



NJD-iScience

№151

The Norwegian Journal of Development of
the International Science





№151/2025

Norwegian Journal of development of the International Science

ISSN 3453-9875

It was established in November 2016 with support from the Norwegian Academy of Science.

DESCRIPTION

The Norwegian Journal of Development of the International Science, established in 2016 with support from the Norwegian Academy of Science, offers a platform for global researchers, academics, and students. Publishing 24 times annually, it covers current science topics. Submitting your article provides exposure to a diverse audience, enhancing your career. Our commitment to research and SEO ensures timely visibility. Submit to the Norwegian Journal of Development of the International Science today and join esteemed authors.

Editor in chief – Karin Kristiansen (University of Oslo, Norway)

The assistant of the editor in chief – Olof Hansen

- James Smith (University of Birmingham, UK)
- Kristian Nilsen (University Centre in Svalbard, Norway)
- Arne Jensen (Norwegian University of Science and Technology, Norway)
- Sander Svein (University of Tromsø, Norway)
- Lena Meyer (University of Gothenburg, Sweden)
- Hans Rasmussen (University of Southern Denmark, Denmark)
- Chantal Girard (ESC Rennes School of Business, France)
- Ann Claes (University of Groningen, Netherlands)
- Ingrid Karlsen (University of Oslo, Norway)
- Terje Gruterson (Norwegian Institute of Public Health, Norway)
- Sander Langfjord (University Hospital, Norway)
- Fredrik Mardosas (Oslo and Akershus University College, Norway)
- Emil Berger (Ministry of Agriculture and Food, Norway)
- Sofie Olsen (BioFokus, Norway)
- Rolf Ulrich Becker (University of Duisburg-Essen, Germany)
- Lutz Jäncke (University of Zürich, Switzerland)
- Elizabeth Davies (University of Glasgow, UK)
- Chan Jiang (Peking University, China) and other independent experts

1000 copies

Norwegian Journal of development of the International Science

Iduns gate 4A, 0178, Oslo, Norway

email: publish@nor-ijournal.com

site: <https://nor-ijournal.com>

CONTENT

BIOLOGICAL SCIENCES

Abdullaeva Sh.

BIODIVERSITY OF RHIZOSPHERIC MICROORGANISMS
OF WOODY SPECIES 3

ECONOMIC SCIENCES

Dr. Irsida Dinoshi, Dr. Ahmet Leka

REAL EXCHANGE RATE FLUCTUATIONS AND THEIR
IMPACT ON ALBANIA'S BUSINESS SECTOR.....6

Norchaeva S.

GLOBAL FINANCIAL CRISIS: RESPONSES TO STABILIZE
ECONOMY 38

Rani Cahyaning Putri, Rini Handayani

THE INTERPLAY OF MARKETING CAPABILITIES:
BRIDGING MARKET ORIENTATION AND PRODUCT
INNOVATION TO BOOST MARKETING PERFORMANCE
IN CREATIVE MSMEs IN SURAKARTA CITY 45

JURISPRIDENCE

Arash Derambarsh

A NEW FRENCH BILL AGAINST FOOD WASTE TO BE
SUPPORTED 57

Ismayilov Kh.

LEGAL BASIS FOR ORGANIZING ELECTIONS TO LOCAL
SELF-GOVERNMENT BODIES IN AZERBAIJAN AT THE
BEGINNING OF THE XX CENTURY 66

MEDICAL SCIENCES

Safaraliyev F., Mammadova S., Gurskaya N.

INDICATIONS FOR PULP REMOVAL BEFORE
PROSTHETICS WITH METAL-CERAMIC
CONSTRUCTIONS.....73

Huseynov V., Musayev Sh., Ibragimov A.

FORENSIC ANTHROPOLOGY IN THE MODERN SYSTEM
OF SCIENTIFIC KNOWLEDGE – SOLVING THE MAIN
PROBLEMS AND NEW CHALLENGES.....75

Polukhova Sh., Dr. Mehtiyeva Sh.,

Dr. Karimova R., Prof. Abiyev H.,

Dr. Heybatova M., Aslanova A.

COMBINED DAMAGE TO THE NERVOUS SYSTEM AND
LIVER AS A RESULT OF ARSENIC POISONING AND
CHANGES IN BIOCHEMICAL PARAMETERS IN THE
BLOOD OF EXPERIMENTAL ANIMALS.....79

Dr. Karimova R., Zulfugarova M.,

Dr. Heybatova M., Abaszade Z.,

Dr. Sadygova G., Dr. Irzayeva A.,

Dr. Valiyeva Sh.

CADMIUM, WHICH PLAYS AN IMPORTANT ROLE IN
THE DEVELOPMENT OF LUNG DISEASES, IS MOST
COMMONLY ACCUMULATED IN THE LIVER 82

Tulyaganova D., Radjabova D., Yakubov M.,

Nazarova G., Khan T.

STATE OF CENTRAL HEMODYNAMICS AND
ENDOTHELIAL FUNCTION IN PATIENTS WITH
ISCHEMIC HEART DISEASE AND TYPE 2 DIABETES
MELLITUS.....85

PEDAGOGICAL SCIENCES

Kolomiets V.

FORMATION OF THE CONCEPT OF BANDONEON ART
DEVELOPMENT IN UKRAINE 90

PHYSICAL SCIENCES

Abbasov V.

QUANTUM BIG DIMENSION THEORY.....97

POLITICAL SCIENCES

Antonyan A.

THE USE OF INFORMATION TECHNOLOGIES IN
SHAPING THE ELECTORAL BEHAVIOR OF CITIZENS .103

Mushchenko Ya.

POLITICAL KNOWLEDGE AS AN ALTERNATIVE TO
EDUCATION IN THE CONTEXT OF UNDERSTANDING
CITIZENS' ELECTORAL BEHAVIOR 106

TECHNICAL SCIENCES

Tsyhanenko V., Trofimov I.

THE IMPACT OF MODIFICATION OF DIESEL FUELS BY
BIOCOMPONENTS AND MAGNETIC FIELD ON THEIR
ANTIWEAR AND OTHER PROPERTIES.....110

BIOLOGICAL SCIENCES

BIODIVERSITY OF RHIZOSPHERIC MICROORGANISMS OF WOODY SPECIES

Abdullaeva Sh.

Ph.d., Senior Lecturer

Azerbaijan State Pedagogical University

БИОРАЗНООБРАЗИЕ РИЗОСФЕРНЫХ МИКРООРГАНИЗМОВ ДРЕВЕСНЫХ ПОРОД

Абдуллаева Ш.А.

Доктор философии

Старший преподаватель

Азербайджанский Государственный Педагогический Университет

<https://doi.org/10.5281/zenodo.14947171>

Abstract

The biodiversity of rhizospheric microorganisms of woody species is an important component of forest ecosystems, significantly influencing the health and growth of trees, as well as the overall stability of forest ecosystems. The rhizosphere is the soil area directly surrounding the plant roots, where active interactions between plants and microorganisms occur. In the rhizosphere of woody species, various groups of microorganisms, including bacteria, fungi, and actinomycetes, inhabit and can have both positive and negative effects on plant development. Associative microorganisms, such as nitrogen-fixing bacteria, mycorrhizal fungi, and other symbiotic organisms, actively contribute to improving tree nutrition, enhancing their resistance to diseases and stresses, and strengthening soil structure.

Аннотация

Биоразнообразие ризосферных микроорганизмов древесных пород представляет собой важную составляющую экосистем лесов, оказывающую значительное влияние на здоровье и рост деревьев, а также на устойчивость лесных экосистем в целом. Ризосфера — это область почвы, непосредственно окружающая корни растений, где происходит активное взаимодействие между растениями и микроорганизмами. В ризосфере древесных пород обитают различные группы микроорганизмов, включая бактерии, грибки, актиномицеты, которые могут оказывать как положительное, так и отрицательное влияние на развитие растений. Ассоциированные микроорганизмы, такие как азотфиксирующие бактерии, микоризные грибы и другие симбиотические организмы, активно способствуют улучшению питания деревьев, повышению их устойчивости к болезням и стрессам, а также способствуют укреплению структуры почвы.

Keywords: Nitrogen-fixing bacteria, biodiversity, pathogenic microorganisms, soil, ecosystems.

Ключевые слова: азотфиксирующие бактерии, биоразнообразие, патогенные микроорганизмы, почва, экосистемы.

ВВЕДЕНИЕ

Ризосфера — это область почвы, непосредственно прилегающая к корням растений, где наблюдается высокая активность микроорганизмов, находящихся в тесном взаимодействии с корневой системой. Это уникальная экосистема играет ключевую роль в поддержании здоровья растений, обеспечении их питательными веществами, а также в защите от патогенов. Древесные породы, как долгоживущие представители растительного мира, формируют устойчивую и разнообразную ризосферную микробиоту, которая способствует адаптации растений к различным стрессовым условиям, таким как засуха, низкое плодородие почв и антропогенное воздействие. Изучение биоразнообразия ризосферных микроорганизмов таких растений позволяет понять механизмы взаимодействия между растениями и микробами, а также выявить перспективные штаммы микроорганизмов для применения в сельском и лесном хозяйстве. Настоящее исследование направлено на анализ биоразнообразия ризосферных микроорганизмов древесных пород, их экосистемных функций и влияния на рост и

развитие растений. Полученные данные могут быть полезны для разработки экологически безопасных подходов в управлении лесными экосистемами и повышения устойчивости древесных пород к неблагоприятным факторам окружающей среды.

Изучение биоразнообразия ризосферных микроорганизмов древесных пород позволило выявить высокую степень видового разнообразия и функциональной активности микроорганизмов, обитающих в зоне корней. Установлено, что микробиота ризосферы играет ключевую роль в обеспечении роста растений, их адаптации к стрессовым факторам окружающей среды и устойчивости к фитопатогенам. Полученные данные подчеркивают значимость изучения ризосферных микроорганизмов для разработки экологически безопасных методов повышения продуктивности и устойчивости лесных экосистем. Выделенные перспективные штаммы микроорганизмов могут быть использованы в биотехнологических приложениях, таких как биофertilизаторы и биоконтроль.

При попадании в благоприятные условия влажности и температуры семена растения набухают

и прорастает. При набухании, а тем более прорастании, в семени происходят соответствующие молекулярно-генетические и физиолого-биохимические процессы. Те же факторы (влажность и температура) оказывают соответствующее действие и на микроорганизмы, находившиеся на поверхности семени. Однако основное действие на микробное сообщество поверхности семян оказывает «выброс» органических веществ из набухающего и прорастающего семени. Концентрация и состав таких веществ видоспецифичны. Например, при прорастании семян пшеницы обнаруживаются углеводы (главным образом глюкоза и фруктоза, а в целом – до 10 компонентов), органические кислоты (в большинстве своем – сукцинат, фумарат и малат) и до 16 аминокислот, среди которых доминируют аспарагиновая и глутаминовая. Установлено, что у пшеницы, овса и люцерны между пятым и пятнадцатым днями развития количество микробов в ризосфере возрастает в 10 - 30 раз. Таким образом, ризосфера формируется очень рано, вскоре после прорастания семян.

Функциональные группы ризосферных микроорганизмов Растение не просто способствует накоплению в ризосфере микробов, а отбирает (селекционирует) определенных представителей микроразнообитания, поэтому микрофлора ризосферы отличается от микрофлоры почвы не только по количеству микробов, но и по их составу. Каждая культура, стимулируя рост, селекционирует определенную микробиоту, так как ризосфера растений является зоной, в которой происходит адаптация почвенной микробиоты к условиям, создаваемым активно растущими растениями. Самыми многочисленными в ризосфере являются, как правило, не споровые бактерии. Второе место принадлежит микобактериям. Актиномицеты, грибы и споровые бактерии обнаруживаются здесь в небольших количествах. По видовому составу и особенно физиологии виды актиномицетов, обитающие в ризосфере и в почве, не отличаются. В ризосфере растений развиваются сообщества почвенных грибов, которые в той или иной степени по своей структуре видового состава специфичны. Специфика корневых выделений определяет различный состав видов грибов в корневой зоне растений

К не споровым бактериям принадлежат азотфиксаторы: *Azotobacter*, *Azomonas*, клубеньковые и фотосинтезирующие бактерии. Все они тяготеют к ризосферам. Здесь же накапливаются и другие представители азотфиксирующей флоры – маслянокислые, микобактерии, водоросли. Количество азотобактера и клубеньковых бактерий может достигать в этой зоне значительных величин: от сотен тысяч до нескольких миллионов клеток в 1 г почвы (клубеньковые бактерии) и до 200 млн. клеток (азотобактер). Клубеньковые бактерии встречаются не только в ризосфере бобовых растений, они с успехом могут развиваться и в ризосфере злаков. Среди ризосферных микроорганизмов чаще других позитивным действием на растения отличаются бактерии из родов *Pseudomonas*, *Bacillus*, *Azomonas*, *Agrobacterium*, *Flavobacterium*, *Arthrobacter*. Им присуща высокая динамичность роста, способность

поселяться в ризосфере и ризоплане культивируемых растений, вытесняя тем самым микроорганизмы, негативно влияющие на рост растений. Все указанные бактерии в большей или меньшей степени способны синтезировать гормоны роста, фиксировать азот атмосферы, переводить соединения фосфора в усвояемые формы, продуцировать соединения, обладающие фунгицидными или фунгистатическими свойствами против фитопатогенных грибов, что благоприятным образом сказывается на физиологическом состоянии и общей продуктивности растений. В ризосфере наблюдается и более интенсивное размножение водорослей. В зоне корней содержится обычно в 2 - 3 раза больше водорослей, чем вне этой зоны. Например, в ризосфере клевера обнаружено 149 тыс. клеток, а вне ризосферы – только 99 тыс. клеток в 1 г. Отмечается некоторые различия в составе водорослевого населения ризосферы. Так, в зоне корней бобовых растений имеется меньше диатомовых водорослей, чем в ризосфере злаков. Так как зона корней растений богаче бактериями, здесь находится очень много простейших. Кроме уже названных микроорганизмов, в ризосфере развиваются и другие группы микробов – аммонификаторы, денитрификаторы, нитрификаторы. Общее количество этих микробов достигает миллионов и даже миллиардов клеток в 1 г почвы. Имеются попытки доказать, что зоне корней каждого вида растений свойственны строго специфические группы микроорганизмов, практически не размножающиеся в ризосфере других растительных организмов. Убедительных данных для подобного утверждения, однако, пока нет. Тем не менее, можно отметить некоторую перегруппировку отдельных микроорганизмов в зоне корней различных растений. Это определяется составом корневых выделений и органических остатков, которые у отдельных видов растений имеют некоторые особенности.

