the earliest records of its usage to mean "male" date from the 11th century. Until the closing decades of the 13th century, the prefixes *wer* and *wif* were used to distinguish men from women, but ultimately *wer* disappeared, so that the root *man* came to denote "male".

Shifts in the meaning of *who* are closely tied to social rather than purely linguistic developments. Originally, men held dominant positions in societal and economic hierarchies, reflecting a male-oriented perspective in social consciousness. As societies evolved, however, and gender relations were redefined, the term's meaning started to diverge along gender lines. Historically, the notions of "name" and "man" were nearly synonymous men carried the

comprehensive set of rights and obligations, so separate lexical items were not needed. But over time, “name” and “male” diverged in usage, shaped by social factors that N. V. Shilova regards as pivotal in the trajectory of anthropocentric vocabulary [17]. Whether the core emphasis was on “male” or, conversely, on “name” was directly related to the notion of an “ethnocultural dominant” [18], comprising religious, ethical, ideological, military-political, and other sociocultural drivers sometimes called “the imperatives of the era” [19].

Later in English, the conceptual elements of “name as a social” and “name as a self-aware individual” emerged, mirroring the Renaissance’s broader philosophical shift in thinking about individual identity. A salient example is *person*, which lacks Germanic roots. It came into Old English in the early 13th century via Old French, and ultimately from the Latin *persona*. From that point forward, *person* gained increasing currency, reflecting a new mental construct. Particularly indicative is how, in the latter half of the 20th century, *person* began to displace *man* to avoid sexist connotations, in accordance with the push for non-discriminatory language. Consequently, *person* became one of the primary English words signifying a name being. The earliest documented illustration of this replacement is *chairperson*.

This line of thought continued to progress through the mid-18th century, when the noun *individual* gained the meaning “a single person”. The word had entered Middle English from Medieval Latin as an adjective, originally signifying “a single entity or object”. It is interesting that by 1742, the sense “name being” began to surface in colloquial usage, and in later usage shaped by social developments the term acquired a more formal tone, along with a secondary nuance referring to “a legal entit”.

All the undifferentiated words in English that refer to a name being, the most recent to enter the language is the lexeme *personality*, derived from the Latin *personalitatem* and the French *personnalité*. Although it has been recorded since the late fourteenth century, its first documented use in the sense of “a person” did not appear until 1889 and even then, it was understood to mean “an individual marked by striking character traits.” One may infer that in the meaning relevant to this work namely, “a figure who occupies a notable place in society” *personality* began to gain currency only somewhat later, once English speakers had formed not only a firm notion of the overall significance of a name being but also a heightened awareness of how certain individuals could play pivotal societal roles, alongside a growing emphasis on personal success. The emergence of a social ideology centering on individual achievement contributed to the broader adoption and usage of this term in twentieth- and twenty-first-century English.

Comparing how philosophy conceptualizes the name being with the historical evolution of specific name-centered words in English leads to the conclusion that the conceptual structure of this linguistic domain and the recorded histories of its associated terms offer an approximate mirror of scientific progress, sociocultural shifts, and changes in how English-speaking peoples regard themselves. Collectively, these features illuminate key aspects of the mindset that has influenced this semantic system, as well as the cultural norms and stereotypes prevalent in English-speaking societies.

## PROJECT RESULTS REVIEW

Examining the methodological approaches used in semantic work on linguistic units in order to uncover their cognitive underpinnings, it proves useful to differentiate established methods according to both the character and the scope of the linguistic material being studied. Drawing on these criteria, one can identify two main groups of investigations.

Many linguists, however, despite the broad range of possible nominators, acknowledge the lexeme as the central verbalizing tool for any concept. Lexical items can be analyzed either as

standalone elements or as part of larger sets. Some work limits itself to homogeneous, single-level means belonging to one word class for instance, nouns denoting different types of clothing. In such cases, materials are generally obtained through thorough sampling from authoritative dictionaries, specialized reference volumes, or literary sources.

Once the data are gathered, the next step is to form a nominative field of the relevant concept, after which researchers must systematically organize it. One widely embraced method in linguistics is to model this field as a category structured in line with prototype theory. A prototypical category is taken to be a group of objects or phenomena deemed equivalent and arranged around a prototype that is, the element most fully embodying all the traits of the given category and functioning as its best exemplar from the viewpoint of a particular community.

One of the most prominent and richly elaborated methods for conveying both the structure and the substance of a concept in contemporary scholarship is known as the frame. A frame is conceptualized as a data configuration intended to capture a typical context or recurring situation. Within linguistic studies, Charles Fillmore introduced the frame concept by depicting it as “a set of linguistic instruments connected to so-called scenarios”. In comparison with a concept, some researchers see a frame as more rigorously structured, thus making it an effective instrument for illustrating a concept’s content. Indeed, numerous studies that explore the underlying cognitive patterns in certain categories of names have presented their outcomes in frame format

Nevertheless, the cognitive schemas underpinning how the English language names beings are not easily captured through a single framing mechanism, given that the domain of anything but stereotypical. Its range of meanings is substantially wider and more varied than what fits into a fixed group of slots. In other words, there is no universal or finite register of personality traits comprehensive enough to serve as a self-contained frame.

A more all-encompassing picture of a conceptual entity’s internal organization can be achieved by means of a conceptsphere, which provides a means to represent more intricate relationships among the entity’s components. Scholars view the conceptsphere as a coordinated layer of knowledge that is expressed via components of a universal object code. It operates akin to an informational reservoir delineating the cognitive worldview, instilling systematic integrity, and largely mediating how reality is understood by individuals [Popova, Sternin 2010]. As a knowledge domain, the conceptsphere is constructed using concepts, conceptual schemas, notions, frames, scripts, gestalts, and an assortment of other abstract cognitive devices that assemble diverse attributes of the external environment. In name cognition, these elements merge to form a multidimensional, multi-layered system in which they intersect with one another and arrange themselves into chains or clusters based on assorted defining traits, all the while sorting themselves into fields structured around a core and a periphery. Significantly, conceptspheres shaped by different linguistic systems diverge in both the set of concepts they house and the ways in which they organize them, reflecting the unique national and cultural features tied to each language.

It is also important to emphasize that the analytic and conceptual-modeling procedures described here are most commonly employed for extensive linguistic corpora. Yet, as demonstrated in multiple inquiries, working with a smaller number of linguistic units presents a different set of considerations. From a broad theoretical perspective, the semantic domain of language aligns closely with the conceptual structures within name cognition. However, when fewer items are under scrutiny, scholars typically undertake an intensive work of each item’s semantic composition and then derive a more narrowly focused conceptual structure from that analysis. By contrast, when large numbers of items are examined, researchers often aim to model conceptual configurations that function at the level of entire conceptual domains or conceptspheres. When one’s scope is reduced to individual lexemes or tightly interrelated synonyms, the domain of investigation becomes comparatively smaller, yet this very specificity

enables the discovery of conceptual bases for meaning construction right within particular words or within certain segments of the linguistic worldview. In such scenarios, the concepts subjected to modeling emerge directly from individual lexical items, which function as fundamental elements within the broader scaffolding of mental constructs.

## CONCLUSION

The project of understanding what it means to be name and of nameity's role both in the broader universe and within specific cultural contexts remains among the most intricate challenges facing contemporary scholars in the nameities. We observe a clear trend of "scientific anthropologization," where many academic inquiries adopt an overtly anthropocentric lens, and various interpretations evolve from prevailing concepts of name essence. One means of exploring the name phenomenon is to investigate mental constructs that accumulate perceptions of name beings, deeply rooted in cognitive processes and revealing themselves in the associated lexical items. Within modern cognitive studies, such an approach is carried out by analyzing terms that name or describe people.

The English language offers a massive system of words that designate name beings, and scrutinizing the cognitive bases for these words gives insight into how Anglophone cultures conceptualize the person. This semantic expanse is exceptionally broad, given that it incorporates references to name beings in all of their numerous aspects ranging from gender and age to social roles and occupations. Delivering a comprehensive account of this system, one that would explain it fully and even allow for predictions, would likely require concerted collaboration among multiple experts.

This project targets a more modest component of the larger knowledge framework that underpins words referring to individuals, emphasizing the most generic perspective on what constitutes a name. It focuses on primary and secondary references that do not specify attributes such as gender or social role, as well as on contemporary trends in categorization evident in newly emerging vocabulary namely, anthropocentric neologisms and occasionalisms introduced into English over the past quarter-century. To date, these particular mental structures and processes have not been thoroughly examined in cognitive linguistics. The outcomes of this endeavor have facilitated the identification of features integral to traditional, culturally ingrained English-language conceptualizations of "the name." Additionally, these findings have shed light on the principal directions in which this conceptual framework is evolving.

The investigation has shown that the cognitive foundations of English name-designation words are remarkably intricate and varied. Accurately capturing these foundations demands the integration of multiple descriptive approaches. Within the English linguistic tradition, researchers typically begin by looking at manifestations of cognitive structures that are readily accessible in other words, by analyzing linguistic meanings themselves. These meanings are recognized within the community of language users and dictate how specific lexical elements are actually employed. By executing a thorough linguistic examination (encompassing definitional analysis, morphological examination, etymological background, contextual investigation, conceptual scrutiny, discourse analysis, and corpus-based methods) of the cluster of words labeled with the generalized sense of "name," the conceptual components anchoring these meanings were identified.