Значение микрофлоры семян древесных растений в формировании микрофлоры ризосферы специально не изучалось. Есть данные, что при выращивании сельскохозяйственных растений на гидропонике микрофлора семян является основным источником микроорганизмов, формирующих ризосферную микрофлору. Очевидно, аналогичную роль будет выполнять спермосфера семян древесных растений в формировании микрофлоры ризосферы при выращивании их на стерильных субстратах. Результаты проведенных опытов свидетельствуют о том, что роль микрофлоры семян сосны в формировании микрофлоры ризосферы сеянцев проявляется и при частичной стерилизации почвы. То есть формирование микрофлоры ризосферы растений будет происходить из представителей микрофлоры семян и почвы. Сведений о видовом составе грибов ризосферы древесных растений для таежной зоны сравнительно не много. В большинстве работ отмечается преобладание среди грибов представителей родов *Penicillium*. Помимо этого в ризосфере обнаруживаются многие почвенные простейшие. Ряд работ был посвящен почвенным животным, которые влияют на круговорот питательных веществ,

выступая в роли «микробных травоядных» в ризосфере. Нематоды, амёбы, микроартроподы питаются грибами и бактериями в ризосфере и продуцируют азот в форме, доступной для растений. Количество такого азота за счет простейших может быть достаточно большим. Перссон подсчитал, что 10 – 50 % от полной минерализации азота в сосновых лесах Швеции происходит за счет почвенных беспозвоночных.

ВЫВОДЫ

В дальнейшем предполагается проведение более глубоких исследований, направленных на изучение молекулярных механизмов взаимодействия между растениями и микроорганизмами, а также на разработку инновационных решений для сохранения биоразнообразия лесных экосистем. Проведенные исследования биоразнообразия ризосферных микроорганизмов древесных пород подтвердили, что ризосфера является уникальной экосистемой с высоким уровнем микробного разнообразия. Выявленные микроорганизмы не только способствуют росту и развитию растений, но и играют важную роль в формировании устойчивости древесных пород к различным неблагоприятным условиям, включая дефицит питательных веществ, засуху и патогенное давление.

Установлено, что ризосферные микроорганизмы выполняют целый ряд ключевых функций, включая:

1. **Мобилизацию питательных веществ**, таких как азот, фосфор и калий, что способствует улучшению питания растений.
2. **Синтез фитогормонов** (ауксинов, цитокининов и гиббереллинов), регулирующих рост и развитие растений.
3. **Антагонистическую активность** в отношении патогенных микроорганизмов, что способствует защите растений от болезней.
4. **Смягчение стрессов**, вызванных экстремальными температурами, засолением и загрязнением почвы, за счет синтеза осмопротекторов и антиоксидантных соединений.

Результаты исследования подчеркивают необходимость сохранения и рационального использования микробного биоразнообразия, особенно в условиях глобальных изменений климата и роста антропогенного давления на лесные экосистемы. Идентификация перспективных штаммов микроор-

ганизмов открывает новые возможности для применения их в биотехнологии, в частности для создания биопрепаратов, направленных на:

- улучшение питания древесных пород,
- повышение их устойчивости к стрессам,
- защиту от фитопатогенов.

Кроме того, результаты исследования подчеркивают значимость многоаспектного подхода, объединяющего классические микробиологические методы и современные молекулярные технологии, для более глубокого понимания экосистемной роли микроорганизмов ризосферы.

В дальнейшем необходимо уделить внимание:

- изучению долгосрочных изменений микробных сообществ под влиянием климатических и антропогенных факторов,
- разработке экологически безопасных технологий на основе ризосферных микроорганизмов,
- внедрению результатов исследований в практику управления лесными и агроэкосистемами.

Таким образом, исследование биоразнообразия ризосферных микроорганизмов представляет собой не только фундаментальный интерес, но и имеет прикладное значение для устойчивого управления природными ресурсами и повышения продуктивности древесных пород.

Список литературы:

1. Андреев, В. Н. Основы микробиологии: Учебное пособие. – Москва: Наука, 2015. – 345 с.
2. Беляев, П. И., Кузьмина, О. В. Биоразнообразие почвенных микроорганизмов: роль и значение. – Журнал микробиологии, 2020, №3, с. 12–25.
3. Иванов, А. А., Петрова, Л. С. Взаимодействие растений и микробов в ризосфере. – Москва: Издательство МГУ, 2018. – 256 с.
4. Smith, S. E., Read, D. J. Mycorrhizal Symbiosis. – Academic Press, 2008. – 787 p.
5. Vessey, J. K. Plant Growth Promoting Rhizobacteria as Biofertilizers: An Overview. – Plant and Soil, 2003, Vol. 255, Issue 2, pp. 571–586.
6. Григорьев, А. А. Микробные сообщества ризосферы деревьев в условиях изменяющегося климата. Вестник экологии и микробиологии, 2019, №4, с.56-62.
7. Тюрин, А. С. Роль микробных метаболитов в поддержании здоровья растений. – Санкт-Петербург: Эконаука, 2021. – 192 с.

ECONOMIC SCIENCES

REAL EXCHANGE RATE FLUCTUATIONS AND THEIR IMPACT ON ALBANIA'S BUSINESS SECTOR

Dr. Irsida Dinoshi

Deputy Dean of the Faculty of Economy, Law and Social Sciences, University College of Business, Tirana, Albania

Dr. Ahmet Leka

Deputy Dean of the Faculty of Defense and Security, Armed Forces Academy, Tirana, Albania
<https://doi.org/10.5281/zenodo.14947173>

Abstract

In a country with a small and open economy like Albania, the exchange rate plays an important role in different economic factors such as in the levels of prices, at the balance of payments, the productivity level, the volume of foreign assets in the country and also in attracting foreign investments and in many other factors in place. Of course, the exchange rate stability helps financial stability of the country.

The object of the research paper is to study the impact of own exchanges rate volatility (appreciation or depreciation of the domestic currency against the basket of the foreign currencies) into the economy. This means the volatility on some macroeconomic factors with whom there is a statistically significant relationship, as well as the economic performance of the business sector that operates in international markets. This extensive object of the study covers the period from 2005 to 2015 with all the necessary time series of each economic factor of our country. The economic factors that have been included in the study are: GDP, inflation expressed with the Consumer Price Index, exports, money supply (M3), the level of foreign currency loans and net foreign assets.

The empirical results of this study have also supported other findings in this field, on the fact that RER is off by its equilibrium level and the most important factors that have influenced in RERs volatility are the difference in relative productivity between countries, and the net foreign assets. Their impact is negative indicating that their growth affects on the strengthening of local currency against foreign currencies.

While RER volatility own has a statistically significant impact on gross domestic product and the level of exports. Despite the study showed us that the divergence of the RER volatility was lower during the study period, the business sector has been attentive to estimates of home currency against foreign currencies.

Abstrakti

Në një vend me një ekonomi të vogël dhe të hapur si Shqipëria, kursi i këmbimit luan një rol të rëndësishëm në faktorë të ndryshëm ekonomikë si në nivelet e çmimeve, në bilancin e pagesave, në nivelin e produktivitetit, në vëllimin e mjeteve të huaja në vend si dhe në tërheqjen e investimeve të huaja dhe në shumë faktorë të tjerë në vend. Sigurisht që stabiliteti i kursit të këmbimit ndihmon stabilitetin financiar të vendit.

Objekti i punimit kërkimor është të studiojë ndikimin e luhatshmërisë së kursit të këmbimit të vet (mbicimim ose nënçmim të monedhës vendase kundrejt shportës së valutave të huaja) në ekonomi. Kjo nënkupton luhatshmërinë e disa faktorëve makroekonomikë me të cilët ka një lidhje statistikisht domethënëse, si dhe ecurinë ekonomike të sektorit të biznesit që operon në tregjet ndërkombëtare. Ky objekt i gjerë i studimit mbulon periudhën 2005-2015 me të gjitha seritë kohore të nevojshme të çdo faktori ekonomik të vendit tonë. Faktorët ekonomikë që janë përfshirë në studim janë: Podhimi i Brendshëm Bruto, inflacioni i shprehur me Indeksin e Çmimeve të Konsumit, eksportet, oferta monetare (M3), niveli i kredisë në valutë dhe mjetet valuto neto.

Rezultatet empirike të këtij studimi kanë mbështetur edhe gjetje të tjera në këtë fushë, mbi faktin se kursi real i këmbimit është jashtë nivelit të ekuilibrit dhe faktorët më të rëndësishëm që kanë ndikuar në luhatshmërinë e tij janë diferenca në produktivitetin relativ midis vendeve dhe aktivet valuto neto. Ndikimi i tyre është negativ duke treguar se rritja e tyre ndikon në forcimin e monedhës vendase kundrejt valutave të huaja.

Ndërsa luhatshmëria e vetë RER-it ka një ndikim statistikisht të rëndësishëm në produktin e brendshëm bruto dhe nivelin e eksporteve. Pavarësisht se studimi na tregoi se divergjencia e luhatshmërisë së RER ishte më e ulët gjatë periudhës së studimit, sektori i biznesit ka qenë i vëmendshëm ndaj vlerësimeve të monedhës vendase kundrejt valutave të huaja.

Keywords: Real Exchange Rate, GDP, Depreciation, Volatility, SME.

Fjalët kyçe: Kursi Real i Këmbimit, Prodhimi i Brendshëm Bruto, Zhvlerësim, Luhatshmëri, Ndërmarrjet e Vogla dhe të Mesme

JEL Code: F31, E01, E22, G12, L26

INTRODUCTION

Since exchange rates in many industrial and developing countries have exhibited substantial fluctuations over the past decades, there has certainly been considerable interest in identifying the factors that have been

the cause of these movements. An important part of this study is also this issue, namely the study of the exchange rate equilibrium and economic factors that converge in the same direction, using one of the RER equilibrium models and the line of previous studies such as:

Edwards S. (1987), (1989), Clark and MacDonald (1998), (2000), Dias and MacDonald, (2007), Williamson (1994). The real exchange rate (RER) has been considered an important economic indicator and its importance has been appreciated since the collapse of the Bretton Woods system, where there could be no equal prices of the consumer basket between different countries. As such, the exchange rate is seen as an indicator that measures the level of competitiveness of a country. Exchange rate fluctuations, i.e. the appreciation or depreciation of the domestic currency against a basket of foreign currencies, can be caused by the situation of several economic factors in the country, but also a fluctuating exchange rate in pronounced divergences certainly has an impact on the economic situation of the country and the business sector that operates in international markets as well. So, this phenomenon is seen as a double link. The exchange rate, based on empirical evidence, is closely linked to the level of production and economic development in the country. A depreciation of the domestic currency creates facilities for increasing exports of domestic goods and services by making our goods cheaper in foreign markets and reducing demand for imported goods in the country. While the strengthening of the domestic currency certainly has the opposite effect, as it makes exports more expensive, imported products become more competitive and this will also affect the deepening of the country's trade deficit.

Our country during the period 2005 – 2015 has shown that it has generally had a stable exchange rate against foreign currencies. Its fluctuations are also a reflection of the economic situation of the foreign countries with which our country trades. The period before the start of the global crisis (2008 – 2009) has positioned the exchange rate index more overvalued in nominal terms than in real terms, especially against the US dollar and at more stable levels against the European currency. This has also helped maintain the inflation rate within the objectives of the central bank. The impact of these fluctuations is intended to be studied through an economic analysis by identifying the most sensitive factors in it as well as by carrying out an analysis in the business sector by focusing on a random target group of businesses with international activities.

Among the factors that have been assessed as having an impact and are also influenced by the level of exchange rate deviation are: gross domestic product, inflation rate, exports, money supply (M3), level of foreign currency loans and net foreign assets. Of course, a stable macroeconomic situation of the country, also helped by the exchange rate, influences the attraction of more foreign investors, foreign capital, especially for developing countries such as Albania.

PYETJET KËRKIMORE – SHKENCORE

Modelet apo përjasjet e studimit të ekulibrit të kursit të këmbimit, sipas evidencave empirike, kanë treguar se ky kurs është i luhatur, pra me periudha mbiçmimi apo nënçmimi të tij. Pikërisht ky nivel luhatje i përcaktuar si diferencë ndërmjet kursit të këmbimit të vlerësuar me kursin aktual, shkaktohet nga situata e disa faktorëve ekonomikë të vendit dhe periudha e zgjedhur e studimit. Por kursi i këmbimit për

vetë rëndësinë që ka, rolin në politikën monetare dhe lidhjen së ngushtë me nivelin e inflacionit, mund t'a transmetojë impaktin e tij në faktorë ekonomikë të rëndësishëm në vend. Pikërisht kjo lidhje e ndërsjelltë e luhatjes së kursit të këmbimit me faktorët ekonomikë të vendit është qëllimi kryesor i këtij studimi, madje edhe më gjerë. Si e tillë, pyetja që lindin për shpjegimin e këtij qëllimi wshtw:

Pyetja kërkimore shkencore

Cili është impakti i kursit të këmbimit në faktorë specifikë ekonomikë dhe financiarë të përzgjedhur në studim? A është pozitiv apo negativ impakti i luhatjeve të kursit të këmbimit në ekonomi?

Nëpërmjet modelit të regresionit të thjeshtë linear do të analizojmë impaktin që ka ky kurs këmbimi në faktorët ekonomikë që ne kemi përzgjedhur në studim dhe sektorit të biznesit që ushtron aktivitet tregtar ndërkombëtar (nëpërmjet një mostre studimi të përzgjedhur në mënyrë rastësore brenda qarkut të Tiranës).

Objektivat e studimit

Ky punim ka si qëllim të studiojë, vlerësojë dhe analizojë pikërisht impaktin e kursit të këmbimit në ekonomi nëpërmjet lidhjes që ai ka me disa faktorë ekonomikë të vendit dhe sektorit të biznesit si pjesa më e ndjeshme e ekonomisë pikërisht në nivelin e përfitueshmërisë dhe veprimtarisë financiare si efekt i luhatjeve që pëson monedha vendase ndaj monedha të huaja. Objektivat e përcaktuara në këtij studim janë:

a. Dhe në të njëjtën mënyrë do të analizohet dhe vlerësohet impakti që ka kursi i këmbimit në faktorë ekonomikë në vend si: prodhimi i brendshëm bruto, niveli i inflacionit i shprehur nëpërmjet indeksit të çmimeve të konsumit, nivelit të eksporteve, ofertës monetare e shprehur nëpërmjet agregatit monetar M₃, nivelit të kredive në monedhë të huaj dhe mjeteve valutore neto.

b. Analiza e studimit të impaktit të RER do të kryhet edhe në nivel mikroekonomik nëpërmjet studimit të një mostre të zgjedhur biznesesh me aktivitet ndërkombëtar të cilët u anketuan nëpërmjet një pyetësi me përmbajtje pyetje cilësore. Faktorët më të rëndësishëm ekonomikë u studiuan bazuar në korrelacionin që ekziston midis tyre dhe impaktin që ka patur vlerësimin i monedhës vendase në tregun valutë. Monedha e përdorur më shpesh në transaksione, monedha që mbahen më shumë kursimet, monedha më e qëndrueshme, përfitueshmëria dhe afatet e pagesës ndërmjet klientëve dhe furnitorëve, janë faktorët më të rëndësishëm të analizuar në këtë pjesë të studimit.

c. Nxjerrja e rezultateve për periudhën e studimit dhe vlerësimin e tyre në përputhje me realitetin ekonomik vendas.

d. Të bëjmë një vlerësim të rolit të monedhës vendase në hartimin e politikave vendim-marrëse në politikën monetare nga Banka e Shqipërisë.

Metodologjia e studimit

Me qëllim realizimin e qëllimit dhe objektivave të përcaktuara më sipër, metodologjia që zgjedhëm të përdorim për këtë studim luan një rol shumë të rëndësishëm. Që nga mbledhja e të dhënave primare

dhe sekondare, burimet e zgjedhura dhe cilësia e tyre, përcaktimi i modeleve të aplikuara dhe analiza ekonometrike e rezultateve ndikojnë në besueshmërinë e rezultateve të studimit dhe vlefshmërinë e tij në fushën e ekonomisë.

Përzgjedhja e literaturës: Literatura ekonomike është e pasur me evidenca empirike mbi fushën tonë të studimit dhe që kanë dhënë rezultate të vlefshme referuese për periudhën dhe vendin në të cilin ranë realizuar.

Mbledhja e të dhënave: Pjesa më e madhe e të dhënave të përdorura për zbatimin e modeleve ishin të dhëna sekondare dhe vetëm analiza e impaktit të RER në sektorin e biznesit u realizua me të dhëna primare të grumbulluara nëpërmjet pyetësorit të shpërndarë një mostre të këtij sektori. **PËR KËTË GJË, HARTUAM NJË PYETËSOR MË 22 PYETJE QË IU DREJTUA SEKTORIT TË BIZNESEVE QË USHTROJNË AKTIVITET NDRËKOMBËTAR DHE OPEROJNË NË QARKUN E TIRANËS. PËRMBAJTJA E PYETËSORIT U VENDOS TË BËHEJ ME PYETJE CILËSORE ME QËLLIM QË;**

SË PARI, DREJTUESIT E BIZNESEVE TË SHPREHIN VLERËSIMET E TYRE MBI NIVELIN E PËRFITESHMËRISË DHE PËRFORMANCËS SË BIZNESIT E KUSHTËZUAR NGA LUHATJET E KURSIT TË KËMBIMIT TË LEKUT ME MONEDHAT E TJERA TË HUAJA. FORMAT E SHPËRNDARJES SË TIJ ISHIN NËPËRMJET E-MAIL, DUKE PËRDORUR FORMATIN E GOOGLE FORM QË MUNDËSON PLOTËSIMIN E TIJ VETËM NËPËRMJET KLIKIMIT TË ALTERNATIVËS QË ËSHTË MË E PËRSHTASHME PËR TA; DHE NË DISA RASTE TAKIMEVE TË DREJTPËRDREJTA NË AMBJENTET E KËTYRE BIZNESEVE. PYETËSORI DËRGUA NË MË SHUMË SE 300 SUBJEKTE DHE ARRITËM QË TË KISHIM NJË FEEDBACK ME RRETH 100 PYETËSORË NGA NJË MOSTËR E RASTËSISHME.

ANALIZA E TË DHËNAVE: Analiza në nivel mikroekonomik është përqëndruar në vlerësime statistikore të të anketuarve dhe në vlerësimin e lidhjeve më të rëndësishme ndërmjet variablave cilësore me qëllim arritjen e interpretimit ekonomik real të ndikimit të luhatjes së kursit të këmbimit në aktivitetin ekonomik të këtyre sipërmarrjeve.

Rishikimi i Literaturës

Pas rrëzimit të sistemit të Bretton – Woods (1971) të pas-luftës me regjim fiks këmbimi shumë ekonomi të industrializuara kaluan në regjim fleksibël këmbimi (Frankel & Rose, 1994). Mbi këtë regjim të ri të kursit të këmbimit në vend, ndër vite janë realizuar studime të shumta me qëllim identifikimin e faktorëve më të rëndësishëm ekonomikë që kanë impakt në hartimin e politikave ekonomike në vend. Mirëpo ndër të gjitha analizat studimore, modelet e aplikuara për vite me rradhë dhe ndër vende të ndryshme, për autorët dhe studiuesit rregullat empirike më të rëndësishme mbetën pothuaj po të njëjtat. Literatura e viteve të fundit mbi kursin fleksibël të këmbimit është e qëndrueshme bazuar në propozimet që jep (Mussa M. , 1979) në studimin e tij, sipas të cilit;

i. logaritmi i kursit spot të këmbimit është afërsisht një model i rastit

ii. shumica e ndryshimeve në kursin e këmbimit janë të papritura

iii. vendet me nivel të lartë inflacioni kanë tendencë të zhvlerësohen afërsisht sa ndryshimi i inflacionit në periudhë afatgjatë

iv. lëvizjet e kursit aktual të këmbimit mund të ndikojnë në vlerësimin e ekulibrit të tij

Kursi i këmbimit është i rëndësishëm sepse ka një ndikim thelbësor në çmimet relative të të mirave vendase dhe atyre të huaja. Ai mat pikërisht vlerën e një monedhe në njësi të një monedhe tjetër të huaj. Dhe ndryshimi i kushteve ekonomike në vend sjell edhe ndryshimin e normave të këmbimit të monedhave. Një rënie e vlerës së monedhës quhet zhvlerësim i saj, si për shembull, nëse monedha e huaj Euro zhvlerësohet ndaj monedhës vendase Lekë, kjo do të thotë se Leku është fuqizuar ndaj Euros. Ndërsa rritja e vlerës së monedhës quhet vlerësim. Impakti i luhatjes së RER është i ndjeshëm në disa faktorë kryesore ekonomikë të vëndit. Vlerësimi i monedhës vendase ndaj monedhave të huaja (ose ulja e kursit të këmbimit në terma sasiore) do të thotë se çmimi i të mirave vendase rritet në tregjet e huaja kundrejt të mirave dhe shërbimeve vendase të tij. Kjo gjë sjell uljen e nivelit të konkurrueshmërisë së produkteve vendase në tregjet e ndërkombëtare. Nga ana tjetër, zhvlerësimi i monedhës vendase (ose rritje e kursit të këmbimit në terma sasiore) sjell efekte të kundërta dhe më positive (Mishkin & Eakins, 2012). Pra, i rëndësishëm është momenti i zhvlerësimit të monedhës vendase pasi lehtëson shitjen e prodhimeve dhe shërbimeve vendase në tregjet e huaja si edhe bëhen më konkurruese ndaj produkteve dhe shërbimeve të vendeve pritëse. Gjithashtu luhatjet e RER ndikojnë dhe në veprimtarinë ekonomike të kompanive me aktivitet ndërkombëtar si për shembull në sasinë e mjeteve monetare hyrëse nga eksporti ose nga filialet e saj jashtë vendit, ose në sasinë e mjeteve monetare dalëse të nevojshme për kryerjen e pagesave të importit

Ekulibri i Kursit Real të Këmbimit

Rëndësia e llogaritjes së ekulibrit të RER si dhe vlerësimi të faktorëve bazë ekonomikë që lidhen me të janë kthyer në çështje të rëndësishme të studiuara vitet e fundit për disa arsye (Dias & MacDonald, 2007):

i. Së pari, disa vende (sidomos ato të Europës Qendrore të cilat së fundmi kanë aderuar në Bashkimin Europian) e kanë të domosdoshme të njohin kursin e duhur të këmbimit për të hyrë në zonën euro.

ii. Së dyti, luhatja e disa monedhave të rëndësishme botërore, ka shkaktuar debate mbi çështjen se këto luhatje a përfaqësojnë lëvizjet në ekulibrin bazë dhe a janë vlerësuar drejt kurset e këmbimeve apo ato janë të shmangura?

iii. Së treti, çështje e rëndësishme është edhe ajo e ç'ekulibrave të vëzhguara në nivel global si dhe implikimeve që kanë sjellë këto zhbalancime të RER-ve.

Kur diskutohet mbi ekulibrin e kursit të këmbimit një nga pikat e rëndësishme për t'u marrë në konsideratë është afati kohor i parashikuar dhe i domosdoshëm që ky ekulibër të arrihet. Në kontekstin e normave të këmbimit dukeqënëse kursi përcaktohet vazhdimisht në tregjet e huaja valutore nga kërkesa dhe oferta për monedhë të huaj, ai do të jetë gjithmonë në vlerën e tij ekulibër.

Ndërsa Edwards (1989) në studimin e tij thekson rëndësinë jo vetëm të vendosjes së ekulibrit por është e rëndësishme të përcaktohet nëse kursi aktual i këmbimi është i shmangur (i mbiçmuar apo i nënçmuar). Sipas Mundell (1971) për një vend me ekonomi të vogël dhe me kushte të përcaktuara të tregtisë, ekulibri i RER shprehet si çmimi relativ i të mirave ndërkombëtare ndaj të mirave vendase të cilat njëkohësisht ekulibrojnë

tregun monetar. Koncepti i ekulibrit të RER i shprehur sipas treguesëve bazë ekonomikë të vendit ngre disa çështje të rëndësishme për diskutim siç janë: ekzistenca e tij, optimizimi, përcaktimi, vlerësimi në periudha të ndryshme, madje shpesh është e rëndësishme të diskutohet mbi disekulibrin e kursit të këmbimit (Cassino & Oxley, 2013).

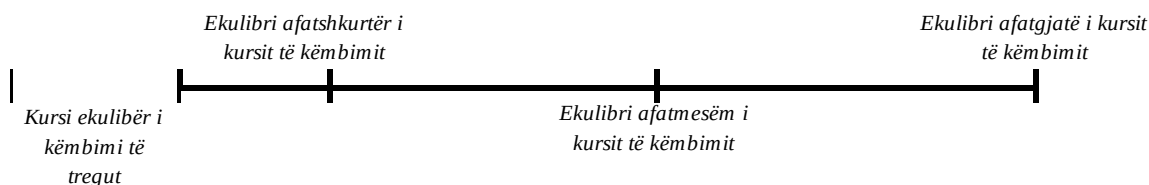


Figura 1.1. - Konceptet e Ekulibrit të Kursit të Këmbimit

Burimi: Cassino, E., & Oxley, D. (2013). "How does the exchange rate affect the real economy? A literature Survey". New Zealand Treasury Working Paper.p. 7

Referuar studimit të Cassino dhe Oxley (2013) mbi impaktin e RER në ekonomi, një pikë kyçe që duhet analizuar është **koha** që duhet për arrijten e ekulibrit të RER. Si e tillë ata shpjeguan konceptin e ekulibrit të RER në tre periudha kohe të ndryshme sipas figurës 1.2 Duke ditur që kursi i këmbimit përcaktohet vazhdimisht nga balancimi i kërkesës me ofertën në tregjet valutore, dikush mund të argumentojë se kursi është gjithmonë në vlerën ekulibër sipas ecures së treguesëve ekonomikë, ekstremi i spektrit (pika fillestare). Ndërsa duke ecur më të djathtë të spektrit kohor, këta autorë përcaktojnë se në ekulibrin afatshkurtër të gjithë treguesit bazë ekonomikë janë në parametrat e tyre aktuale (jo domosdoshmërisht në përputhje me ndonjë vlerë në dukje afatgjatë) dhe se ky nivel i kursit është i shpjegueshëm. Ekulibri afatmesëm arrihet në përputhje me një ekonomi në ekulibër të brendshëm dhe të jashtëm. Dhe së fundmi, arritja e ekulibrit afatgjatë do të thotë se ekonomia ka arritur pikën nga e cila nuk ka më mundësi për ndryshim.

Regjimi i Kursit të Këmbimit në Shqipëri

Kursi i këmbimit në terminologjinë ekonomike përcaktohet si një tregues i vlerës së monedhës vendase

ndaj monedhave të huaja duke pasqyruar në këtë mënyrë situatën ekonomike të atij vendi krahasuar me ekonominë e tjera. Në një vend me ekonomi të hapur, kursi i këmbimit konsiderohet si një variabël kryesor në aspektin e ndërveprimit të tij me variabla të tjerë ekonomikë të brendshëm dhe të jashtëm. Gjithashtu, vlerësohet se luhatjet e tij mund të ndikojë si në performancën ekonomike të vendit po ashtu në zhvillimet ekonomiko – politike në vend, në vendimet e politikës monetare të Bankës së Shqipërisë etj. Vëmendja ndaj rolit që luan kursi i këmbimit në faktorët ekonomikë në vend është mjaft e lartë sepse këta faktorë kanë një lidhje të ndërsjelltë me njëri – tjetrin dhe ndikojnë në performancën ekonomike të vendit dhe sepse studimet empirike dëshmojnë se dinamika e impaktit të kursit të këmbimit këto faktorë ekonomikë është afat-gjatë (Mirzaeenezhad, Mohammadi, & Tabas, 2012). Përcaktimi i kursit të këmbimit është vlerësuar si një nga fushat në të cilat është hulumtuar gjerësisht në ekonomi. Zakonisht në vendet me ekonomi në zhvillim, si dhe Shqipëria, shumë transaksione në monedha të huaja realizohen më shumë në një treg të lirë sesa nëpërmjet kanaleve zyrtare të këmbimit (Muço & Stavri, 2000).

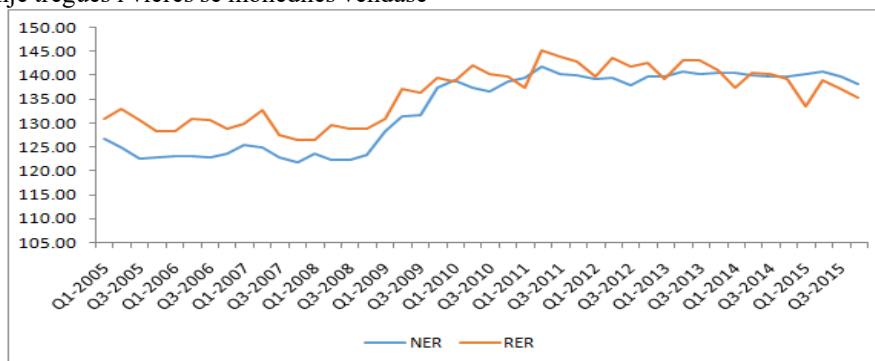


Figura 2.1 - Dinamika e kursit nominal dhe real të këmbimit Lek / Euro

Burimi: Databaza Statistikore e Bankës së Shqipërisë dhe llogaritjet e autoreve

Sipas figurës 2.1 kursi real i këmbimit ka patur luhatje mbiçmuese dhe nënçmuese ndaj monedhës europiane relativisht të qëndrueshme. Për periudhën 2005 deri në fillim të vitit 2009 kursi mesatar i këmbimit

ishite 1 euro = 130 lekë. Gjatë viteve 2005 – 2006 monedha vendase ka qënë e mbiçmuar ndaj dollarit amerikan dhe ka qëndruar në nivele të qëndrueshme në lidhje me euron. Një ecuri e tillë ka ndihmuar në

ruajtjen e një norme inflacioni brenda vlerave të objektivitetit të bankës qendrore. Kjo tendencë mbiçmuese e lekut kundrejt shportës së valutave të huaja ka vijuar edhe për vitet 2007 – 2008. Sipas raportit monetar të bankës qendrore, mbiçmimi nënkupton uljen e konkurrencës ndaj tregjeve ndërkombëtare dhe atraktivitetit më të lartë për importet e mallrave të huaja. Sjellja mbiçmuese e lekut si në terma nominale dhe në terma realë reflekton qëndrueshmërinë ekonomike në vend, thellimin e diferencës së normave të interesit si dhe nivelet e krahasueshme të inflacionit me partnerët kryesorë (Banka e Shqipërisë, 2007). Kjo pozitë mbiçmuese e lekut ndaj monedhës euro gjatë kësaj periudhe, po ashtu edhe ndaj dollarit amerikan, si dhe ritmi rritës që ka ndjekur niveli i eksporteve vendase ka ndikuar në qëndrueshmërinë e indeksit të normës nominale efektive të kursit të këmbimit. Në terma realë monedha vendase paraqitet e mbiçmuar më shumë sesa në terma nominale.