This organizational arrangement rests on overarching, undifferentiated labels that encapsulate key name traits those aspects deemed necessary to classify an entity as name. These traits include biological, social, psychological, and physical factors. The reconstructed conceptual schema details how these core elements cohere internally. The time-honored, culturally

embedded conceptions of a name being in English, expressed via the lexical items under discussion, rely on distinct dualities (antonymous semantic feature pairs) that shape the cognitive groundwork of name designations in English. The establishment of collectives or categories draws upon a variety of attributes social standing, ethnic background, specific circumstances, or personal traits. Singularity and plurality within this conceptual schema diverge somewhat from how these terms function grammatically, wherein singularity signifies not just the grammatical contrast between singular and plural but also the difference between an individual entity and a collective, group, or society.

Like any other domain of knowledge, our conceptions of “the name” continue to enlarge and shift. This work’s results show that this conceptual domain’s volatility is especially apparent in the continuous generation of more granular labels that articulate specialized aspects: contextual roles, behavioral tendencies, physical or physiological features, appearance, intellectual capacity, societal nuances, and so forth. The proliferation of these lexical innovations confirms the English language’s notable capacity for creativity. Moreover, this phenomenon is likely encouraged by the novel communication contexts introduced by technology and the internet. Simultaneously, the significant volume and quick pace of new anthropocentric neologisms and occasionalisms along with a manifest inclination to pinpoint increasingly specific traits highlight the importance of this semantic sphere for present-day English speakers.

Ultimately, these observations permit a measure of forecasting regarding future directions for this linguistic subsystem and improve how recently created designations for “name” are interpreted. Given that new lexical elements appear in large numbers and at a remarkable speed often bypassing lexicons or formal references consistent linguistic monitoring is imperative to track and scrutinize such developments. This investigation has demonstrated that in modern English, new ways of naming people most frequently hinge on behavioral attributes, whether these behaviors are stable and habitual or prompted by particular circumstances. The work has also reinforced the ongoing vitality of established English noun-formation mechanisms, particularly compounding, blending, and semantic shifts; in contrast, affixation, conversion, and borrowing have contributed somewhat less to the influx of recent anthropocentric neologisms.

Thus, continual scholarly attention remains essential to capture and describe the ever-unfolding conceptualization of “the name” in the English language.

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# The Efficacy of Active Learning Strategies in Enhancing Student Engagement and Academic Performance

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## Abstract

Active learning has emerged as one of the most effective teaching strategies in contemporary education. This article explores the principles of active learning, its various forms, and the empirical evidence supporting its effectiveness in improving student engagement and academic performance. By fostering a more interactive and participatory classroom environment, active learning not only enhances knowledge retention but also cultivates critical thinking and collaboration skills among students.

### Introduction:

Traditional teaching methods, characterized by passive learning through lectures and rote memorization, have been increasingly challenged by the need for more engaging and effective educational practices. Active learning, defined as an instructional approach that actively involves students in the learning process, has gained traction as a powerful alternative. This article examines the key components of active learning, its implementation in various educational settings, and the research supporting its benefits.

### Key Components of Active Learning:

Active learning encompasses a range of instructional strategies that encourage students to engage with the material, collaborate with peers, and apply their knowledge in practical contexts. Some common active learning techniques include:

1. Think-Pair-Share: Students think about a question individually, discuss their thoughts with a partner, and then share their insights with the larger group.
2. Problem-Based Learning (PBL): Students work in groups to solve complex, real-world problems, promoting critical thinking and collaboration.
3. Case-Based Learning: Students analyze and discuss real or hypothetical cases, applying theoretical knowledge to practical situations.
4. Interactive Simulations and Role-Playing: Students engage in simulations or role-playing exercises that mimic real-life scenarios, enhancing their understanding and application of concepts.

### Implementation in Educational Settings:

Active learning can be effectively implemented across various educational levels, from primary schools to higher education institutions. Instructors can incorporate active learning strategies into their curricula by redesigning lesson plans to include collaborative projects, group discussions, and hands-on activities. The use of technology, such as online discussion forums and interactive learning platforms, can further enhance active learning experiences.

### **Empirical Evidence of Effectiveness:**

Numerous studies have demonstrated the positive impact of active learning on student engagement and academic performance. For instance, a meta-analysis conducted by Freeman et al. (2014) found that students in active learning environments performed significantly better on examinations than those in traditional lecture-based settings. Additionally, active learning has been shown to increase student motivation, satisfaction, and retention rates.

1. Increased Engagement: Active learning strategies promote higher levels of student engagement by making learning more interactive and relevant to students' lives. Engaged students are more likely to participate in discussions, ask questions, and seek help when needed.

2. Enhanced Critical Thinking: By encouraging students to analyze, evaluate, and apply knowledge, active learning fosters the development of critical thinking skills. Students learn to approach problems from multiple perspectives and develop solutions collaboratively.

3. Improved Academic Performance: Research consistently shows that active learning leads to better academic outcomes. Students who engage in active learning tend to achieve higher grades, perform better on assessments, and retain information longer than their peers in traditional learning environments.

### **Challenges and Considerations:**

While active learning offers numerous benefits, educators may face challenges in its implementation. These challenges include resistance to change from traditional teaching methods, the need for additional training and resources, and the potential for unequal participation among students. To address these challenges, educators should seek professional development opportunities, collaborate with colleagues, and create a supportive classroom culture that values diverse contributions.

### **Conclusion:**

Active learning represents a transformative approach to education that enhances student engagement and academic performance. By fostering an interactive and participatory learning environment, educators can equip students with the skills necessary for success in an increasingly complex world. As research continues to support the efficacy of active learning strategies, it is essential for educators to embrace and implement these practices to create more effective and meaningful learning experiences for all students.

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## Political Studies

# THE SOUTH CAUCASUS AND ITS GEOGRAPHICAL, ECONOMIC AND POLITICAL IMPORTANCE

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### Abstract

The Caucasus region is historically an important geographical space where East and West, North and South intersect. This territory, in addition to constituting one of the most complex geopolitical and ethnic mosaics in the world, is also distinguished by its rich natural resources, favorable climatic conditions and transit routes. The article analyzes the fact that the Caucasus has been in the sphere of interest of various empires since ancient times, and the impact of political changes taking place here on the geopolitical status of the region. From a historical-geographical point of view, not only the physical-geographical features of the Caucasus are taken into account, but also socio-cultural and political-strategic factors. The article also emphasizes the role of the region in energy resources, transport communications and international relations in modern times. As a result of the research, it is concluded that the strategic importance of the Caucasus has not decreased over time, but, on the contrary, has increased further against the background of the interests of global and regional powers.

**Keywords:** Caucasus, historical geography, geopolitics, strategic importance, transit routes, energy resources.

### 1. History and geographical features of the Caucasus

The Caucasus, which has an important geographical position due to its border function between the Asian and European continents, has a deep-rooted past in terms of history. The name "Caucasus" was first mentioned as "Mount Kavkasos" in the novel "Chained Pleasure and Entertainment" by the ancient Greek author Aeschylus, known to have been written in 490 BC. After the ancient Greeks, the Romans also used the name "Kavkasus" (Caucasus) for the mountain range located between the Black Sea and the Caspian Sea, which is called "Mount Alburuz" in Turkish-Islamic works [1, p. 15].

The Caucasus, which is generally a mountainous region, has a very rugged geography and is a region where a severe continental climate prevails. [2, p. 157].

The Caucasus Main Range, which extends from the Taman Peninsula on the Sea of Azov to the Apsheron Peninsula on the shores of the Caspian Sea, is a natural fortress and fortification, and forms the natural border of the Middle Eastern Mountain Region, which includes the mountains of Armenia and Iran, as the western wing of the Himalayan system. [3, p. 3]. The Caucasus Mountains pass through the middle of the region, extending like an arc from northwest to southeast, dividing the region into north and south. [4, p. 3545]. The northern part of the Caucasus Mountains is called the North Caucasus and the southern part is called Trans-Caucasus/South Caucasus. [5, pp. 3-4]. The Caucasus Mountains extend 1200 km from the Caspian Sea in the southeast to the Black Sea coast in the northwest. The highest parts of these formidable mountains are the Elbrus and Kazbek Peaks. [6, p. 3].

The Caucasus region has been the focus of great powers throughout history due to its strategic and geopolitical importance. The South Caucasus region maintains its importance today due to its rich energy resources, its location on the historical Silk Road and its function as an energy corridor [7, pp. 139-160].

## **2. Geopolitical location and strategic features of the region**

When the natural features of the Caucasus geography are carefully examined, it is understood that human geography is parallel to physical geography. This geographical feature of the region also provides a very important advantage for defense. [8, p. 19].

The fact that the Caucasus is a border region, and therefore, since the early periods of history, many nations (Alans, Huns, Scythians, Romans, Arabs, Khazars, Mongols, Golden Horde etc.) have tried to make these lands their homeland, paved the way for different beliefs and cultures to live together here. As a point where the north-south, east-west roads meet, the Caucasus has an extremely important geopolitical and geostrategic position, as it connects the continents of Europe, Asia and Africa. The intercontinental geographical location of the Caucasus has enabled the region to be a transit point for political, economic and cultural relations, especially between these lands.