Ndërsa gjatë periudhës 2009 – 2013 leku ka marrë pozita nënçmuese ndaj euros duke qëndruar në një kurs mesatar këmbimi 1 euro = 140 lekë. Natyrisht që rënia ekonomike globale që prej vitit 2008 filloi që të përcillej edhe tek nëpërmjet luhatjes që patën disa treguesë ekonomikë. Ulja e kostove të lëndëve të para në botë filluan të krijonin kushte për rënien e inflacionit i cili në linjë me trendin global ra me 1.2 pikë përqindje gjatë 2009-s krahasuar me një vit më parë (Banka e Shqipërisë, 2009). Sipas bankës qendrore gjatë kësaj periudhe monedha vendase u nënçmua mesatarisht me 7.6 përqind ndaj monedhës europiane duke shkaktuar rritjen e inflacionit të importuar, tregues ky i rëndësishëm për vendin tonë pasi ndikon në formimin e normës së inflacionit në vend. Gjatë viteve 2013 – 2015 ecuria e monedhës vendase karakterizohet nga vlera të lehta mbiçmimi dhe nënçmimi ndaj monedhave të huaja. Gjithashtu leku është mbiçmuar më shumë në terma reale dhe nënçmuar lehtë në terma nominale duke deshmuar kështu një kontribut periferik në transmetimin në vend të presioneve të huaja inflacioniste (Banka e Shqipërisë, 2015).

Situata ekonomike e Shqipërisë sipas ecurisë së disa faktorëve makroekonomikë

Ndryshimi i sistemit politik dhe ekonomik pas viteve 1990 në Shqipëri u shoqëruar jo vetëm me sfida të mëdha por nder vite me rradhë është komentuar dhe

analizuar nga shumë studiues vendas dhe të huaj. Pikërisht procesi i daljes së Shqipërisë nga izolimi prej dekadash dhe hapja e ekonomisë së vendit ndaj tregjeve dhe zhvillimeve rajonale e botërore, bëri të mundur që vendi të kalonte nga faza e tranzicionit drejt një zhvillimi ekonomik. Muço, Sanfey dhe Taci (2003) vlerësojnë se duke filluar nga një bazë shumë e ulët në vitet 1991-1992, Shqipëria hyri shpejt në rrugën e rritjes së prodhimit të brendshëm dhe rënies së inflacionit, të lidhura me lëvizjet e para drejt reformave serioze për tregun. Sipas vlerësimeve që shpreh Banka Botërore në raportin periodik mbi ecurinë ekonomike të vendeve të Evropës Juglindore, Shqipëria ka shënuar rritje pozitive të nivelit të prodhimit të brendshëm ekonomik gjatë viteve të fundit. Ajo ka qënë e favorizuar duke mos u prekur nga ngjarjet shokuese klimaterike që goditën përgjithësisht rajonin (përmbajtje që shkatërruan ekonomitë e Bosnje-Hercegovinës dhe Serbisë, nga moti i keq u prek dhe ekonomia e Malit të Zi (Banka Botërore, 2015)) duke shënuar një performancë të dobët ekonomike rajonale. Shqipëria ka treguar shenja më të rëndësishme rimëkëmbjeje pozitive për arsye të një niveli më të lartë të eksporteve (kryesisht i energjisë elektrike) si dhe përmirësimeve në sektorin e turizmit vendas.

Situatën ekonomike të Shqipërisë është e vështirë ta përmbledhësh në një paragraf apo të trajtohet brenda një çështje. Kjo periudhë, e vlerësuar nga studiuesit si etapa e dytë (që nga viti 2005 e deri në ditët e sotme) e fazës së tranzicionit të përshtetshëm të vendit (Meidani, 2010), ka shënuar ngjarje të rëndësishme politike dhe ekonomike si: anëtarësimi në NATO, liberalizimi në hapësirën “Shengen”, nënshkrimi i Marrëveshjes të Stabilizim-Asociimit dhe përpjekjet për të arritur standartet e vendit kandidat për në Bashkimin Europian, me pritshmëri edhe në marrëdhënie më të fuqishme tregtare, liberalizim hapësirës tregtare me vendet e BE-së si vendet më të mëdha partnere, kriza në sistemin bankar në vitet 2009 – 2010 e shoqëruar në një nivel të lartë të kredive me probleme ndaj totalit të portofolit të kredisë së disburësuar, etj.

Në treguesit më kryesorë ekonomikë që do të analizojmë dhe pasqyrojnë situatën e përgjithshme ekonomike të shqipërisë janë: rritja e nivelit të brendshëm bruto, niveli i remitancave, niveli i investimeve në vend, niveli i eksporteve, niveli i papunësisë, norma e inflacionit.

Tabela 2. 1 - Ecuria e treguesëve ekonomikë gjatë periudhës së studimit

Treguesit ekonomikë	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Rritja e PBB-së (%)	5.7	5.7	5.9	7.5	3.3	3.8	2.6	1.6	1.4	2.1
Volumi i Eksporteve*	530	631	786	918	751	1172	1406	1526	1732	1827
Remitancat*	802	937	952	833	781	690	665	675	544	592
IHD*	209	250	464	610	689	789	717	727	923	812
Papunësia (%)	14.1	13.8	13.2	12.5	13.6	13.7	13.3	13	13	13.3
Norma e inflacionit (%)	2.4	2.4	2.9	3.4	2.2	3.6	3.5	2	1.9	1.63

*Të shprehura në million Euro

Burimi: Banka e Shqipërisë, INSTAT, Ministria e Mirqënies dhe Punëve Sociale.

Ecuria e Prodhimit të Brendshëm Bruto dhe Kërkesa Agregate

Ekonomia shqiptare gjatë periudhës 2005 – 2015 përgjithësisht ka ruajtur rritje ekonomike pozitive

ndonëse me luhatje të theksuara në normat vjetore të rritjes së saj, e shkaktuar kjo si nga faktorë të brendshëm dhe të jashtëm ekonomikë. Ndër kontribuesit kryesorë në rritjen e PBB – së ishin sektori i transportit dhe telekomunikacionit, atij të tregëtisë,

hotelerisë dhe restoranteve si dhe ai i industrisë. Ecuria e qëndrueshme dhe pozitive e tyre arriti që të balancoje ngadalësimin e aktivitetit në sektorin e ndërtimit, në të cilin u shënuan rënie në vëllimin e ndërtimeve të reja (Banka e Shqipërisë, 2007).

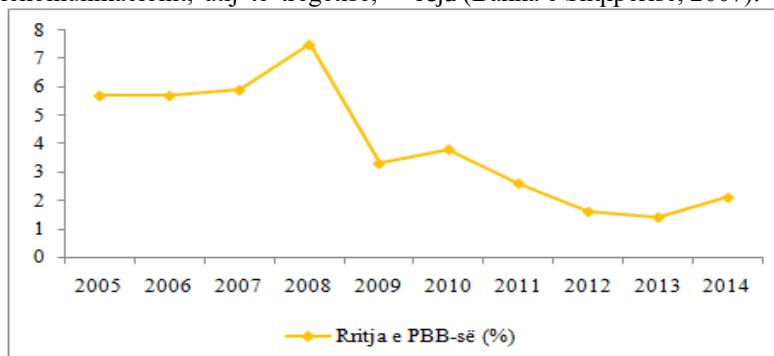


Figura 2.2 - Dinamika e ecurisë së Prodhimit të Brendshëm Bruto
Burimi: Databaza statistikore e INSTAT

Në raportet periodike të Bankës së Shqipërisë mbi monitorimin dhe vlerësimin e situatës ekonomike të vendit, kanë përcaktuar disa faktorë të brendshëm si: rënia e nivelit të të ardhurave buxhetore të mbledhura nga tatimet dhe taksat, rënia e nivelit të investimeve dhe konsumit si rezultat i rënies së financimit nga sektori bankar dhe rënies së të ardhurave nga remitancat. Gjithashtu sektorët më të rëndësishëm të ekonomisë si industria dhe ndërtimi pësuan rënie drastike të nivelit të shitjeve vjetore (Banka e Shqipërisë, 2009). Ndërsa gjatë vitit 2010 situata u paraqit më e përmirësuar me terma sasiorë 3.8 %, ekonomia vendase deri në vitin 2013 shënoi nivelet më të ulta historike të rritjes së saj. Gjatë këtij viti, i vlerësuar si më i vështiri për ekonominë shqiptare, të gjithë treguesit makroekonomikë të ambjentit të brendshëm pësuan ulje (konsumi i brendshëm, investimet publike dhe private, niveli i rritjes ekonomike, mbështetja e financimit, norma e inflacionit, rritje e deficitit buxhetor) si edhe ambjenti i jashtëm si efekti i problemeve në vendet e Eurozonës, nuk ishte i favorshëm në mbështetjen e eksporteve, në nivelin e konkureshmërisë së produkteve vendase në tregjet e huaja. Megjithatë banka qendrore vlerëson se gjatë këtij pati edhe zhvillime pozitive si: sistemi bankar qëndroi solid dhe i mirëkapitalizuar, qëndrueshmëri e pozicionit të jashtëm të ekonomisë si edhe i kursit të këmbimit të monedhës vendase ndaj monedhave të huaja, të cilat ndihmojnë në ruajtjen e

stabilitetit makroekonomik të vendit (Banka e Shqipërisë, 2013).

Gjatë dy viteve të fundit ekonomia shqiptare ka patur përmirësime graduale, madje vlerësohet të ketë përmirësime të mëtejshme në periudhën afatmesme (Banka e Shqipërisë, 2015). Lehtësimi i kushteve të financimit, rritja e mbështetjes me kredi bankare duke përmirësuar kostot e kredimarrjes në sektorin bankar (jo vetëm nëpërmjet uljes së normës së interesit bazë), rifillimi i investimeve të sektorit privat si dhe përmirësimi i ambjentit të huaj me qëllim hyrjen e kapitalit të huaj në vend, janë disa nga faktorët e rëndësishëm që jo vetëm ndikojnë në përmirësimin në terma sasiorë të rritjes reale të ekonomisë por ndikojnë edhe në rritjen e treguesit të besimit të konsumatorit në vend.

Ecuria e Inflacionit dhe Politika Monetare

Objektivi kryesor i politikës monetare të Bankës së Shqipërisë është arritja dhe ruajtja e stabilitetit të çmimeve¹. Arritja dhe ruajtja e stabilitetit të çmimeve nënkupton arritjen e normave të ulta por pozitive të inflacionit dhe ruajtjen e tyre për periudha relativisht të gjata kohe. Sigurisht që inflacioni është dhe do të mbetet gjithnjë subjekt i goditjeve të ndryshme të paparashikuara (jashtë ndikimit të politikës monetare) dhe si e tillë do të ketë vazhdimisht shmangie nga objektivi i synuar i B.Sh. prej 3 % (Banka e Shqipërisë, 2015).

¹ Bazuar në Ligjin nr. 8269, datë 23.12.1997 “Për Bankën e Shqipërisë” (i ndryshuar)

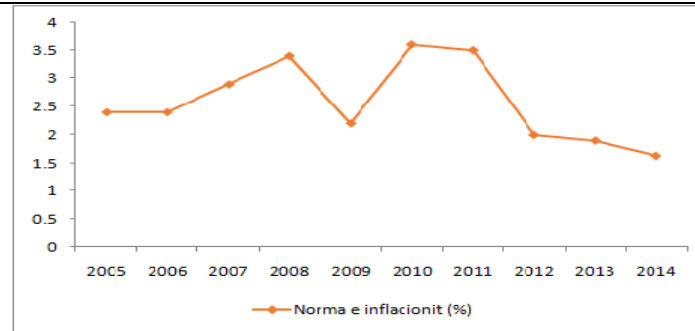


Figura 2.3 - Ecuria e Normës së Inflacionit

Burimi: Raportet periodike të Politikës Monetare të Bankës së Shqipërisë

Norma mesatare e inflacionit bazë gjatë këtij viti ishte 2.9 % thajse e njëjtë me objektivin e bankës qendrore, pamvarësisht luhatjeve të ndjeshme midis tremujorëve të këtij viti. Për këtë periudhë kriza energjitike, rritja e çmimit të energjisë elektrike dhe rritja e çmimit të naftës po ashtu edhe pasiguritë e ndjeshme lidhur me ecurinë e prodhimit të brendshëm bujqësor vlerësoheshin se do të vijonin të ushtronin presion edhe gjatë vitit në vijim (Banka e Shqipërisë, 2007). Edhe gjatë vitit 2015 niveli i inflacionit është ende i ulët ndaj objektivave të bankës qendrore për vetë faktin se presionet afatmesme të faktorëve makroekonomikë si kërkesa agregate, niveli i prodhimit dhe niveli i punësimit në vend janë ende nën potenciale dhe të dobta. Ana pozitive e dy viteve të fundit qëndron në frenimin e inflacionit të importuar si pasojë e qëndrueshmërisë së kursit të këmbimit dhe prirjes rënëse në çmimet e lëndëve të para si edhe në inflacionet e partnerëve kryesorë tregtarë të vendit (Banka e Shqipërisë, 2015). Sigurisht roli i B.Sh. në hartimin e politikës monetare dhe vendimet që ka ndërmarrë uljen e normës bazë të interesit të parasë nën çdo minimum historik të ndërmarrë ndonjëherë, është i pamjaf-tueshëm nëse nuk ndërthuret edhe me ndërmarrjen e reformave ekonomike të duhura nga ana e organeve qeverisëse. Efektet pozitive të tyre parashikohen të shihen në periudhë afatmesme me qëllim rritjen e nivelit të inflacionit në objektivin 3%.

Ecuria e Eksporteve dhe Bilanci Tregtar

Teoria ekonomike na sugjeron se midis kursit të këmbimit dhe bilancit tregtar ekziston lidhja që

nënçmimi i monedhës vendase Lekë kundrejt monedhës së huaj Euro (ose rritje e kursit të këmbimit), bën që çmimi i mallrave të importuara të rritet në tregun vendas dhe uljen e çmimit të mallrave të eksportuara në tregjet e huaja. Në këtë kuadër, kur këto mallra të eksportuara janë më konkurruese në tregun e huaj, kjo do të sjellë një nxitje për të rritur volumin e eksporteve dhe përmirësim të bilancit tregtar të vendit. Sigurisht që efekti i kundërt, ai i mbiçmimit të monedhës vendase (ose ulja e kursit të këmbimit) do të ketë impakt të kundërt mbi eksportet dhe bilancin tregtar në vend. Sipas autorëve Salko, Beci, dhe Kodra (2014) kjo lidhje kaq e ngushtë pritet të ndodhë në kushtet kur konkurrenca është perfekte, por në kushtet kur eksportet shqiptare kanë një peshë të ulët dhe nivel të ulët konkurrues në tregjet e huaja, luhatjet e kursit të këmbimit Lekë / Euro nuk do të ndikojnë me të njëjtin intensitet në bilancin tregtar në vend.