The fact that the Caucasus is located at a point where transit trade routes between the Asian and European continents meet, of course, increases the strategic importance of this geography. This region, which has a rich commercial capacity, has been the focus of attention of many nations for centuries, and great struggles have taken place to possess the region. It is known that the Caucasus Mountains have rich underground resources such as coal, iron, lead, zinc, copper, and manganese. In addition, the region's rich oil reserves and its proximity to Central Asia, which has important energy resources such as natural gas and oil, have allowed this geography to continue its strategic value to a great extent today. [9, p. 53].

Based on these considerations, we can determine the main aspects of the South Caucasus security in the context of global security. The problem is that the South Caucasus is self-organizing as a geopolitical system. There is no other way to ensure regional security in the context of global security. For this purpose, it is necessary to neutralize the negative effects of the threats and threats we have already mentioned and to increase the effectiveness of the mechanisms that ensure stability in the region [10, p. 223-248].

## **3. The ethnic complexity of the region and the attitude of Armenians towards Azerbaijanis**

The Caucasus, where geographically very different characteristics coexist, is a cosmopolitan region where many ethnic groups live together. Different nations live together in this vast geography. There are Caucasian communities such as Circassians (Abaza, Aphaz, Ubykh, Arguway, Nethach, Chebin, Kabartay, etc.), Nokhchi (Chechens, Ingush), Andellas (Avars), Laks (Gazi-Kumuks), Georgians, Chakurs, Aguls, Lezgins, Germans, Nemchelis. In addition to these tribes, Turks and other Caucasian communities continue their existence in the region. [11, p. 26-45].

The real natives of the Caucasus live mostly in the mountainous areas. All the people who have settled on the steep hills of the Caucasus, in the high plateaus, in the river valleys, in the deserts, and by the sea have found their own way of sustaining their lives. For this reason, there are 40-50 different tribes in the Caucasus who do not know each other's languages at all.

Despite the coexistence of dozens of peoples and ethnic groups, Armenians have always been in a separatist and terrorist position towards Azerbaijanis. This was not accidental. In order to control the region and manage it in accordance with their interests, geopolitical powers managed to resettle Armenians to the historical lands of Azerbaijan and settle them in these territories. This became an integral part of their geopolitical interests.

They tried to realize their geopolitical interests in the region by using Armenians and provide opportunities for control over the region. This policy continues to this day. The policy of mass resettlement, which began in the early 19th century, was mainly aimed at changing the democratic situation in the South Caucasus in favor of Armenians and creating their state at the expense of the lands of neighboring countries. Armenians, who resorted to various methods to realize their vile nature, were not ashamed of bribery, nationalism, discrimination, cunning, and hypocrisy. Thus, the Armenians who settled in the territory of present-day Armenia gradually began to implement their aggressive intentions against the Azerbaijani lands, deport local Azerbaijanis and commit genocide against them. This policy of discrimination, terror and genocide, which was implemented with the support of the Armenian community, manifested itself not only in the region, but also in a wider area. If we refer to the writings of Azerbaijani, Russian and Armenian authors, we will see the reasons for the occurrence of these historical events, the true essence of Armenian separatism. These acts of terror and genocide, which were purposefully designed to prevent the ideas of freedom and independence of the Azerbaijani people, and to eradicate them as an ethnic group, were carried out under the auspices of Russia. It is not surprising that the insidious intentions of the Armenians to always cover up their actions and give them a political guise, stem from their insidious intentions. One of the important aspects of the Armenians' loyalty to the policy of chauvinism and vandalism was that they always carried out their dirty intentions, despite living together with Azerbaijanis during the years of Soviet rule [12, p. 16-21; 13, p. 334-339].

### **Conclusion**

Studies show that the Caucasus region has been formed as a very complex and multifaceted space not only from a natural-geographical point of view, but also from a historical, ethnic and political point of view. Since ancient times, the Caucasus, a place where various civilizations, empires and peoples intersect, has always had strategic importance from a geopolitical point of view. Its location between Europe and Asia, access to rich energy resources and important transport and communication lines have included this region in the sphere of interest of important actors both in history and in the system of modern international relations.

As a result of the analysis conducted in the article, it is concluded that the historical and geographical position of the Caucasus is one of the main factors determining the nature of the events taking place in the region. At different times, the states and political powers that ruled here tried to secure their interests in this area, and for this reason the Caucasus has always been a field of competition and confrontation. In the 20th and 21st centuries, the importance of the region has become even more relevant from the aspects of energy policy, transport and logistics capabilities and security.

In this regard, the historical geography and strategic position of the Caucasus continue to play an important role not only in regional but also in global geopolitical dynamics. In the future, a correct assessment of historical and geographical features, cooperation and dialogue between interested parties come to the fore as an essential condition for the stability and development of the region.

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# European Supranational Identity in the context of Liberal World Order

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## Abstract

This article explores the evolution and challenges of European supranational identity within the context of the liberal world order. Rooted in the post–World War II project of integration, the European Union (EU) has developed as a unique supranational entity grounded in liberal democratic norms, multilateralism, and the rule of law. As a self-proclaimed normative power, the EU has sought to project these values globally through diplomacy, trade, and institutional influence. However, this identity is increasingly contested. Internally, the rise of nationalism, democratic backsliding, and divisions over sovereignty have strained the cohesion and legitimacy of EU governance. Externally, the retreat of U.S. leadership under the Trump administration’s “America First” doctrine and Europe’s continued reliance on NATO have exposed the limits of EU strategic autonomy. The article outlines several future trajectories for the EU—ranging from deeper integration and strategic autonomy to normative retrenchment or decline into intergovernmentalism—and argues that the Union’s ability to adapt without abandoning its core values will be critical to its continued role as a pillar of a reimagined liberal world order.

**Keywords:** European supranational identity, liberal world order, strategic autonomy, normative power, global actor

## Introduction

Since the end of the Second World War, the European project has represented a bold experiment in regional integration - a supranational order built not only on shared economic interests but on a collective identity grounded in liberal democratic norms and collective memory. Awareness of belonging to the Western civilization became one of the key factors in convergence of European states. The European Union (EU), as the institutional embodiment of this experiment, reflects a deeper aspiration: to transcend the traditional Westphalian nation-state system and construct a new form of governance rooted in cooperation, rule of law, multilateralism, and respect for human rights. In doing so, Europe has not only redefined the contours of sovereignty within its borders but has also positioned itself as a global actor upholding the principles of the liberal international order.

The liberal world order, a system of international relations established primarily under USA leadership after 1945, has been characterized by the promotion of democracy, free trade, international institutions, and the protection of individual rights. Institutions such as the United Nations, World Trade Organization, and International Monetary Fund have served as key instruments in maintaining this order. The European Union, however, stands out as a unique regional embodiment of these liberal ideals, with its own supranational governance structures and legal order. Through its institutional architecture, regulatory reach, and normative influence, the EU has become both a product and a proponent of the liberal order.

However, in recent years, both the liberal world order and the European supranational project have come under increasing strain. The global balance of power is shifting, marked by the relative decline of Western influence and the resistance of non-Western powers, most notably Russian

Federation and China. These shifts have led to a more fragmented and contested international environment, where norms that once seemed universal are now actively challenged. At the same time, internal challenges within the EU, such as democratic backsliding in member states like Hungary, the rise of populist and Eurosceptic movements, the ongoing impacts of Brexit, and divisions over migration and economic policy have raised fundamental questions about the coherence and sustainability of the European identity.

In this complex and evolving context, the question arises: **What role can the European supranational identity play in defending or reshaping the liberal world order?** Can the EU continue to serve as a beacon of liberal norms and multilateral governance, or will it retreat into a more inward-looking, fragmented regional actor? These questions are particularly pressing as the EU seeks to navigate external pressures, including strategic competition between the United States and China, Russian aggression in Ukraine, and instability in its near neighborhood while simultaneously confronting internal tensions that threaten to erode its foundational values.

The concept of a **“European supranational identity”** goes beyond legal and institutional frameworks. It encompasses a shared sense of purpose, historical consciousness, and normative commitment that binds member states together under a common project. Unlike intergovernmental cooperation, supranationalism implies a partial transfer of sovereignty to institutions that can act independently of national governments. This identity is not purely instrumental; it is also ideological, representing a collective belief in liberal democracy, human dignity, and peaceful cooperation. At the global level, this identity enables the EU to act as a “normative power,” projecting its values through diplomacy, trade agreements, development aid, and participation in multilateral forums.

Yet, this very identity is being tested. The war in Ukraine has renewed the EU’s focus on hard security, leading to debates about strategic autonomy and the limits of soft power. The rise of illiberal democracies within the EU raises questions about the Union’s internal cohesion and credibility as a promoter of liberal norms abroad. Moreover, the growing influence of alternative governance models challenge the universality of liberal values.

This article argues that while the European supranational identity remains a vital pillar of the liberal world order, it faces both internal and external challenges that demand strategic adaptation. The EU has to reaffirm its commitment to its core values while becoming more geopolitically assertive, strategically autonomous, and internally resilient. At stake is not only the future of European integration, but the credibility and survival of the liberal international order itself.

To explore this argument, the article is structured as follows. First, it examines the historical and institutional foundations of the European supranational identity, tracing its evolution from postwar integration to the present. Second, it analyzes the EU’s role as a normative power and its contribution to the liberal world order through global diplomacy and regulatory influence. Third, the article discusses internal challenges, including nationalism, democratic backsliding, and institutional limitations. Fourth, it considers the external pressures reshaping the global order and the implications for the EU’s global role. Finally, the article reflects on potential future trajectories for European supranationalism and its capacity to contribute meaningfully to a redefined, more inclusive liberal world order.

This article seeks to demonstrate that while the EU remains a unique and important actor within the liberal world order, its identity and influence are not guaranteed. They must be actively defended, reimagined, and strengthened in the face of 21st-century geopolitical realities.

### **The Foundations of European Supranational Identity**

The formation of European supranational identity is the result of decades of purposeful political, legal, and institutional development designed to overcome nationalist rivalries and embed liberal democratic norms in a continental framework. Rooted in the aftermath of two devastating world

wars, European integration was envisioned not merely as an economic or political convenience, but as a transformative project - one that would redefine sovereignty, institutionalize peace, and foster a collective European consciousness. The origins of European supranationalism can be traced to the post-World War II period, when European leaders sought to prevent the recurrence of violent conflict by binding their nations together through economic and political cooperation<sup>14</sup>. The Schuman Declaration of 1950 and the subsequent creation of the European Coal and Steel Community (ECSC) in 1951 marked the first significant step toward supranational governance. By pooling critical industries under a common authority, France and West Germany along with Belgium, the Netherlands, Luxembourg, and Italy laid the groundwork for a shared European future.

This cooperation deepened with the signing of the Treaties of Rome in 1957, which established the European Economic Community (EEC) and the Euratom Treaty. While still primarily economic in nature, the EEC introduced mechanisms for common decision-making and laid the foundation for later political integration. The evolving legal framework reflected a conscious effort to transcend narrow national interests in favor of shared prosperity, democratic stability, and peaceful coexistence.

### Institutional Architecture of Supranationalism

The European Union today is unique in global politics for its complex and multilayered institutional structure that blends intergovernmental and supranational elements. Key institutions: such as the European Commission, European Parliament, European Court of Justice (ECJ), and European Central Bank function with varying degrees of independence from member states and collectively form the backbone of EU governance.

- The **European Commission** proposes legislation and acts as the guardian of EU treaties. Its supranational nature lies in its obligation to represent the Union as a whole, rather than individual national interests.
- The **European Parliament**, directly elected since 1979, provides democratic legitimacy to the Union and co-legislates with the Council of the EU.
- The **ECJ** ensures the uniform interpretation and application of EU law across member states, with its rulings taking precedence over national law—a defining feature of supranational authority.
- The **European Central Bank**, particularly in the context of the Eurozone, has become a powerful symbol of European unity and economic interdependence.

The Treaty of Maastricht (1992) was pivotal in transforming the EEC into the European Union, expanding its competencies beyond economics to include foreign policy, security, justice, and home affairs. It also introduced European citizenship, giving individuals the right to reside and work anywhere in the Union and vote in EU and local elections, which is considered as an important step toward creating a shared political identity.

Subsequent treaties, notably the Treaty of Amsterdam (1997), Treaty of Nice (2001), and Treaty of Lisbon (2007), further refined the institutional framework, enhancing the role of the European Parliament, expanding qualified majority voting, and streamlining decision-making processes to accommodate enlargement and growing complexity.

### Normative Foundations of Identity

While institutional design is central to supranationalism, the European identity is also deeply normative. It is rooted in liberal democratic values - democracy, rule of law, human rights, and the

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<sup>14</sup> C, Schweiger. *Introduction: the process of institutionalized European integration and the permissive consensus of the first four decades*, 2016

<https://www.elgaronline.com/monochap/9781784717841/chapter01.xhtml>

protection of minorities—which are explicitly codified in EU treaties and reinforced through conditionality mechanisms, such as those required for accession to membership. The **Copenhagen Criteria**, adopted in 1993, require candidate countries to demonstrate stable institutions guaranteeing democracy and the rule of law, respect for human rights, and protection of minorities—values that lie at the heart of the liberal world order.

This normative orientation is reflected not only in legal frameworks but in the EU’s external actions. The Union has consistently framed itself as a “**normative power**,” projecting its liberal values globally through diplomacy, trade, development aid, and human rights promotion. Scholars such as Ian Manners have emphasized the EU’s ability to influence the behavior of other international actors not through coercion or material inducements, but through the attractiveness and legitimacy of its values and practices<sup>15</sup>. Paradoxically, the process of crisis management has often deepened supranational integration. The response to financial crises, migration pressures, Brexit, and the COVID-19 pandemic has demonstrated both the limits and the adaptive potential of European institutions. Each major crisis has generated debate over the scope of supranational authority and the resilience of the shared identity.

Equally important has been the process of enlargement, particularly the incorporation of Central and Eastern European countries after the Cold War. Enlargement has expanded the Union’s cultural and political diversity, challenging the depth of integration while reinforcing the EU’s identity as a promoter of peace and liberal democracy in post-authoritarian societies.

#### The EU as a Normative Power in the Liberal World Order

The European Union has often been described not just as a regional organization but as a unique kind of international actor—a “**normative power**”—whose influence derives less from traditional hard power and more from its ability to project values such as democracy, human rights, rule of law, and multilateralism. This concept, popularized by scholar Ian Manners, positions the EU as a global force for liberal norms within the broader liberal world order. In this context, the EU has attempted to reshape international relations by promoting a rules-based, cooperative, and rights-oriented global system. However, this role is increasingly contested both externally by the rise of alternative governance models and internally by growing divisions among EU member states.

At the heart of the EU’s identity lies the belief that it can and should influence the international system not primarily through military might or economic coercion, but by exporting a set of liberal-democratic principles. The notion of normative power argues that the EU has the capacity to shape the norms of international politics, particularly through its foreign policy, trade agreements, enlargement strategies, and development aid.

This normative orientation has been institutionalized through a wide range of EU policy instruments:

- **The European Neighbourhood Policy (ENP)** aims to foster stability and democratic reform in countries bordering the EU.
- **Trade agreements** with third countries often include conditional clauses on human rights, labor standards, and environmental protections.
- **Development aid programs** prioritize good governance, democratic institutions, and the rule of law.
- **Accession negotiations** are associated with the Copenhagen Criteria, ensuring that potential member states align with liberal democratic norms.

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<sup>15</sup> I.Manners, Normative Power Europe: Contradictions in terms? *Journal of Common Market Studies*, 2002. pp.235-258.

By embedding liberal principles into these policies, the EU positions itself as a guardian of the rules-based international order.

### **Diplomacy and Multilateralism**

The EU has also been a steadfast advocate for multilateral diplomacy and global cooperation. This commitment is evident in its strong support for the United Nations system, World Trade Organization, and other multilateral institutions. The EU has often acted as a diplomatic bridge between conflicting parties and regions, especially in areas where traditional great powers have found it difficult to act. For instance, the EU played a key role in negotiating the Joint Comprehensive Plan of Action (JCPOA) with Iran, aiming to prevent nuclear proliferation through diplomacy rather than confrontation<sup>16</sup>. Additionally, it has been a leading actor in climate diplomacy, helping to broker international agreements such as the Paris Agreement and positioning itself as a global leader in sustainable development. Through the EU Global Strategy (2016), the Union explicitly reaffirmed its role as a principled actor committed to a rules-based international order, democracy promotion, and cooperative security.

This multilateral engagement strengthens the EU's identity as a post-sovereign actor deeply embedded in and committed to maintaining the liberal order.

### **Enlargement and Conditionality as Normative Tools**

The process of EU enlargement represents one of the clearest examples of normative influence. Countries aspiring to join the EU must undertake significant political and institutional reforms to align with the Union's liberal values. This conditionality has helped shape political transitions in countries across Central and Eastern Europe, the Western Balkans, and, more recently, Ukraine and Moldova. While the success of this normative model is not out of limitations, many new member states have experienced democratic backsliding after accession. The enlargement process has nonetheless served as a vehicle for exporting liberal norms far beyond the EU's borders. Additionally, through the Stabilisation and Association Agreements, Eastern Partnership, and instrumental foreign aid, the EU continues to exert normative influence in neighboring regions, often positioning itself as an alternative to Russian or Chinese political models.

Another crucial, and often underestimated, source of the EU's global influence lies in its ability to set regulatory standards. Known as the "Brussels Effect", the EU's stringent regulations, specifically, in areas such as data protection (GDPR), environmental law, consumer safety, and digital markets often become de facto global standards due to the EU's economic weight and market access. Through this form of soft power, the EU indirectly shapes global governance without the use of coercive tools. Multinational corporations and non-EU governments often adopt EU standards to maintain access to the European market, further entrenching the Union's normative footprint on the global stage. Despite its ambitions, the EU's normative role faces some criticism and contains some contradictions. Internally, democratic backsliding in countries like Hungary undermines the EU's credibility as a promoter of liberal values. Externally, the effectiveness of normative power is questioned in regions where the EU lacks geopolitical leverage or where liberalism is increasingly rejected in favor of authoritarian models. Furthermore, critics argue that the EU's normative rhetoric is often undermined by inconsistencies, such as tolerating other states for strategic or economic reasons (e.g., migration deals with Turkey or energy partnerships with Gulf states). These contradictions risk weakening the Union's legitimacy as a normative power and raise questions about whether values truly drive EU foreign policy, or whether they serve as convenient instruments of soft power.