Një tregues thelbësor në vlerësimin e konkurrueshmërisë së vendit tonë në tregjet e huaja është edhe niveli i performancës së eksporteve shqiptare. Stuktura e eksporteve shqiptare sipas mallrave dhe destinacionit ka ndryshuar në mënyrë të konsiderueshme gjatë periudhës 2005 – 2015. Përveç kontributit të mallrave të përpunuar dhe atyre të tjera të papërpunuar, iu shtuan edhe kontributi pozitiv në rritje të lëndëve djegëse minerale dhe lëndëve të para minerale². Në të njëjtën kohë, eksportet shqiptare filluan të zhvendosen nga destinacioni i tyre kryesor BE – ja, drejt vendeve anëtare të CEFTA-s³ dhe tregjeve të tjera në zhvillim (Mitro, 2013).

² Bazuar në Indeksin e Çmimeve të metaleve, publikuar me frekuencë mujore nga FMN-ja., gjatë periudhës 2005-2011, ky indeks shënoi rritje të qenësishme, mesatarisht me rreth 18 % në terma vjetore, sipas citimit të (Mitro, 2013, p. 110)

³ CEFTA 2006 – Marrëveshje e tregëtisë së lirë ku bëjnë pjesë: Shqipëria, Bosnjë-Hercegovina, Kroacia, Maqedonia, Moldavia, Mal i Zi, Serbia dhe Kosova.

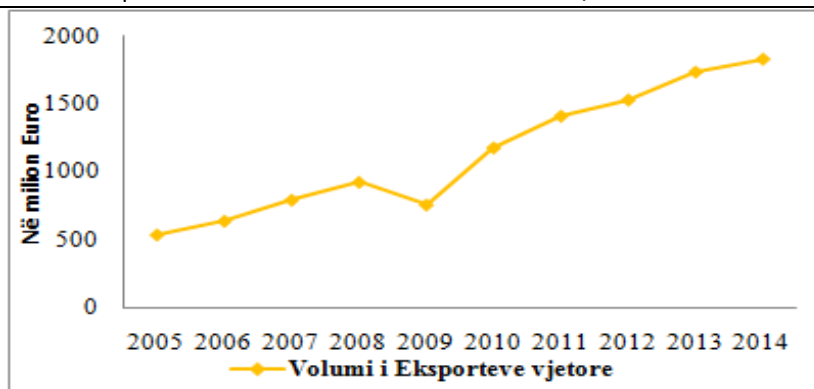


Figura 2.4 - Ecuria e volumit Eksporteve shqiptare shprehur në milion Euro

Burimi: Sipas databazës statistikore të INSTAT

Sipas grafikut 2.4 dinamika e eksporteve shqiptare ka qenë në rritje dhe kontributi i tyre në përmirësimin e bilancit tregtar verësohet të jetë i pamjaftueshëm

krahasuar me nivelin vjetor të volumit të importeve të mallrave dhe shërbimeve.

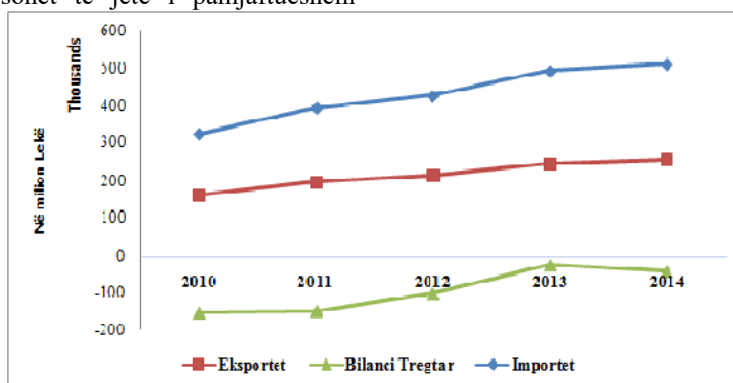


Figura 2.5 - Ecuria e Bilancit tregtar, Importeve dhe Eksporteve

Burimi: Sipas databazës statistikore të INSTAT

Grafiku 2.5 tregon një pasqyrë të përmblendhur të tre treguesëve të rëndësishëm të tregëtisë së jashtme: niveli i eksporteve, importeve dhe bilancit tregtar gjatë periudhës së fundit 2010 – 2014 rezulton se ka patur një përmirësim të bilancit tregtar duke e ngushtuar deficitin

e tij. Ky përmirësim viret re më shumë në vitin 2013 i ndjeshëm më shumë nga ulja e nivelit të importeve dhe një përmirësim i nivelit të eksporteve.

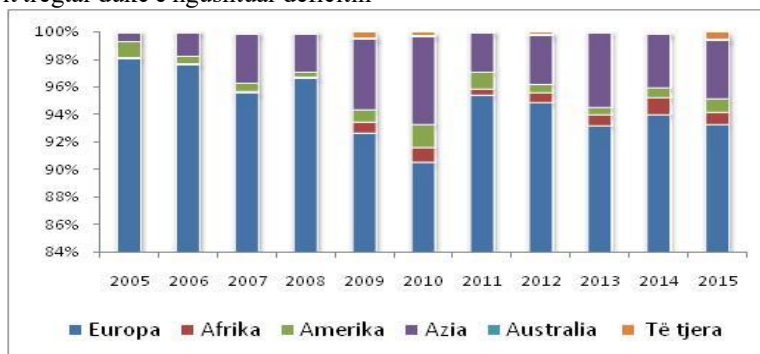


Figura 2.6 - Shpërndarja gjeografike e Eksporteve vendase në tregjet botërore

Burimi: Sipas databazës statistikore të INSTAT

Gjithsesi, tregu i BE mbetet vazhdon të mbetet destinacioni kryesor i produkteve shqiptare të eksportit ndonëse pesha e tij ka shënuar rënie vitet e fundit sipas rezultateve të konkluduara në punimin Mitre (2013) dëshmohet në nivelin nga 89 % në vitin 2005, në 76 % në vitin 2012. Ndërsa indeksi i TCI⁴, i cili i përgjigjet

pyetjes se a duhet një vend eksportues të fillojë të prodhojë mallra të reja për eksport drejt një vendi të dhënë apo duhet të zgjerohet në tregjet ekzistuese kur eksportin, ka shfaqur një trend rritës nga 41.7 në vitin 2005 duke shkuar në 54.2 në vitin 2012. Niveli i këtij indikator tregon një përputhshmëri në rritje të

⁴ TCI ang: Trade-Complementarity Index, është një indikator që ndihmon në vlerësimin dhe orientimin gjeografik të eksporteve. Ai mat shkallën me të cilën modeli i eksporteve

të një vendi përputhet me modelin e importeve të një vendi tjetër.

strukturës së eksporteve shqiptare me strukturën e eksporteve të BE -së.

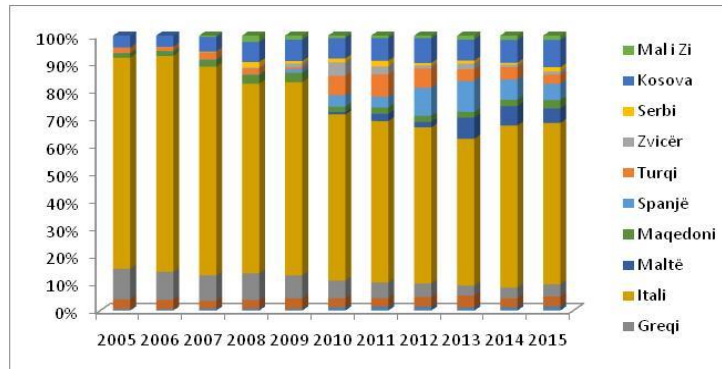


Figura 2.7 - Shpërndarja gjeografike e Eksporteve vendase në tregjet e Bashkimit European Burimi: Sipas databazës statistikore të INSTAT

Vendet partnere të zgjedhura në studim janë Italia, Greqia, Gjermania dhe Spanja, të dhënat e të cilave janë përfaqëse mbi nivelin e eksporteve të vendit tonë me vendet e huaja partnere. Volumi i eksporteve me këto vende, gjatë dekadës së fundit, shënon vlerën 1.2 miliardë lekë, dhe përbëjnë rreth 73 % të volumit total të eksporteve në Europë dhe rreth 68 % të volumit të eksporteve totale të Shqipërisë në të gjithë botën, gjatë periudhës 2005 – 2015. Sikurse shihet dhe grafiku, Italia zë vendit kryesor me të cilin eksportojmë, dhe më pas në nivele më të ulta por me trend rritës të volumeve drejt këtyre vendeve nga viti në vit, janë Greqia, Spanja, Turqia, Kosova, Gjermania, etj.

Në vlerësimin e lidhjes midis kursit real të këmbimit dhe rritjes së eksporteve, autorët Eichengreen dhe Gupta (2006) studiojnë 66 vende me nivele të ndryshme zhvillimi ekonomik dhe theksojnë rëndësinë e ndërmarrjes së politikave të duhura ndaj kursit real të këmbimit për vetë faktin se vendet në zhvillim po zhvendosen nga eksporti i produkteve dhe mallrave kryesore në eksportin e shërbimeve tradicionale (në fusha si tregti dhe transport, turizëm, shërbime financiare dhe siguracione) dhe atyre moderne (si shërbimi në fushën e komunikimit, kompjuterave, informimit dhe fusha të tjera lidhur me keto). Autorët konkludojnë se mbështetja në nënvlerësim të kursit të këmbimit me qëllim nxitjen e rritjes së niveli të eksporteve të mallrave dhe shërbimeve ka kufizimet e veta:

- Sipas Eichengreen (2008) dhe Haddad dhe Pancaro (2010) nënvlerësimi se zhvlerësimi apo nënvlerësimi i kursit mund të përdoret si një mjet i politikës monetare me qëllim nxitjen e rritjes së nivelit të eksporteve por vetëm në periudhë afatshkurtër, sepse një vend nuk mund të mbajë pafundësisht kursin e këmbimit të zhvlerësuar.

- Mund të ketë kosto të cilat përfshijnë tensionet me vendet e tjera, mbledhja e rezervave valutore mund të shoqërohet me humbje të kapitalit dhe nga ana tjetër sistemimi mund të vijë në formën e inflacionit.

Ndaj dhe këto analiza empirike sugjerojnë se vendet për të patur një kurs real këmbimi konkurrues dhe të ketë impaktin e tij pozitiv në nivelin e eksporteve, duhet të kenë institucione të fuqishme, politika të shëndosha makroekonomike, një treg pune të disiplinuar, norma të larta kursimi ose politika të tjera përcuese me qëllim tërheqjen e kapitaleve të huaja.

Të ardhurat nga Remitancat dhe Investimet huaja direkte në vend

Të ardhurat nga remitancat dhe investimet e huaja direkte përbëjnë flukset më të rëndësishme të monedhave të huaja në vend. Ato kanë ndikuar në përmirësimin e bilancit të pagesave dhe në nivelin e zhvillimit ekonomik në vend dhe në dhjetë vitet e fundit dinamika e tyre ka qënë e ndjeshme.

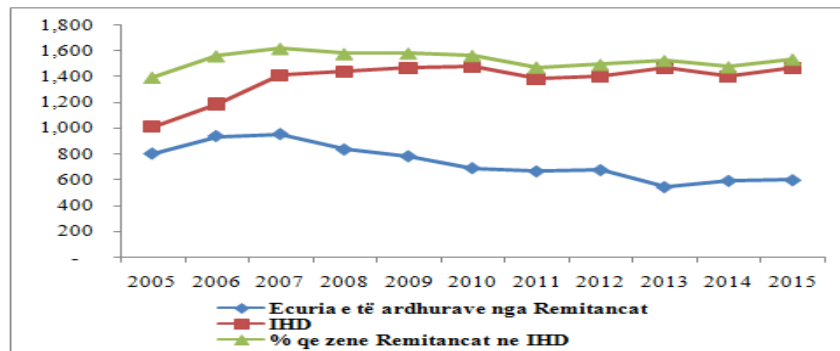


Figura 2.8 - Dinamika e ecurisë së Remitancave, Investimeve të huaja dhe Pjesës që zenë Remitancat në IHD gjatë periudhës

Burimi: INSTAT dhe Banka e Shqipërisë

Figura 2.8 tregon grafikisht se niveli i Remitancave dhe IHD – ve nuk kanë patur të

njëtin rritëm rritje me kalimin e viteve. Që pas vitit 2006 niveli i remitancave ka ardhur në rënie dhe niveli

më të ulët të tij e ka patur gjatë periudhës 2012 – 2014 si pasojë e krizës ekonomike që preku vendet fqinjë Greqi dhe Itali në të cilat niveli i migracionit të popullsisë është më i lartë. Kjo situatë e vështirë është pasqyruar edhe në uljen e nivelit të PBB-së së vendit. Ndërsa IHD-të kanë patur një ritëm më pozitiv duke u ritur ndjeshëm gjatë periudhës. Kjo ka ardhur si rezultat i politikës vendase me qëllim përmirësimin e kushteve të të bërit biznes në Shqipëri, ekspozimit të burimeve në sektorë të ndryshëm të ekonomisë ndaj të huajve etj.

Të ardhurat nga remitancat përfaqësojnë atë pjesë e transfertave hyrëse në totalin e të ardhurave kombëtare të vendit që dërgohen nga ajo pjesë e popullsisë vendase e migruar jashtë kufinjve të Shqipërisë. Vendosëm të analizojmë dhe dinamikën e këtij treguesi për periudhën e studimit për vetë kontributin që ai ka në zhvillimin e ekonomisë si dhe impaktin në luhatjen e kursit të këmbimit të monedhës vendase ndaj monedhave të huaja. Evidencat empirike të studimeve ndër vite zbulojnë dy aspekte të padiskutueshme të rëndësishme të remitancave:

☞ flukse të qëndrueshme të remitancave ndikojnë në reduktimin e luhatjeve të zhvillimit ekonomik në vend dhe;

☞ një nivel i qëndrueshëm i remitancave ndikon në zhvillimin e sektorit financiar duke lehtësuar kushtet e kreditimit për investime në vend (Hassan & Holmes, 2010).

Ndërsa sa i përket impaktit që ato kanë në luhatjet e kursit të këmbimit studimet⁵ tregojnë se fluksi i lartë i të ardhurave nga remitancat (ose fluksi i hyrjeve të monedhave të huaja) në vend ka efekte shpesh të padëshiruara duke ndikuar në vlerësimin e kursit të këmbimit dhe uljen e nivelit të konkureshmërisë së sektorit të të tregtueshmeve të ekonomisë. Në Shqipëri flukset e remitancave kanë qënë gjithmonë të rëndësishme sepse ato përbënin një pjesë kryesore të të

ardhurave familjare për një pjesë të mirë të popullsisë, por edhe sepse ato përbëjnë një pjesë të rëndësishme të nivelit të prodhimit të brendshëm bruto të vendit.