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<sup>16</sup> F. Akar, Revisiting the Role of the European Union on the Iran Nuclear Deal (JCPOA), 2020, <https://behorizon.org/revisiting-the-role-of-the-european-union-on-the-iranian-nuclear-deal-jcpoa/>

### Internal Challenges to European Supranationalism

While the European Union presents itself as a supranational model rooted in liberal democratic values, this identity has come under increasing pressure from within. Over the past decade, internal political, institutional, and socio-economic challenges have revealed deep fissures within the Union. These include the rise of nationalism and populism, democratic backsliding in member states, institutional disputes over the balance of power, and unresolved tensions between national sovereignty and supranational authority. Together, these dynamics threaten to erode the EU's coherence, legitimacy, and capacity to act as a unified actor within the liberal world order.

One of the most visible internal challenges to the European supranational identity is the resurgence of nationalism and the growing appeal of populist movements across the continent. Populist parties often portray the EU as an undemocratic, elitist bureaucracy that undermines national sovereignty and identity. Leaders such as Viktor Orbán in Hungary, Marine Le Pen in France, and Matteo Salvini in Italy have built political platforms that explicitly emphasize an importance of conservative, traditional values instead of the liberal ones enshrined in the EU's treaties and foundational documents.

This trend has not only undermined public trust in supranational governance but has also emboldened Eurosceptic narratives. In countries where these parties have gained power or influence, compliance with EU law and values has weakened, creating legal and political tensions between national governments and EU institutions.

### Democratic Backsliding and European solidarity

Growing phenomenon of democratic backsliding within the EU poses a direct threat to its normative foundations and conduction of soft power strategy, since it undermines the Union's credibility as a promoter of liberal democratic values, weakens internal cohesion, and limits its ability to influence external actors through normative appeal rather than coercive means. As member states increasingly challenge judicial independence, media freedom, and minority rights often under the guise of protecting national sovereignty or traditional values - the EU's internal consensus on core democratic principles becomes fractured. This fragmentation not only complicates collective decision-making but also erodes the normative coherence necessary for effective external action. In this context, an interesting and complex question arises: **does the invocation of traditional or conservative values by some governments necessarily amount to democratic backsliding?** While the promotion of cultural or moral conservatism is not inherently undemocratic, problems emerge when such agendas are pursued through illiberal methods, such as weakening institutional checks and balances, restricting dissent, or consolidating executive power. Thus, the line between democratic pluralism and illiberal governance becomes increasingly blurred. The EU faces the difficult task of distinguishing legitimate ideological diversity from norm violations that threaten the integrity of the supranational project.

### The Brexit Precedent and the Limits of Unity

The United Kingdom's decision to leave the European Union, which finalized in 2020 was perhaps the most dramatic blow to the EU's supranational identity. Brexit was not only a political and institutional rupture, but also a symbolic rejection of London to believe that Brussels has at its disposal necessary political, economic, social, cultural resources to project meaningful geopolitical weight in the international arena. The historical trajectory of the United Kingdom's relationship with the European project has long been marked by ambivalence and strategic caution. Although the UK officially joined the European Economic Community in 1973, its accession was preceded by skepticism and resistance—notably from French President Charles de

Gaulle, who vetoed Britain's entry twice in the 1960s, arguing that the UK's global outlook and close ties with the United States rendered it incompatible with the deeper political integration envisioned by the founding members. De Gaulle's concerns foreshadowed the UK's enduring reluctance to fully embrace supranationalism. Throughout its membership, the UK often positioned itself on the periphery of integration efforts opting out of key initiatives such as the Eurozone and the Schengen Area. Nevertheless, Britain remained a core actor within the EU, forming one of the three central powers alongside Germany and France, and significantly shaping the Union's economic, security, and foreign policy agendas. However, the UK consistently emphasized its distinct geopolitical identity, often framing itself as a power with autonomous strategic interests rather than as a fully embedded European actor. This dual orientation ultimately contributed to the political divergence that culminated in Brexit. Although the EU demonstrated unity in the Brexit negotiations and managed to prevent immediate contagion to other member states, the departure of a major liberal democracy raised fundamental questions about the reversibility of integration, the appeal of EU membership, and the limits of public consent for supranational governance. Moreover, Brexit exposed divisions within the Union over how much political integration is desirable or feasible. While some advocate for deeper federalism and greater EU-level decision-making, others resist further centralization, preferring to preserve national autonomy. These divergent visions of Europe's future remain unresolved and continue to create tension within policymaking and treaty reform debates.

#### **Migration, Borders, and the Solidarity Dilemma**

The 2015 refugee crisis revealed another fault line in the European project: the tension between supranational solidarity and national self-interest. While EU institutions and some member states emphasized humanitarian responsibility and burden-sharing, others closed borders and rejected quotas for refugee relocation. The failure to reach a cohesive, value-based response to the crisis highlighted the fragility of European solidarity, especially in areas involving identity, culture, and security. This lack of cohesion continues to hamper the development of a common asylum and migration policy. The Dublin Regulation, which places disproportionate responsibility on border states like Greece and Italy, remains contentious. As a result, the EU's internal divisions on migration have empowered far-right parties, strained relations between Eastern and Western member states, and exposed the limitations of supranational governance in emotionally charged policy areas.

The crisis also exposed deep ideological divisions within the Union, as some member states framed migration primarily as a humanitarian obligation, while others portrayed it as a threat to national identity and security. Central and Eastern European countries, particularly Hungary and Poland, were especially vocal in their opposition to mandatory relocation quotas, often invoking sovereignty and cultural preservation as justifications. This resistance not only stalled collective decision-making but also fueled accusations of selective solidarity, undermining mutual trust within the bloc. The EU's inability to enforce a unified response weakened its normative stance on human rights and asylum protections, leading to ad hoc national responses and the outsourcing of border control to third countries, such as the controversial 2016 EU-Turkey deal. Moreover, the securitization of migration policy has allowed far-right and populist parties to capitalize on public anxieties, turning migration into a powerful tool for electoral mobilization and anti-EU rhetoric. This politicization of migration has had a chilling effect on institutional reform, making consensus on long-term solutions increasingly elusive. Consequently, the EU finds itself trapped between normative commitments to asylum and the political realities of divergent national interests, raising fundamental questions about the limits of supranational solidarity in times of crisis.

## External Pressures and the Shifting Global Order: The US Retreat and Europe's Strategic Dilemmas

While internal divisions continue to challenge the European supranational project, **external** geopolitical shifts have also placed significant strain on the EU's role within the liberal world order. Chief among these is the changing nature of the transatlantic alliance, particularly during the presidency of Donald Trump (2017–2021). Under his “**America First**” foreign policy, the United States retreated from many of its traditional commitments to multilateralism and liberal internationalism, destabilizing longstanding pillars of Western cooperation. For Europe, this period exposed uncomfortable truths about its overreliance on American leadership and its own limitations as a geopolitical actor. The Trump administration marked a sharp departure from previous U.S. administrations' support for the liberal international order. Key elements of this shift encompassed multiple areas:

- 1) Withdrawal from international agreements: The U.S. pulled out of the Paris Climate Agreement, the Iran Nuclear Deal (JCPOA), and temporarily suspended support for the World Health Organization during the COVID-19 crisis.
- 2) Open criticism of multilateral institutions: Trump repeatedly criticized NATO, the United Nations, and the World Trade Organization, framing them as burdens on American sovereignty.
- 3) Transactional diplomacy: Emphasizing bilateral deals over alliances, Trump often treated long-standing allies in Europe as competitors rather than partners, imposing tariffs and questioning mutual defense obligations under NATO's Article 5.

For the European Union, these actions revealed the fragility of its dependence on American leadership to sustain the liberal world order. They also highlighted the asymmetry in transatlantic relations. While the EU had invested deeply in a rules-based, multilateralist global system, its primary partner appeared to be abandoning it. As a result, the Trump years triggered serious debates within Europe about strategic autonomy - the idea that the EU must rely on its own resources to act independently in defense, foreign policy, and global affairs.

This strategic pivot by key Anglo-Saxon actors, most notably the United States and the United Kingdom signaled a broader shift away from multilateral engagement toward more unilateral and interest-driven foreign policy approaches. In this evolving context, Germany and France, as the remaining core powers within the EU, were compelled to assume greater responsibility in maintaining the coherence, stability, and global credibility of the Union. Both countries intensified their efforts to uphold multilateral frameworks, support EU integration, and champion the development of a common foreign and security policy. However, their leadership has been met with uneven support across the bloc. Mid-range powers such as Poland have maintained close strategic alignment with the United States and, post-Brexit, increasingly with the United Kingdom, particularly in the fields of defense, energy security, and NATO cooperation. This divergence in foreign policy orientation has further complicated efforts to build a unified European geopolitical identity, illustrating the fragmented nature of EU strategic culture and the difficulty of achieving genuine strategic autonomy in a multipolar and uncertain international environment.

### Dependency on NATO and the Security Paradox

The United States' retreat forced the EU to confront a long-standing structural weakness: its dependence on NATO, and by extension, on U.S. military power, for its own security. While the EU has made strides toward common defense and security policy—particularly through initiatives like PESCO (Permanent Structured Cooperation) and the European Defence Fund, the reality remains that NATO, led by the USA remains the cornerstone of European defense.

This dependency creates a paradox for European supranationalism. On one hand, the EU aspires to act as a global actor, promoting peace and liberal norms. On the other, it lacks the hard power and unified military command to back its diplomacy with credible force. This reliance on NATO,

and on U.S. military protection in particular, undermines efforts to establish the EU as a fully sovereign geopolitical entity.