Ndërsa sa i përket **investimeve të huaja direkte** janë ndërmarrë vazhdimisht iniciativa për rritjen e volumit të tyre për vetë rolin kyç që ato luajnë në zhvillimin ekonomik të vendit. Ndër përparësitë më kryesore të tyre mund të përmendim transferimin e teknologjisë, nxitjen e konkurrencës në vend, krijimin e vendeve të reja të punës, rritjen ekonomike të vendeve pritëse etj (Zisi, 2014). Një nga faktotë që ndikon në këtë tregues është edhe sjellja e kursit të këmbimit. Kur monedha vendase zhvlerësohet (pra vlera e saj bie ndaj vlerës së monedhave të huaja) sjellja e kursit të këmbimit në vend mund të ketë dy ndërlikime potenciale për volumin e IHD. Së pari, ndikon në uljen e kostove të prodhimit dhe pagave të atij vendi ndaj partnerëve të huaj. Në këtë mënyrë vendi me monedhë të zhvlerësuar bëhet më tërheqës për investitorët e huaj pasi ata investojnë në projektet e planifikuara me një normë kthimi më të lartë. Dhe së dyti, vështirësitë më të mëdha në realizimin e IHD-ve si shkak i luhatjeve të kursit të këmbimit janë kur vendimet e investimeve nuk mbështeten në parashikime të kursit si e tillë niveli i fitimit është më i ulët se ai i pritshëm (Goldberg, 2005).

Në Shqipëri, IHD - të u shfaqën pas viteve 90 me ndryshimin e sistemit politik dhe niveli i tyre ishte i ulët. Por pas viteve 2000 filluan që volumi i tyre të rritej në mënyrë të ndjeshme pasi vendi ofronte mundësi të mëdha për investitorët e huaj jo vetëm për resurset e shumta të pashfrytëzuara pothuaj në çdo sektor ekonomik por edhe sepse sistemi politik i zbatuar ndoqi rrugën e privatizimeve në sektorët e energjitikës, telekomunikation, në shërbime, infrastrukturë e sidomos linja ajrore, sektori bankar etj.

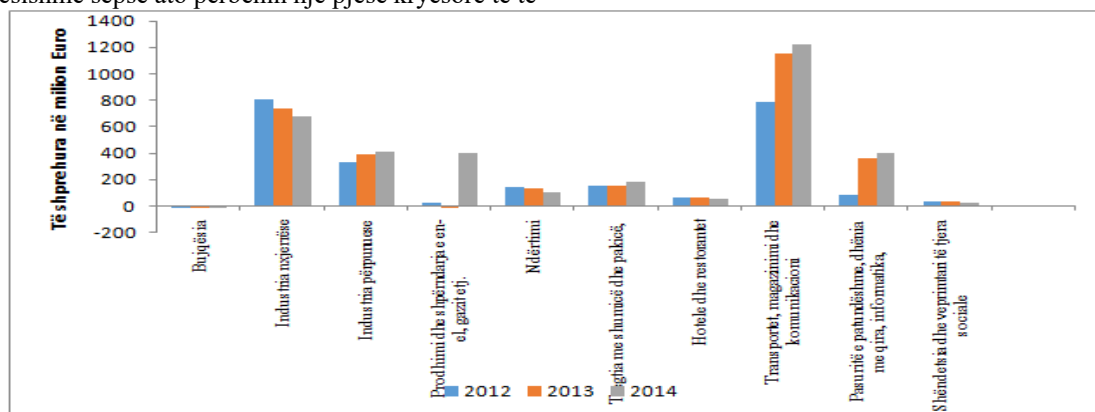


Figura 2.9 - Stoku i IHD në Shqipëri sipas aktivitetit ekonomik gjatë periudhës 2012 - 2014

Burimi: Banka e Shqipërisë

Në figurën 2.9 pasqyrohet niveli i IHD – ve në Shqipëri sipas aktivitetit ekonomik në periudhën 2012 – 2014 me qëllim që të tregojmë ecurinë e këtyre fukseve pas periudhës së vështirë ekonomike të vendit. Fluksi i investimeve është përmirësuar sidomos gjatë vitit 2014 dhe vendet e origjinës së investitorëve të huaj

që kanë investuar tek kompanitë në Shqipëri gjatë vitit 2014 janë Greqia (me 26 % të totalit), Kanadaja (17 % të totalit), Italia (12 % të totalit) dhe Holanda (9 % të totalit) dhe vende të tjera⁶. Ndërsa sa i përket aktivitetëve ekonomike ku janë përqëndruar më shumë stoku i investimeve janë: transporti dhe komunikacioni,

⁵ (Hassan & Holmes, 2010), (Cakrani, Koprencka, & Resulaj, "Do Migrant Transfers cause Dutch disease in Albania?", 2013), (Singer, 2008), (Muktarbek, 2012)

⁶ Departamenti i Stabilitetit Financiar dhe i Statistikave. (2015). "Pozicioni i Investimeve Ndërkombëtare". Tiranë: Banka e Shqipërisë.

shërbimi financiar, industria nxjerrëse dhe sektorët e tjerë në një përqindje më të ulët.

METODOLOGJIA E STUDIMIT

Në këtë punim ne kemi studiuar impaktin e RER në ekonomi nëpërmjet analizës në nivel makroekonomik dhe nivel mikroekonomik mbi lidhjet e kursit të këmbimit me faktorë ekonomikë specifikë të përfshirë në model. Metodologjia e ndjekur do të jetë e detajuar në çdo hap të testeve statistikore, përpunimin e saktë të të dhënave, ngritjen e hipotezës dhe realizimin e analizës së rezultateve në mbështetje të realitetit ekonomik në vend gjatë periudhës së studimit.

Pyetja kërkimore shkencore

Cili është impakti i kursit të këmbimit në faktorë specifikë ekonomikë dhe financiarë të përzgjedhur në studim? A është pozitiv apo negativ impakti i luhatjeve të kursit të këmbimit në ekonomi?

Mbledhja e të dhënave

Në këtë studim janë zgjedhur disa faktorë ekonomikë me qëllim shpjegimin e objektivave primarë të përcaktuara që në fillim të tij.

Analiza e sektorit të biznesit ka si qëllim të vlerësojë ndikimin e luhatjeve të RER në aktivitetin ekonomik të bizneseve që operojnë kryesisht në qarkun e Tiranës dhe përdorin monedha të huaja për transaksionet në marrëdhënie me klientët dhe furnitorët e tyre. Kjo analizë është mbështetur mbi të dhënat primare. Zgjedhja e mostrës së studimit në këtë rast është e rastësishme dhe periudha e studimit përfshinë vitet 2010 – 2015. Të dhënat e këtyre bizneseve janë marrë nga databaza e regjistrimeve të bizneseve pranë Drejtorisë së Tatim – Taksave në Tiranë. Forma e vjeljes së të dhënave u realizua nëpërmjet një pyetësi të strukturuar me pyetje cilësore dhe teknikat e shpërndarjes që u përdorën ishin posta elektronike dhe takimet e drejtpërdrejta në disa prej tyre.

Ndërsa, për grumbullimin e të dhënave primare, mbi ndërtimin e modelit në nivel mikroekonomik u përdor: pyetësi i strukturuar në 22 pyetje cilësore dhe i shpërndarë me teknika, të postës elektronike dhe takimeve të drejtpërdrejta në disa prej tyre.

SPECIFIKIMI I MODELIT EKONOMETRIK

Me qëllim që ti japim përgjigje *pyetjes kërkimore shkencore*, vendosëm të studiojmë impaktin që ka luhajtja e kursit të këmbimit në ekonominë e vendit tonë gjatë periudhës 2005-2015, dhe kjo do të realizohet nëpërmjet studimit të lidhjeve që ka kursi i këmbimit me faktorë të rëndësishëm makroekonomikë dhe financiarë.

Forma bazë e ekuacioni të regresionit të thjeshtë me dy variabla do të zbatohet për çdo lidhje të krijuar:

$$Y = \alpha + \beta X + \varepsilon$$

Variablat e përdorur për vlerësimin e impaktit të RER në nivelin makroekonomik

Kursi real i këmbimit të monedhës vendase Lek kundrejt Eur (RER) i shprehur sipas formës së mësipërme dhe ndërtuar (si më sipër) me të dhënat e mbledhura nga burime kryesore për çdo seri korore të duhur.

Prodhimi i Brendshëm Bruto (PBB) është variabël i shprehur në vlerë monetare në miliardë lekë.

Inflacioni (CPI) për matjen e inflacionit do të përdoret Indeksi i Çmimit të Konsumit (2010 = 100) dhe ky variabël është shprehur në përqindje.

Eksportet, ky variabël shprehet në vlerë monetare miliardë lekë duke treguar nivelin e tyre ndër periudha.

Oferta monetare (M₃) e shprehur nëpërmjet agregatit monetar M₃ në vlerë monetare.

Kreditimi në valutë (KD) është variabël që shpreh nivelin e kredisë së disbursuar në valutë të huaj e dhënë në vlerë monetare.

Mjetet valutore neto (MVN) një variabël që referohen vlerës së aseteve të huaja që zotëron një vend, minus vlerën e aseteve të tij vendase të cilat zotërohen nga të huajt, shprehet në vlerë miliardë lekë.

NDËRTIMI I HIPOTEZAVE STATISTIKORE E MODELIT

Në rastin e studimit tonë, për pyetjen kërkimore shkencore janë ngritur dhe hipotezat bazë, vërtetimi i të cilave bazohet në rezultatet që japin lidhjet midis variablave dhe nënhipotezat mbështetëse. Në mënyrë më specifike ndërtimi i hipotezave ka vijuar si më poshtë:

❖ Për pyetjen *kërkimore shkencore* hipotezat e ngritura janë:

Cili është impakti i kursit të këmbimit në faktorë specifikë ekonomikë dhe financiarë? A është pozitiv apo negativ impakti i RER në ecurinë e faktorëve të përzgjedhur në studim? Cilët janë faktorët që ndikohen nga dinamika e shmangies së RER?

Analiza do të mbështetet në vlerësimin e lidhjeve specifike ndërmjet një faktori dhe RER, sipas një modeli të regresionit me dy variabla;

Forma funksionale e modelit linear do të jetë:

$$Y = \alpha + \beta X + \varepsilon$$

α : termi i gabimit

Y: variabli i varur

X: X₁, X₂, X₃,...X_n vektori i variablit të pavarur (shpjegues)

β : β_1 koeficienti i variablit të pavarur (shpjegues)

ε : termi i gabimit

$$H_0: \beta_1 = 0$$

$$H_a: \beta_1 \neq 0$$

Sipas ekuacionit të funksionit të regresionit linear i cili përcakton lidhjen midis variablave të marrë në studim, vlera e tij do të varet nga koeficienti β që do të thotë nëse ky koeficient është negativ atëherë variabli parashikues ose i pavarur ndikon negativisht tek variabli i varur: një rritje me një njësi në variablin e pavarur do të ulë variablin e varur në vlerën e koeficientit përkatës. Në të njëjtën mënyrë shpjegohet nëse koeficienti β i variablit të pavarur do të rritet me vlerën e koeficientit përkatës. Koeficienti α është vlera e konstantes për të cilën parashikohet të ketë variabli i varur nëse koeficienti β është i barabartë me zero, si e tillë $Y = \alpha$. Ndërsa, termi i gabimit ε shpreh efektin e të gjithë variablave të tjerë, përveç variablave të varur dhe pavarur të marrë në shqyrtim në funksionin e regresionit.

Ose;

H_0 : Kursi real i këmbimit nuk ka ndikim të statistikisht të rëndësishëm në faktorët ekonomikë të përfshirë në studim

H_a : Kursi i këmbimit ka ndikim të statistikisht të rëndësishëm në të paktën një faktor ekonomik i përfshirë në studim

Për vërtetimin e hipotezës bazë janë ngritur nënhipotezat për të testuar ndikimin e secilit faktor në luhatjen e RER, të shprehura si më poshtë:

☞ *Testimi i lidhjes Kursi i Këmbimit – Prodhim i Brendshëm Bruto*

H_{01} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në prodhimin e brendshëm bruto ($\beta_1 = 0$)

H_{a1} : Kursi i këmbimit ka ndikim të rëndësishëm në prodhimin e brendshëm bruto ($\beta_1 \neq 0$)

☞ *Testimi i lidhjes Kursi i Këmbimit – Inflacion*

H_{02} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e inflacionit në vend ($\beta_2 = 0$)

H_{a2} : Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e inflacionit në vend ($\beta_2 \neq 0$)

☞ *Testimi i lidhjes Kursi i Këmbimit – Eksporte*

H_{03} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e eksporteve ($\beta_3 = 0$)

H_{a3} : Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e eksporteve ($\beta_3 \neq 0$)

☞ *Testimi i lidhjes Kursi i Këmbimit - Ofertë Monetare*

H_{04} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në ofertën monetare ($\beta_4 = 0$)

H_{a4} : Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e eksporteve ($\beta_4 \neq 0$)

☞ *Testimi i lidhjes Kursi i Këmbimit - Kredi në Valutë*

H_{05} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e kredisë në valutë të huaj ($\beta_5 = 0$)

H_{a5} : Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e kredisë në valutë të huaj ($\beta_5 \neq 0$)

☞ *Testimi i lidhjes Kursi i Këmbimit - Mjete Valutore Neto*

H_{06} : Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e mjeteve valutore neto ($\beta_6 = 0$)

H_{a6} : Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e mjeteve valutore neto ($\beta_6 \neq 0$)

Ndërsa sa i përket analizës në nivel mikroekonomik mbi ekspozimin e bizneseve ndaj luhatjeve të kursit të këmbimit, jemi fokusuar në vlerësimin e korrelacionit të lidhjeve ndërmjet variablave më të rëndësishëm. Për testimin e këtyre lidhjeve ngritëm 5 nënhipotezat mbështetëse të hipotezës kryesore, dhe për të cilat do të vlerësojmë rëndësinë statistikore të lidhjes nëpërmjet rezultatit të koeficientit të korrelacionit të Pearson Chi-square. Nga analiza e nënhipotezave i japim dhe përgjigje hipotezës kryesore të analizës mikro, nëse pranohet apo refuzohet.

H_0 : Diferencat ndërmjet dy variablave nuk janë statistikisht të rëndësishme

H_a : Diferencat ndërmjet dy variablave janë statistikisht të rëndësishme

H_{01} : Monedha me të cilët kryen shumica e transaksioneve të bizneseve nuk ka lidhje të rëndësishme me monedhën me të cilën bizneset mbajnë kursimet e tyre

H_{02} : Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin që bizneset japin mbi nivelin e përfitueshmërisë si efekti i luhatjeve të kursit të këmbimit.

H_{03} : Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin e performancës së tyre si efekti i fuqizimi të monedhës europiane.