The Russian invasion of Ukraine in 2022 reinforced this paradox. While the EU responded with unprecedented sanctions, financial aid, and arms support, the strategic backbone of Europe's military deterrence came not from Brussels, but from Washington and NATO. The war reaffirmed the indispensability of the U.S. security umbrella, even as it reignited calls for deeper European defense integration.

In recent years, strategic autonomy has become a central concept in EU foreign policy discourse, especially under French leadership. President Emmanuel Macron has strongly advocated for a more independent Europe capable of defending its interests without overreliance on the United States. The European Commission under Ursula von der Leyen has also echoed these calls, positioning the EU as a potential "geopolitical Commission."

Yet the practical realization of strategic autonomy remains constrained by several factors:

- 1) **Divergent threat perceptions** among member states: Eastern and Baltic countries prioritize U.S.-led NATO defense against Russia, while Western and Southern countries are more receptive to EU-led security initiatives.
- 2) **Insufficient defense spending and coordination**: Despite commitments, many EU members continue to underfund their militaries and resist deeper defense integration.
- 3) **Institutional fragmentation**: The EU lacks a unified command structure or rapid response capability on par with NATO.
- 4) **Political will**: National governments remain cautious about surrendering more sovereignty in defense matters, limiting the EU's ability to speak and act with one voice.

As a result, while strategic autonomy remains a rhetorical priority, the EU continues to rely on external security guarantees, limiting its credibility as a self-standing pillar of the liberal world order.

#### **Future Trajectories for European Supranational Identity in a Changing World Order**

As the liberal world order faces unprecedented stress, and Europe navigates both internal fragmentation and external pressures, the future of the EU's supranational identity remains open-ended. Whether the EU can reaffirm and adapt this identity will largely determine its relevance in the emerging multipolar global system. Several possible trajectories lie ahead—some more optimistic, others cautionary, but all hinge on the Union's capacity to resolve its internal contradictions, assert geopolitical agency, and sustain its normative commitments. One possible trajectory is the strengthening of European unity through deeper integration, both institutionally and strategically. Under this scenario, the EU would address internal rule-of-law crises more decisively, push forward reforms to streamline decision-making (e.g., expanding qualified majority voting in foreign policy), and invest in greater defense coordination.

This path would involve: expanding common defense projects under the Strategic Compass and PESCO; creating a more autonomous European security architecture that complements NATO but reduces dependence on U.S. leadership, Advancing the EU's external action through a stronger European External Action Service (EEAS) and a more unified foreign policy voice. Such a trajectory could enable the EU to evolve into a co-leader of a reformed liberal world order, particularly one more inclusive of the Global South and responsive to 21st-century challenges like climate change, digital governance, and multipolar diplomacy.

A more pragmatic, though less ambitious, trajectory would be the adoption of a model of "managed pluralism" or flexible integration. In this scenario, the EU would formally recognize that not all member states are willing or able to integrate at the same pace. Core countries could proceed with deeper political, economic, and security integration, while others participate selectively. This would allow the EU to maintain functionality and coherence without constant

internal deadlock. Furthermore, this would facilitate preservation of the supranational core while accommodating national differences.

However, this trajectory risks creating a multi-speed Europe that may deepen inequality and resentment among members, potentially weakening the emotional and normative foundations of a shared European identity.

Given rising global non-liberal alternative governing models advocated by such actors like Russia and China and considering domestic political shifts, the EU may also choose or be forced to adopt a more defensive posture, prioritizing the preservation of its liberal values internally over projecting them externally. This trajectory would involve reasserting democratic norms within the Union through stricter enforcement mechanisms, shifting focus from enlargement or normative outreach to consolidation.

While this strategy may help protect the EU's internal cohesion, it risks reducing the Union to a fortress of liberalism - reactive and inward-looking, rather than globally influential.

A more pessimistic trajectory is that of erosion of supranational identity in favor of intergovernmentalism, where national governments increasingly assert primacy over EU institutions. This could be driven by:

- 1) Continued democratic backsliding in member states.
- 2) Lack of consensus on foreign policy and security.
- 3) Public disillusionment with the EU's effectiveness in crises.

In this case, the EU may remain a functional economic bloc but lose its ability to act as a cohesive global actor. Its normative identity would become fragmented, weakening its influence in defending or shaping the liberal world order.

### Conclusion

The European Union stands at a crossroads not only as a political and economic union, but as a normative project and a potential steward of liberal values in an increasingly unstable international system. From its postwar origins rooted in peace and cooperation, to its evolution into a supranational polity defined by shared rules and democratic ideals, the EU has long been a central pillar of the liberal world order. Yet today, both the supranational identity of Europe and the broader liberal order it helped sustain are under serious strain.

Internally, the EU faces growing fragmentation. The rise of nationalism, democratic backsliding in key member states, and institutional tensions over sovereignty have eroded the Union's normative coherence. Externally, the retreat of the United States from global leadership under the Trump administration—and the enduring legacy of “America First”—exposed Europe's strategic vulnerabilities and cast doubt on the durability of transatlantic liberalism. The EU's reliance on NATO, and particularly on U.S. military power, further complicates its aspirations to act as an autonomous geopolitical actor. Despite these challenges, the European supranational identity remains both a valuable asset and a source of potential renewal. The EU's commitment to multilateralism, human rights, and democratic governance continues to distinguish it as a normative power—one that can offer a compelling alternative to authoritarian models of order emerging elsewhere. However, maintaining and strengthening this identity will require more than rhetorical reaffirmation. It demands a renewed effort to address internal contradictions, enforce foundational values, and pursue strategic autonomy with seriousness and unity.

The future of the liberal world order may no longer be shaped solely by transatlantic hegemony, but by a constellation of actors committed to rules-based cooperation and democratic norms. In this landscape, the EU has a critical choice to make: it can either step forward as a confident and cohesive normative power, capable of shaping global outcomes, or retreat into irrelevance as internal divisions and external dependencies undermine its voice. Ultimately, the resilience of the European supranational identity—and its continued relevance in global affairs—will depend on

whether the EU can adapt to the demands of a multipolar world without compromising the liberal principles on which it was founded. If it succeeds, it may not only preserve its own unity and legitimacy but also play a defining role in reinventing the liberal order for the 21st century.

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# Azerbaijan's geopolitical position: searching for balance between global powers

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## Summary

Azerbaijan's geopolitical position significantly enhances its strategic importance both in the Caucasus region and globally. Located at the crossroads of East and West, North and South, Azerbaijan has become a key actor in the region due to its energy resources and transport-logistics capabilities. Maintaining balanced relations with major powers such as Russia, Iran, Turkey, and the West remains a core strategic priority for Azerbaijan. Azerbaijan's balancing policy is based on a complex network of relations – cooperation with Russia within the CIS and CSTO frameworks, strategic partnership and military-political alliance with Turkey, and energy security and economic ties with Western countries. At the same time, ethno-political issues and border security concerns with Iran remain geopolitical risks. This balancing strategy increases Azerbaijan's maneuverability in the multipolar world order, preserves domestic stability, and enables flexible responses to shifting regional power dynamics. In the future, deepening energy diplomacy, strengthening security cooperation, and advancing regional integration can further consolidate Azerbaijan's geopolitical position.

**Keywords.** Azerbaijan's geopolitical position, balance policy, energy security, regional integration, strategic partnership, multipolar world, foreign policy

## Introduction

The global geopolitical transformations of the modern era have necessitated the application of flexible strategies in the foreign policy of states. In this context, for countries with a strategic location such as Azerbaijan, the "balance policy" plays an important role in ensuring regional stability and protecting their interests in the international system. Located in the Caspian Sea basin, in the center of the South Caucasus, Azerbaijan has become a geopolitical bridge between Russia, Iran, Turkey and the West, becoming a crossroads of many conflicting interests [6]

The geopolitical position of Azerbaijan equally encompasses both security challenges and strategic advantages. On the one hand, the country plays an important role in the energy security of Europe and Asia through its energy resources and transport networks; on the other hand, the need to create a balance between regional powers forces it to constantly make flexible diplomatic maneuvers. The war in Ukraine, tense relations with Iran and the West's active involvement in building a new order further complicate the maintenance of this balance. This article will analyze the main factors influencing the formation of Azerbaijan's geopolitical position, the content of the balancing policy pursued against the backdrop of relations with Russia, Iran, Turkey and the West, and the successes and limitations of this policy. The aim is to explain how Azerbaijan occupies a position in the multipolar world order and how this position strengthens its role as a regional power

**Relevance and purpose of the topic.** Azerbaijan, geostrategically located in the center of the Caucasus, plays the role of a bridge between the West and the East, as well as the North and the South. Energy resources, transport routes and neighboring regional and global powers (Russia, Turkey, Iran, the USA, China and the European Union) make Azerbaijan an important actor in

geopolitical terms. The changing regional order after the 2020 Karabakh war, the Russia-Ukraine war, the West-East conflicts and the new multipolar world order, the balance policy pursued by Azerbaijan are of particular relevance.

**Purpose:** The purpose of this article is to analyze the geopolitical position of Azerbaijan, the balance policy in its relations with regional and global powers, to assess the successes and risks of this policy, as well as to explore its future prospects.

**Concepts of geopolitics and balance policy.**

**Geopolitics** is a concept that explains the foreign policy and power games conducted by states based on their geographical location, resources, relations with neighboring countries and strategic interests arising from this position. Geopolitical analysis is carried out, in particular, by assessing energy security, transport routes and military-strategic positions.

**The balance policy** is a policy of a state aimed at protecting its interests through neutrality or flexible partnership between different power centers. This policy is especially vital for small and medium-sized states, as these states, avoiding direct confrontation, seek to both maintain regional stability and strengthen their independence.

For Azerbaijan, this policy is implemented within the framework of a strategic partnership with Russia, brotherhood and military cooperation with Turkey, partnership with the West in the fields of energy and security, as well as pragmatic relations with Iran and China

**Research methodology and sources used**

This article was conducted using the descriptive-analytical method. The main goal is to explain the geopolitical situation of Azerbaijan and analyze its relations with various power centers. The article refers to both primary and secondary sources: Primary sources: official documents of the Azerbaijani government, presidential speeches, reports of the Ministry of Foreign Affairs; Secondary sources: scientific articles, reports of international research centers (Carnegie, Chatham House, RUSI, etc.), expert opinions, analytical articles; Media analysis: information from international and local news agencies (BBC, Al Jazeera, Eurasianet, Trend, APA, etc.); Maps and statistical indicators: official databases related to energy, trade and transport. The methodological approach is based on both political analysis and geopolitical risk assessment.

**Energy resources and transport and logistics capabilities.** In addition to having rich oil and natural gas reserves, Azerbaijan has an extensive and diversified transport infrastructure to transport these resources to global markets. The Baku-Tbilisi-Ceyhan (BTC) oil pipeline, the Baku-Tbilisi-Erzurum (BTE) gas pipeline, and the Trans-Adriatic Pipeline (TAP) put Azerbaijan at the forefront as a reliable partner in Europe's energy security [6]. With these resources, Azerbaijan occupies a strategic position in both the regional and global energy markets. In addition, projects such as the Baku-Tbilisi-Kars railway, the Baku International Sea Trade Port, and the Zangezur corridor strengthen Azerbaijan's role as a logistics and transport hub. This infrastructure network enables Azerbaijan to serve as an important bridge between the countries of Central Asia and Europe [9].

**Geopolitical neighborhood:** Russia, Iran, Turkey, and the West. Azerbaijan's geopolitical neighborhood is complex and multi-vector in nature. With a long border with Russia in the north, Azerbaijan occupies a strategic place in Moscow's Caucasus policy. Relations with Russia combine elements of cooperation and competition in both the military-strategic and economic spheres. Despite ethnic, religious and historical ties with Iran, located in the south, relations are observed with tension from time to time, especially against the background of Azerbaijan's rapprochement with Israel. However, relations with Tehran are maintained in terms of economic cooperation and regional stability. Relations with Turkey are built on the principle of "one nation, two states". After 2020, cooperation in the military, economic and political spheres has further strengthened, and with the Shusha Declaration, it has risen to the level of a strategic alliance. Western countries, especially the European Union and the United States, consider Azerbaijan an energy partner and an important player for regional stability. The main priorities in these relations are concentrated

in the areas of energy security, legal reforms and regional cooperation. This multipolar neighborhood environment necessitates Azerbaijan's balancing policy. Thanks to this policy, Azerbaijan protects its sovereignty and ensures its national interests without succumbing to the influence of any power center.

**Relations with Russia:** historical legacies and modern realities. Cooperation within the CIS. Azerbaijan-Russia relations are based on a long-standing historical heritage. Having shared a common history as part of the Russian Empire since the 19th century and later as part of the Soviet Union, the two states established cooperation within the Commonwealth of Independent States (CIS) after the collapse of the USSR. The CIS played an important platform for Azerbaijan in the early years in terms of maintaining economic and technical ties in the post-Soviet space. However, over time, the institutional weakness and political ineffectiveness of the CIS have led to it remaining only as a practical tool for technical cooperation. Although Azerbaijan retains its membership in the CIS, it takes a passive position in political decision-making and security issues within the organization. This coincides with Azerbaijan's policy of protecting its sovereign decision-making rights and staying away from bloc-like alliances. [7]

**Attitude to the CSTO and the Eurasian Economic Union.** Azerbaijan is not a member of the Russian-led integration associations such as the Collective Security Treaty Organization (CSTO) and the Eurasian Economic Union (EAEU). The reasons for this include the Russia-centric security architecture of both organizations and the possibility of creating geopolitical dependence. Azerbaijan's main argument in relation to the CSTO has been the organization's neutral position towards Armenia's aggressive policy. Azerbaijan has repeatedly stated that membership in the CSTO is not in its national interests, as it could undermine the country's balanced foreign policy. At the same time, by not joining the EEU, Azerbaijan is trying to preserve its economic sovereignty and not limit relations with Western markets [5].

**Geopolitical importance of Azerbaijan.** Geographical position: Crossroads between East and West, North and South. Azerbaijan is strategically located at the crossroads of Europe and Asia, located in the center of the South Caucasus, on the western shore of the Caspian Sea. This geographical location makes the country a strategic transit hub between East and West, as well as North and South. The territory of Azerbaijan was one of the main crossing points of the historical Silk Road, and it plays an important role in new transport and trade initiatives such as the "Middle Corridor" in modern times (Aliyev, 2023). Azerbaijan's geographical position allows it to develop both energy and security cooperation with the European Union, and trade and logistics relations with Central Asia and China in parallel. This position also makes the country vulnerable in terms of regional stability and geopolitical competition.

**Balanced policy against the backdrop of the Ukrainian war.** The Russia-Ukraine war, which began in February 2022, has seriously changed the geopolitical order in the post-Soviet space. Against the backdrop of this war, Azerbaijan has tried to take a very cautious and balanced position. On the one hand, Azerbaijan has openly declared on international platforms that it supports the territorial integrity of Ukraine, and on the other hand, it has paid special attention not to aggravate relations with Russia/ Azerbaijan has provided humanitarian assistance, but has not joined the sanctions policy, and has also increased its strategic importance by increasing gas exports to Europe against the backdrop of Russia's exclusion from the energy market. This has once again confirmed Azerbaijan's neutral and flexible diplomatic maneuvering ability. In addition, the growing Russian-Iranian rapprochement as a result of the war has led to a clash of interests in the South Caucasus, prompting Azerbaijan to deepen relations with Turkey and the West. Despite all this, Baku-Moscow relations continue in the context of mutual economic dependence and energy logistics.

**Relations with Iran:** ideological and ethno-political tensions. Although relations between Azerbaijan and Iran are based on historical, religious and ethnic ties, in modern times these

relations are often assessed against the background of ideological, geopolitical and ethno-political tensions. The changing geopolitical order in the South Caucasus, especially after 2020, has created additional difficulties in Iranian-Azerbaijani relations.

**Border security and the Zangezur issue.** Azerbaijan and Iran share a common border of more than 700 km. After Azerbaijan regained control over the border areas after the Second Karabakh War in 2020, it began to implement new border crossing regimes and customs systems in these zones. This has created difficulties on the routes of passage to Nakhchivan from Iran and has caused Tehran's concern about the Zangezur corridor. The Iranian side views the creation of the Zangezur corridor as an increase in the influence of Turkey and Azerbaijan in the region, as well as a threat to the Iran-Armenia land connection [16]. As a result, Iran has conducted military exercises in the border areas, which has been perceived by Azerbaijan as a danger signal.

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**The South Azerbaijan factor.** One of the most sensitive issues in Azerbaijan's relations with Iran is the rights and political position of millions of ethnic Azerbaijanis living in Southern Azerbaijan, that is, in Iran. Although the cultural and historical attachment to Southern Azerbaijan is strong in Azerbaijani public opinion, official Baku is reluctant to raise this issue to an open political level. However, Iran views this attachment as a separatist threat and accuses some organizations in Azerbaijan of acting against Tehran [16]. In addition, the restriction of the linguistic and cultural rights of Azerbaijanis living in Iran itself is a serious public concern in Azerbaijan. This is considered one of the main components of the socio-psychological tension between Azerbaijan and Iran.

**The impact of Iran-Armenia relations.** Iran's relations with Armenia, especially since the 1990s, have been stable and strategic. Iran has maintained trade and energy relations with Armenia during periods of international sanctions and provided significant support to this country. After 2020, these relations have begun to have geopolitical significance, as Armenia is Iran's only

alternative land route to the West. The deepening of Iranian-Armenian relations is met with concern in Azerbaijan, as these relations are both compatible with efforts against the Zangezur corridor and strengthen Armenia's position against Azerbaijan [3]. The spread of information about Iran's military-technical cooperation with Armenia is also a factor straining Baku-Tehran relations.

**Strategic partnership with Turkey.** Azerbaijani-Turkish relations are built on historical, cultural and linguistic unity, but these relations are not only emotional, but also strategic and multifaceted cooperation. In recent years, this cooperation has deepened at the level of military-political, economic and organizational integration. For Azerbaijan, Turkey serves as both a regional security pillar and a balancing partner against global powers.

**Shusha Declaration and Military-Political Cooperation.** A new stage in the strategic partnership between Azerbaijan and Turkey began with the Shusha Declaration signed on June 15, 2021. This document envisages deepening cooperation between the two states in the fields of defense, military industry, security and regional policy. With the Shusha Declaration, relations between the two countries have risen to the level of alliance [15].

After the signing of the declaration, joint military exercises between the two countries have intensified, joint projects and technological cooperation in the defense industry have increased. This cooperation has become a means of strategic balancing for Azerbaijan against major players in the region such as Russia and Iran.