H_{04} : Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin e performancës së tyre si efekti i fuqizimi të monedhës amerikane.

H_{05} : Afati kohor i pagesës së klientëve nuk ka lidhje të rëndësishme me afatin kohor të pagesës së furnitorëve të bizneseve.

ANALIZA NË NIVELIN MAKROEKONOMIK E IMPAKTIT TË RER NË DISA FAKTORË TË RËNDËSISHËM EKONOMIKË

Analiza e të gjitha të dhënave që vendosëm të grumbullojmë më qëllim studimin e impaktit të kursit të këmbimit në disa faktorë të rëndësishëm ekonomikë, është vlerësuar në nivel makroekonomik. Studimi përfshin të dhëna për periudhën 2005-2015 me frekuencë të serive kohore 3-mujore. Hipoteza kryesore që mbështet pyetjen kërkimore shkencore është:

H_0 : Kursi real i këmbimit nuk ka ndikim të statistikisht të rëndësishëm në faktorët ekonomikë të përfshirë në studim

H_a : Kursi i këmbimit ka ndikim të statistikisht të rëndësishëm në të paktën një faktor ekonomik i përfshirë në studim

Për vërtetimin e kësaj hipoteze mbështetimi në analizën e mëposhtme statistikore, duke e plotësuar edhe me interpretime statistike e ekonomike.

Analiza e përshkruese e serive kohore

Në tabelën 4.10 pasqyroren përmbledhur treguesit kryesorë statistikorë të variabaleve të përfshirë në studim. Gjithashtu studiuam edhe shpërndarjen normale të serive kohore nëpërmjet testit Jarque-Bera.

Tabela 4.20 - Treguesit përshkrues të serive të marrë në studim

	Minimale	Maximale	Mean	Dev.stand.	J-B test	Prob (J-B)
RER	126.52	145.32	136.05	5.71	3.71	0.156
PBB	203699	346476	270417	38932	1.8	0.405
CPI	253.22	335.25	294.1	24.48	3.21	0.2
EX	1.36	4.42	2.74	9.86	4.44	0.108
M3	1543666	3628540	2722677	675836	3.63	0.162
KV	183641	1067983	785165	286706	7.45	0.024
MVN	365970	1072309	667428	183360	1.3	0.521

Burimi: Llogaritjet e autores

Për secilin variabël janë analizuar 44 vrojtime. Përveç variablaeve të RER dhe CPI, vlerat e variablaeve të tjerë si prodhimi i brendshëm bruto, niveli i eksporteve, oferta monetare, volume i kredive në valutë dhe mjetet valutore neto shprehen në milionë lekë kryesisht për treguesit e vlerave të tyre minimale, vlerën maksimale të shënuar dhe mesataren e devijimin standart.

RER është i njëjtë si dhe në analiën e modelit BEER. Gjithashtu nga tabela shohim gjithashtu se, sipas testit Jarque – Bera⁷ probabiliteti i çdo serie

kohore (pra, vlera e rëndësisë statistikore të tij) është më i madh se 0.05, kjo tregon se çdo seri kohore ka shpërndarje normale.

4.2.1 Rezultatet e testimit të stacionaritetit të serive kohore

Testimi i stacionariteti të serive kohore ose i rrënjëve njësi unitare, është realizuar me testin e Philip-Peronit, rezultatet e të cilit përmbledhen në tabelën e mëposhtme:

Tabela 4.31 - Rezultatet e stacionaritetit sipas testit Philip – Peron

	Testi Philip – Peron		
	t-statistic	p-value	Niveli stac.
LnRER	-8.89	0.0000	I(1)
LnPBB	-24.81	0.0001	I(1)
LnCPI	-14.1	0.0000	I(1)
LnM3	-4.38	0.0011	I(0)
LnEX	-9.06	0.0000	I(1)
LnKD	-5.9	0.0000	I(0)

Burimi: Llogaritjet e autores

PP: Vlerat kritike të MacKinnon (1996) janë; për nivelin 1 % = - 3.59, për nivelin 5 % = -2.93 dhe për nivelin 10 % = -2.6

Rezultatet ekonometrike dhe vlerësimi i modeleve për testimin e hipotezave

Literatura teorike na ka sugjeruar se kursi i këmbimit ka impakt të rëndësishëm në disa faktorë ekonomikë, por nëpërmjet studimit të disa lidhjeve specifike të RER me faktorë makroekonomikë ose financiarë ne i kemi dhënë një përgjigje kësaj çështje për periudhën 2005 – 2015 për vendin tonë sipas sugjerimeve që na japin modelet e ndërtuara si më poshtë:

☞ Testimi i lidhjes kursi i këmbimit – prodhim i brendshëm bruto

H_{01} : $\beta_1 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në prodhimin e brendshëm bruto (nuk vërtetohet)

H_{a1} : $\beta_1 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në prodhimin e brendshëm bruto (vërtetohet)

⁷ Sipas testit Jarque – Bera treguesit kohorë kanë shpërndarje normale deri në dy shkaillë lirie.

Analizën ekonometrike e filluam për testimin e stacionaritetit të dy treguesëve, që siç është pasqyruar dhe në tabelën 4.10 për çdo variabël. Nga testi i korrelacionit Johansen për këto dy variabla rezultoi se nuk kishte asnjë vektor kointegrimit midis tyre. Të dy testet mbështetëse të Johansen, Trace Test dhe Max-eigenvalue Test rezultuan me zero vektor kointegrimit. Modeli që do të përdorim në vlerësimin e lidhjes afatgjatë ndërmjet dy variablave është modeli VAR.

Fillimisht përcaktuam gjerësinë e vonesave kohore dhe kritret⁸ na sugjeruan 5 vonesa kohore.

Në pjesën e parë të tabelës paraqiten vetëm rezultatet e variablave me 4 vonesa kohore që mbështesin lidhjen e RER me PBB-në me 95 % siguri duke e kthyer RER si faktor i rëndësishëm në luhatjen zhvillimit të ekonomisë.

Tabela 4.42 – Varësia e PBB-së nga kursi i këmbimit

Variabli	Koeficienti	Gabimi stand.	t	Probabiliteti
LnRER (4 vk)	1.42	0.46	3.08	0.0046
C	1.98	0.71	2.81	0.0091
R²	0.949	Mesatarja e Var.Varur		12.53
R² axhustuar	0.931	Gab.stan.Var.Varur		0.12
S.E.i regresit	0.031	Kriteri Akaike		-3.82
ShKM	0.028	Kriteri Schwarz		-3.35
Log likelihod	85.57	Kriteri Dur-Wats.		1.87
Statistika F	52.77	Prob. (stat. F.)		0.000

Burimi: Llogaritjet e autores

Bazuar në të dhënat e tabelës ekuacioni i regresionit me dy variabla që shpreh lidhjen midis prodhimit të brendshëm bruto (Y) dhe kursi real të këmbimit (X), mund të shkruhet si më poshtë:

$$Y = 1.98 + 1.42 \cdot X$$

Ndikimi i RER është pozitiv dhe statistikisht i rëndësishëm mbi luhatjen e nivelit të zhvillimit ekonomik, edhe pse me 4 vonesa kohore. Nga rezultatet e modelit për t'u vlerësuar është edhe ndikimi i vetë PBB-së me 4 vonesa kohore në luhatjen korente të këtij variabli. Vlera e koeficientit të përcaktueshmërisë R² i axhustuar shënon shifrën 93.1 % tregon se vlerësimet e variablave të RER deri ne 4 vonesa kohore dhe vetë PBB-së në 4 vonesa kohore shpjegojnë në masën 93.1 % ndryshueshmërinë e variablit të varur PBB.

☞ Testimi i lidhjes Kursi i këmbimit – Inflacion

H₀₂: $\beta_2 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e inflacionit në vend (vërtetohet)

H_{a2}: $\beta_2 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e inflacionit në vend (nuk vërtetohet)

Teoria ekonomike shpjegon se midis nivelit të inflacionit (matur në analizën në vijim nëpërmjet indeksit të çmimit të konsumit) dhe kursit të këmbimit

duhet të ketë një lidhje pozitive: nëse monedha e huaj euro shtrenjtohet, në një ekonomi ku importet e mallrave të konsumit janë më të rëndësishme, pritjet që mallrat dhe shërbimet të bëhen më të shtrenjta, pra të rritet IÇK. Në rastin e vendit tonë ku importet janë shumë më të larta se niveli i eksporteve, si edhe në rastin kur volumin më të madh të importeve e zënë mallrat e konsumit, atëherë ne presim një rritje të inflacionit ose një rritje të IÇK. Shumë diskutime të viteve të fundit nga ekspertë të ekonomisë, e quajnë këtë rritje të inflacionit një lloj inflacioni të “importuar”⁹ që lind si rrjedhojë e rritjes së çmimeve të mallrave që importohen. Këtë problem të importimit të inflacionit autorët Salko, Beci, dhe Kodra (2014) e konsiderojnë si një problem thelbësor dhe delikat për vendin tonë, sepse nuk është testuar e as vlerësuar nëse rritja e nivelit të importeve ka ardhur si rezultat i rritjes së volumit të tyre apo si rezultat i rritjes së çmimeve të importit jashtë vendit. Ata gjithashtu shtojnë se jo vetëm që nuk përcaktohen qartë këto raporte por edhe nuk njihet efekti i tyre në ekonomi.

Në bazë të rezultateve të stacionaritetit të këtyre dy variablave, IÇK dhe RER, rezulton se ata janë stacionarë të rendit të parë, ndërsa Johansen sugjeron se nuk ka vektorë kointegrimit midis tyre. Viojmë me modelin VAR dhe testet na sugjerojnë përfshirjen e variablave me 4 vonesa kohore. Rezultatet e modelit paraqiten të përmbledhura në tabelën e mëposhtme:

⁸ Nga zbatimi i testit kriteret që merren parasysh janë ai i AIC, SC dhe HQ të shpjeguar edhe ne modelin BEER.

⁹ “Targeting inflation” është koncepti më së shumti i trajtuar në teorinë ekonomike vitet e fundit sa i përket çështjes së nivelit të inflacionit në vend.

Tabela 4.53 - Varësia e nivelit të inflacionit nga kursi i këmbimit

Variabli	Koeficienti	Gabimi stand.	t	Probabiliteti
Ln RER (1vk)	0.058	0.133	0.439	0.663
Ln RER (2vk)	-0.032	0.179	-0.178	0.859
Ln RER (3vk)	0.207	0.177	1.17	0.25
Ln RER (4vk)	-0.19	0.126	-1.498	0.144
Ln CPI (4vk)	0.613	0.181	3.383	0.002
C	0.122	0.185	0.66	0.514
R²	0.98	Mesatarja e Var.Varur		5.69
R² axhustuar	0.98	Gab.stan.Var.Varur		0.075
S.E.i regresit	0.008	Kriteri Akaike		-6.48
ShKM	0.002	Kriteri Schwarz		-6.1
Log likelihood	138.7	Kriteri Dur-Wats.		1.49
Statistika F	377	Prob. (stat. F.)		0.000

Burimi: Llogaritjet e autores

Sipas të dhënave të tabelës, ekuacioni i regresionit që shpreh lidhjen ndërmjet nivelit të inflacionit (Y) dhe variablit të pavarur RER në të katër vonesat kohore:

$$Y = 0.122 + 0.058 \cdot X_1 - 0.032 \cdot X_2 + 0.207 \cdot X_3 - 0.19 \cdot X_4 + 0.613 \cdot X_5$$

Ku:

Y = niveli i inflacionit

X1 = Ln RER (1vk)

X2 = Ln RER (2vk)

X3 = Ln RER (3vk)

X4 = Ln RER (4vk)

X5 = Ln CPI (4vk)

Nga prezantimi i modelit VAR në vlerësimin e lidhjes midis IÇK dhe RER nuk rezulton asnjë lidhje statistikisht e rëndësishme (në asnjë nga vonesat kohore të sugjeruara) mbi ndikimin luhatjeve të RER në rritjen e çmimeve të mallrave të konsumit ose normën e inflacionit në vend. Për periudhën që kemi marrë në studim, edhe vetë RER shfaq devijime të kufizuara gjë që tregon se monedha jonë ka patur momente vlerësimi dhe zhvlerësimi të kontrolluara dhe nuk kanë përcjellë impakt në luhatjen e çmimeve të konsumit të mallrave vendase apo në rritjen e nivelit të inflacionit vjetor¹⁰.

☞ Testimi i lidhjes Kursi i këmbimit – Eksporte

H₀₃: $\beta_3 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e eksporteve (nuk vërtetohet)

H_{a3}: $\beta_3 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e eksporteve (nuk vërtetohet)

Në analizën e stacionaritetit të këtyre dy variablave rezultojnë sipas testit të Philip-Peronit të jenë stacionarë në diferencë të parë ndërsa Johansen na sugjeroi se ka vektorë kointegrimi midis tyre. Mbështetur në këto rezultate dhe ato që na sugjeron literatura ekonometrike mbi metodat e vlerësimit që duhen përdorur në varësi të rezultateve të kointegrimit të variablave, përdorim metodën e VECM për vlerësimin e ndikimi të RER në eksporte.

Teorikisht zhvlerësimi i monedhës vendase rrit eksportet dhe nga ana tjetër ul importet, pra përmirëson deficietin tregtar. Kursi real i këmbimit, si treguesi që shpreh më mirë aftësinë konkurruese të vendit tonë në tregjet ndërkombëtare, me dinamikën e kufizuar të tij gjatë kësaj periudhë studimi, ka patur një ndikimin sinjifikativ në përmirësimin e nivelit të eksporteve. Në mbështetje të këtij konkluzion gjejmë edhe punime të Mitre (2013) i cili këtë trend nënçmues të monedhës vendase ose ndryshe rritje e indeksit të NER dhe RER, mund të ketë rritur kërkesën për eksportet e “lira” shqiptare në tregjet e huaja. Ndërsa Çeliku dhe Metani (2011) vlerësojnë produktivitetin e punës në sektorin e të tregtueshmeve (si sektori me peshë më të lartë ndaj të patregtueshmeve) me një prirje rënëse, trend ky që mund të shpjegojë efektin pozitiv të konkurrencës së eksporteve shqiptare. Treguesit më kryesore që na rezultojnë testimi i rëndësishëm statistikore të modelit paraqiten të përmbledhura në tabelën e mëposhtme:

¹⁰ Tabela e plotë e rezultateve të modelit për testimin e lidhjes IÇK – RER është pasqyruar e plotë në anekse

Table 4.64 - Varësia e nivelit të eksporteve nga kursi i këmbimit

Variabli	Koeficienti	Gabimi stand.	t - stat	Probabiliteti
LnRER (1 vk)	-5.09	1.01	-5.02	0.000
LnRER (2 vk)	-2.67	1.16	-2.28	0.03
LnRER (3 vk)	-2.31	0.89	-2.57	0.016
C	0.072	0.016	4.4	0.0002
R²	0.70	Mesatarja e Var.Varur		0.022
R² axhustuar	0.57	Gab.stan.Var.Varur		0.086
S.E.i regresit	0.056	Kriteri Akaike		-2.67
ShKM	0.081	Kriteri Schwarz		-2.48
Log likelihod	62.75	Kriteri Dur-Wats.		2.2
Statistika F	5.55	Prob. (stat. F.)		0.00016

Burimi: Përlllogaritjet e autores sipas EvIEWS 9.5

Nga rezultatet e modelit mund të ndërtojmë edhe ekuacionin e regresionit me dy variabla që shpreh lidhjen ndërmjet dy variablave, Eksporteve (Y) dhe Kursit real të këmbimit (X):

$$Y = -12.74 + 7.47 * X$$

Kjo do të thotë se, nëse kursi i këmbimit do të ishte 1 atëherë do të kishim një rënie të eksporteve në masën (-12.74 %)¹¹

Ndërsa, (7.47*X) tregon se nëse kursi i këmbimit do të rritej me 1 %, që do të thotë një zhvlerësim të monedhës vendase, atëherë niveli i eksporteve do të rritej me 7.47 %

Mbështetur në statistika të rëndësishme si ajo e prob (t-stat) të cilat rezultojnë më të vogla se 0.05, mund të pohojmë me siguri të lartë se RER ndikon në diferencën e Eksporteve me një deri në tre vonesa kohore, dhe ai është një tregues statistikisht i rëndësishëm. Ky rezultat na çon drejt pranimit të hipotezës alternative, po ashtu edhe në rrëzimin e hipotezës bazë të ngritur mbi ndikimin e RER në të paktën një faktori ekonomik të përfshirë në model. Sa i përket shenjës së koeficientëve ata janë negative, ashtu si edhe literatura teorike e dëshmon këtë lidhje ndërmjet RER dhe Eksporteve, kjo do të thotë se me rënien e kursit real të këmbimit, pra me mbiçmim të monedhës vendase ndaj asaj të huaj, niveli i eksporteve do të ulet. Ndërsa rritja e RER favorizon rritjen e eksporteve, nxit konkurrencën e produkteve vendase drejt tregjeve të huaja, synohet një përmirësim i bilancit tregtar të vendit.