**Integration in the Turkic States Organization.** Azerbaijan and Turkey, as leading members of the Turkic States Organization (TSO), are the initiators of political, economic and cultural integration among Turkic-speaking countries. The main goal of the TSO is to strengthen cooperation between member states and form a regional power center based on a common history, language and culture. Turkey plays a leadership role in this organization, and Azerbaijan, by supporting this leadership, contributes to the transformation of the TSO into a truly functional organization [10]. Azerbaijan's Zangezur Corridor initiative is also aimed at strengthening the infrastructure basis of this integration. At the same time, cooperation projects in the energy, transport and digital fields are being implemented within the organization.

**Regional leadership and cultural affinity.** The cultural and spiritual connection between Azerbaijan and Turkey is the basis of this cooperation. Both states are united by a common language, religion, customs and traditions and historical memory. This cultural affinity acts as an important psychological foundation that strengthens diplomatic relations. In addition, Turkey has been strengthening its regional leadership with its increasing activity in the South Caucasus and Central Asia in recent years and is putting forward joint regional initiatives with Azerbaijan. Energy projects such as the Zangezur corridor, the Middle Corridor projects, and TANAP further deepen the geopolitical dimension of this cooperation [4]. For Azerbaijan, Turkey is of strategic importance as both a security pillar and an allied actor in the multipolar system of influence in the region.

**Strategic partnership with Turkey.** The relations between Azerbaijan and Turkey are not only diplomatic and economic, but also a multifaceted alliance based on historical, cultural and strategic values. In recent years, this cooperation has entered a new stage, deepening both in terms of military-political and organizational integration and regional power distribution.

#### **Shusha Declaration and Military-Political Cooperation**

Relations between Azerbaijan and Turkey have gained new dynamics after the Second Karabakh War of 2020. The Shusha Declaration, which is the official symbol of these relations, was signed on June 15, 2021, confirming the strategic alliance between the two countries. The declaration identified defense industry, military exercises, security cooperation and ensuring regional stability as key priorities.

With the signing of this document, military cooperation between Azerbaijan and Turkey has further intensified, and partnership in joint military exercises and defense technologies has

expanded. At the same time, Turkey has been an important actor providing diplomatic support in the recognition of Azerbaijan's sovereignty and territorial integrity at the international level. This cooperation has played a significant role in changing the balance in the South Caucasus and forming a new center of power.

**Integration in the Organization of Turkic States.** One of the important platforms of the partnership between Turkey and Azerbaijan is the Organization of Turkic States (OTS). The organization promotes integration between Turkic-speaking countries in the political, economic, humanitarian and security spheres. Azerbaijan, in addition to being an active participant in this organization, plays the role of a locomotive of regional initiatives. Transport corridors, energy projects, joint economic projects and diplomatic coordination implemented within the framework of the OTS deepen integration between countries. Projects such as the Zangezur Corridor initiative and the Middle Corridor (Trans-Caspian Corridor) are practical results of this integration. Azerbaijan has begun to present itself as the central coordinating force of the Turkic world through this organization.

**Regional leadership and cultural affinity.** One of the main pillars on which cooperation between Turkey and Azerbaijan is based is cultural affinity and common identity. The slogan "One nation, two states" forms the ideological foundation of these relations. The common heritage in terms of history, language, religion and traditions strengthens this cooperation not only in the political and military context, but also in terms of social and civilizational values. In regional politics, Turkey acts as a NATO member with leadership potential and a strong economy. Azerbaijan benefits from this leadership in the form of security guarantees, economic investments and diplomatic support. These relations, which were formed on the basis of mutual interests, have also led to the formation of a new balance of power in the Caucasus and Central Asia.

**Relations with the West:** energy security and diplomatic balance. Azerbaijan's relations with the West are of great importance from a geopolitical perspective, both from the perspective of energy security and diplomatic balance. Azerbaijan takes a pragmatic approach in its relations with both the European Union (EU) and the United States, that is, while maintaining close relations in economic cooperation and security issues, the principle of sovereignty is the basis for domestic politics. Although this has occasionally created tensions in the areas of democracy and human rights, it has given a significant impetus to Azerbaijan's balanced policy.

**Energy Cooperation with the European Union (Southern Gas Corridor).** Energy cooperation is the cornerstone of relations between Azerbaijan and the European Union. The Southern Gas Corridor (SGC) project is one of the most important outcomes of this cooperation. Through the SGC, Azerbaijani natural gas is delivered to the European market via Georgia, Turkey, Greece, Albania and Italy. This route has led to Azerbaijan becoming a strategic actor in Europe's energy security [22]. Within the framework of this cooperation, Azerbaijan has concluded long-term energy contracts with Europe, and the Azerbaijan–EU Strategic Energy Partnership Memorandum signed in 2022 aims to double gas exports. This has also created an important alternative for Europe seeking to reduce its energy dependence on Russia.

**US–Azerbaijan relations.** Relations between Azerbaijan and the US have developed mainly in the areas of energy, security and regional stability. Particularly since the 1990s, the US has made significant investments in energy projects in Azerbaijan (e.g. BTC and TANAP), while also providing diplomatic support for a peaceful resolution of the Nagorno-Karabakh conflict. There is a strategic dialogue between the parties in the areas of counter-terrorism, regional logistical infrastructure, and peacekeeping cooperation. At the same time, tensions have occasionally arisen in relations due to some pro-Armenian positions in the US Congress. Nevertheless, Azerbaijan maintains its cooperation with the United States both bilaterally and in the NATO format [14].

**Democracy, Human Rights, and the Balance Dilemma.** The most sensitive point in relations between Azerbaijan and Western countries, especially the EU and the US, is in the areas of

democracy, human rights, and political freedoms. The European Parliament and the US State Department have published critical reports against Azerbaijan, which have provoked a reaction from official Baku. Nevertheless, Azerbaijan responds to these criticisms based on the principle of sovereignty and non-interference in internal affairs. The priority for Baku is the security, stability, and economic development of the state. Therefore, Azerbaijan follows a pragmatic cooperation-criticism balance strategy in relations with the West. This approach allows Azerbaijan to maintain an independent policy course. The main goal of Azerbaijan in its relations with the West is to deepen partnership in the energy and economic spheres, as well as to ensure its independence by protecting internal political stability and national interests.

#### **Challenges and opportunities of the balance policy.**

Maneuvering opportunities in a multipolar world order, The mutual competition of power centers such as the US, China, Russia and the European Union at the global level is shaping the new world order. In this context, small and medium-sized states, including Azerbaijan, are trying to protect their national interests through strategic flexibility and a balanced policy [20]. Azerbaijan's simultaneous cooperation with Russia in the economic and security fields, with Turkey in the strategic and military fields, and with the West in the energy and human rights fields is an example of this maneuvering ability [9]. This approach can be evaluated within the framework of the concepts of "independent foreign policy" and "pragmatic balancing" [11]. Azerbaijan's chairmanship of the Non-Aligned Movement (2019–2023) was also an important step in the international recognition of this multi-vector policy.

**The impact of internal stability on foreign policy.** The effectiveness of the geopolitical balance policy directly depends on the level of internal stability. Azerbaijan's economic stability, political stability and the resources it receives from energy revenues allow the country to make more flexible and independent decisions in foreign policy [6]. At the same time, strengthening internal ethnic and social processes, especially national unity in regional divisions, limits the possibilities of intervention by external actors. As a successful example of internal consolidation, national solidarity and political unity during the 2020 Patriotic War strengthened Azerbaijan's positions in the international arena.

**The changing balance of power in the region and Azerbaijan's position.** The changing balance of power in the South Caucasus in recent years – the relative weakening of Russian influence, the growing military-political role of Turkey, and the selective activation of the West – are redefining Azerbaijan's geopolitical coordinates [19]. Azerbaijan's neutral, yet active and flexible policy in these processes has made it a stabilizing and coordinating actor in the region. For example, Azerbaijan became a key actor in ensuring European energy security in 2022–2024, and at the same time continued cooperation with Russia within the North-South corridor [2]. This approach is important both in terms of maintaining regional balance and protecting international legitimacy.

#### **Conclusion**

The foreign policy model pursued by Azerbaijan in the 21st century is distinguished by its ability to create a balance between regional and global powers. The country's geographical location - located at the crossroads of East and West, North and South - not only gives it strategic importance, but also increases risks and responsibilities. The export of Azerbaijan's energy resources to the West, as well as its relations with Russia and Iran based on the principles of good neighborliness, constitute the fundamental pillars of the balance policy. The complex dynamics in the geopolitical environment - the Russia-Ukraine war, Iran's South Caucasus policy, the West's growing interests and the rising role of Turkey - both expand Azerbaijan's diplomatic maneuvering opportunities and pose new challenges. Independent decision-making ability, multifaceted partnerships and the preservation of internal stability are among the main factors increasing Azerbaijan's geopolitical power.

In order for Azerbaijan to continue its successful balance policy in the future, it is recommended to strengthen activities in the following areas:

**Deepening energy diplomacy** - expanding energy cooperation with Europe and promoting new projects;

**Flexible coordination in the field of security and defense** - strengthening cooperation with Turkey and other strategic partners against regional threats;

**Activation of cultural and humanitarian diplomacy** – acceleration of cultural integration with the Turkic world and improvement of international image policy;

**Flexible response to regional changes** – taking a flexible and proactive diplomatic position in accordance with the changes taking place in the Caucasus and the Middle East.

Thus, Azerbaijan's successful geopolitical balance policy serves not only regional stability, but also strategic depth based on national interests in relations with global powers.

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