Sipas tabelës 4.13 edhe treguesit e tjerë statistikorë paraqiten me rëndësi, ndër të cilët R² (koeficienti i përcaktueshmërisë) i axhustuar në vlerën 0.57 tregon se variabli i pavarur RER shpjegon në masën 57 % variabilitetin e variablit të varur, eksportet për periudhën në studim 2005 – 2015. Normalisht ky është

një model i thjeshtë regresioni me dy variabla ndaj dhe në luhatjen e nivelit të eksporteve ndikojnë edhe shumë faktorë të tjerë që nuk janë përfshirë në këtë studim.

Statistika e Fisherit 5.55 dhe Prob (stat.F) 0.00016 tregojnë se ky model është në total i rëndësishëm statistikisht, variabli i pavarur është statistikisht i ndryshëm nga zero.

Gjithashtu kriteri i Durbin Watson është 2.2 pra pak më i madh se dy, dhe rezultat i mirë, pra do të thotë se modeli i ndërtuar për të testuar këtë lidhje midis variablave nuk vuan nga autokorelacioni.

☛ Testimi i lidhjes Kursi i këmbimit – Ofertë Monetare

H₀₄: $\beta_4 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në ofertën monetare (*vërtetohet*)

H_{a4}: $\beta_4 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e eksporteve (*nuk vërtetohet*)

Variabli i varur mjetet monetare rezultojnë të jetë i integruar sipas rendit I(0) ndërsa variabli i pavarur RER është i integruar i rendit I(1). Si e tillë, kemi ndjekur procedurën e kointegrimit të variablave sipas së cilës metoda më pak strikte që teston variablat pamvarësisht se ata janë të gjithë I(0), të gjithë I(1) apo një përzierje e të dyjave është metoda e vonësës së shpërndarë autoregresive (ARDL). Kjo metodë është relativisht efiçiente kur përdoret për seri kohore të shkurtra dhe më një numër të kufizuar vrojtimesh. Fillimisht përcaktuam numrin e vonësave kohore të provimit të të dhënave¹². Rrjedhimisht gjatësia e vonësës së variablave shpjegues u bazua në kriterin Schëartz. Rezultatet e vlerësimit të lidhjes midis dy variablave sipas kësaj metode përmbledhen në tabelën e mëposhtme:

¹¹ Nëse kursi i këmbimit do të ishte i barabartë me 1 do të thotë se jemi në kushtet e paritetit të fuqisë blerëse kur çmimet e mallrave të konsumit midis vendeve relative janë të njëjta.

¹² Sipas Pesaran dhe Shin (1999) rekomandojnë që për të dhënat tremujore të provohen jo më shumë se 8 vonesa kohore – cituar në (Vika & Luçi, "Ekulibri i kursit real të këmbimit Lekë-Euro-Sai shmangur është ai?", 2011, p. 17)

Tabela 4.15 - Varësia e ofertës monetare nga kursi real i këmbimit

Variabli	Koeficienti	Gabimi stand.	t - stat	Probabiliteti
LnM3 (-1)	0.952	0.011	81.16	0.0000
LnRER	-8.081	0.095	-0.85	0.399
LnRER (-1)	0.194	0.097	2	0.052
C	0.163	0.259	0.629	0.532
R²	0.99	Mesatarja e Var.Varur		14.97
R² axhustuar	0.99	Gab.stan.Var.Varur		0.25
S.E.i regresit	0.012	Kriteri Akaike		-5.83
ShKM	0.006	Kriteri Schwarz		-5.67
Log likelihod	129.5	Kriteri Dur-Wats.		1.86
Statistika F	5918	Prob. (stat. F.)		0.000

Burimi: Përlllogaritjet e autores sipas Eviews 9.5

Sipas rezultateve të mësipërme shohim se RER nuk ka ndikim statistikisht të rëndësishëm në luhatjen e nivelit të ofertës monetare sepse probabiliteti i LnRER dhe Ln RER të një periudhe më parë janë më të larta se $p=0.05$. Në rastin tonë oferta monetare e shprehur nga agregati M_3 ndikohet vetëm nga vlerat e periudhës paraardhëse të saj.

Me të dhënat e tabelës që shprehim ekuacionin e regresionit me variablat e përfshirë në këtë model:

$$Y = 0.163 - 8.081 \cdot X_1 + 0.194 \cdot X_2 + 0.952 \cdot X_3$$

Ku:

Y = oferta monetare

X_1 = kursi i këmbimit

X_2 = LnRER (-1)

X_3 = LnM3 (-1)

R^2 i axhustuar = 99 % shpreh që variacioni i ofertës monetare shpjegohet nga variablat e përfshirë në model por në një masë mjetat të madhe nga LnM3(-1) me një nivel besueshmërie 95%. Ndërsa variacioni i ofertës monetare ndikohet nga vlerat e periudhës paraardhëse të RER me nivel besueshmërie 90 %.

☞ Testimi i lidhjes Kursi i këmbimit – Kredi në Valutë

H₀₅: $\beta_5 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e kredisë në valutë të huaj (vërtetohet)

H_{a5}: $\beta_5 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e kredisë në valutë të huaj (nuk vërtetohet)

Nisur nga rezultati i testit të stacionaritetit të dy variabla, kur variabli i varur kredia në valutë është i integruar në nivel zero dhe variabli i pavarur kursi i këmbimit është i integruar në diferencë të parë, edhe në këtë rast përdorim metodën e ARDL-së për të vlerësuar lidhjen e tyre. Rezultatet e testit pasqyrohen në tabelën e mëposhtme por bëjmë të qartë se në testim kemi përfshirë si variabël të pavarur edhe LnKV (-1) dhe LnKV (-2);

Tabela 4.16 - Varësia e kredisë në valutë nga kursi real i këmbimit

Variabli	Koeficienti	Gabimi stand.	t - stat	Probabiliteti
LnRER	-0.355	0.182	-1.944	0.0593
LnKV (-1)	1.213	0.152	7.95	0.000
LnKV (-2)	-0.253	0.144	-1.75	0.087
C	2.312	0.837	2.76	0.008
R²	0.995	Mesatarja e Var.Varur		13.53
R² axhustuar	0.995	Gab.stan.Var.Varur		0.44
S.E.i regresit	0.029	Kriteri Akaike		-4.10
ShKM	0.033	Kriteri Schwarz		-3.93
Log likelihod	90.16	Kriteri Dur-Wats.		2.10
Statistika F	2993	Prob. (stat. F.)		0.0000

Burimi: Përlllogaritjet e autores sipas Eviews 9.5

Të dhënat e tabelës 4.16 na tregojnë se ndikimi i RER në luhatjen e nivelit të kreditimit në valutë është negative dhe josingjektiv për një nivel rëndësie 5 %. Luhatja e KV ndikohet vetëm nga vlera e saj në periudhën paraardhëse për të njëjtin nivel rëndësie. Vlen për t'u përmendur se ndikimi i RER në nivelin e

KV rezulton negative dhe i rëndësishëm vetëm për nivel rëndësie 10 %.

Ekuacioni që shpreh lidhjen e variabla midis variabla me të dhënat e tableës;

$$Y = 2.312 - 0.355 \cdot X_1 + 1.213 \cdot X_2 - 0.253 \cdot X_3$$

Ku:

Y = kredia në valutë

X_1 = kursi i këmbimit

X_2 = LnKV (-1)

X_3 = LnKV (-2)

Të dhënat e tjera të vlerësimit të modelit rezultojnë në parametrat e duhur dhe mbështesin rëndësinë statistikore të tij, variabli i pavarur është statistikisht i ndryshëm nga zero.

☞ **Testimi i lidhjes Kursi i këmbimit - Mjete Valutore Neto**

H₀₆: $\beta_6 = 0$ Kursi real i këmbimit nuk ka ndikim të rëndësishëm në nivelin e mjeteve valutore neto (vërtetohet)

H_{a6}: $\beta_6 \neq 0$ Kursi i këmbimit ka ndikim të rëndësishëm në nivelin e mjeteve valutore neto (nuk vërtetohet)

Në vlerësimin e luhatjes së nivelit të MVN i ndikuar nga niveli i RER kemi përdorur metodën e VECM mqs të dy këto variabla rezultuan të integruar të rendit të parë I(1). Testet e gjerësisë kohore na sugjeruan 5 vonesa kohore, si rrjedhim rezultatet e modelit i përmbledhim në tablën e mëposhtme:

Tabela 4.17 - Varësia e mjeteve valutore neto nga kursi real i këmbimit

Variabli	Koeficienti	Gabimi stand.	t - stat	Probabiliteti
LnRER (-1)	0.4	0.357	1.14	0.263
LnRER (-2)	-0.4	0.395	-1.01	0.321
LnRER (-3)	-0.5	0.393	-1.01	0.212
LnRER (-4)	-0.2	0.411	-0.48	0.628
LnRER (-5)	0.24	0.362	0.66	0.512
LnMVN (-1)	0.92	0.192	4.81	0.000
C	1.66	1.09	1.52	0.140
R²	0.98	Mesatarja e Var.Varur		13.4
R² axhustuar	0.97	Gab.stan.Var.Varur		0.23
S.E.i regresit	0.03	Kriteri Akaike		-3.53
ShKM	0.03	Kriteri Schwarz		-3.06
Log likelihod	79.89	Kriteri Dur-Wats.		2.01
Statistika F	157.8	Prob. (stat. F.)		0.000

Burimi: Përlllogaritjet e autores sipas EvIEWS 9.5

Nga tabela 4.17 rezulton se në luhatjet e nivelit të mjeteve valutore neto kursi i këmbimit ka ndikim negativ dhe jo të rëndësishëm për nivelin e rëndësishëm 5 %. Këto rezultate tregojnë se kjo lidhje midis variabla nuk është e rëndësishme për periudhën e studimit me të dhënat bazuar në të dhënat e akumuluar. Por mund të shtojmë se në luhatjen e MVN-së ndikojnë pozitivisht dhe me një nivel të lartë rëndësie vetëm vlerat e këtij variabli të një periudhe paraardhëse.

Ekuacioni me të dhënat e mësipërme shpreh lidhjen si mëposhtë:

$$Y = 1.66 + 0.4 \cdot X_1 - 0.4 \cdot X_2 - 0.5 \cdot X_3 - 0.2 \cdot X_4 + 0.24 \cdot X_5 + 0.92 \cdot X_6$$

Ku:

Y = mjetet valutore neto

X_1 = LnRER (-1)

X_2 = LnRER (-2)

X_3 = LnRER (-3)

X_4 = LnRER (-4)

X_5 = LnRER (-5)

X_6 = LnMVN (-1)

Bazuar në rezultatin e kriterit të DW = 2.01 mund të konkludojmë se variablat në këtë model nuk kanë autokorrelacion serial, si e tillë kemi plotësimin e modelit klasik të regresionit.

Përmbledhje e analizës në nivel makroekonomik mbi ndikimin e luhatjeve të kursit të këmbimit në disa faktorë ekonomikë.

Zhvillimi i analizës ekonometrike e ekonomike mbi pyetjen e dytë kërkimore shkencore u realizua nëpërmjet vlerësimit të lidhjeve ndërmjet kursit të këmbimit dhe çdo faktori ekonomik të përfshirë në model. Periudha e studimit është sërish periudha 2005 – 2015. Dukeqënëse shohim impaktin e drejtpërdrejtë të një faktori, kursit të këmbimit, në luhatjen e secilit faktor ekonomikë, si PBB-ja, Inflacioni, Eksportet, Oferta monetare, Kredia në valutë të huaj dhe Mjetet valutore neto, ky impakt mund të matej më së miri nëpërmjet përcaktimit të modeleve të duhura statistikore në varësi të nivelit të integritetit dhe korrelimit të variabla mes tyre.

Tabela 4.18 - Pasqyrimi përmbledhës i vlerësimeve të modeleve

	t-stat	p-value	H ₀	Sgn e vlerësuar
RER – PBB	3.08	0.0046**	<i>Nuk vërtetohet</i>	+
RER – CPI	-1.49	0.142	<i>Vërtetohet</i>	-
RER – EX	-5.024	0.000**	<i>Nuk vërtetohet</i>	-
RER – M3	2	0.052*	<i>Vërtetohet</i>	+
RER – KV	-1.94	0.059*	<i>Vërtetohet</i>	-
RER – MVN	1.14	0.263	<i>Vërtetohet</i>	+/-

Burimi: Llogaritjet e autores

Në përmbledhje të analizës mbi vëtetimin hipotezës kryesore ngritur sipas pyetjes kërkimore shkencore, vlerësojmë se luhatja e kursit të këmbimit nuk ka patur ndikim në të gjithë faktorët e përfshirë në studim. Vlerësimi i monedhës vendase ndaj monedhave të vendeve partnere me të cilët bashkëpunojmë më shumë, duket se ka dhënë impaktin e saj më shumë në nivelin e eksporteve kombëtare duke ndikuar edhe bilancin tregtar vendas. Sipas analizës RER ka ndikuar në eksporte deri në tre vonesa kohore me nivel besueshmërie 95 %. Gjithashtu, vlerësohet se RER ndikon në ecurinë e zhvillimit ekonomik të vendit sepse zhvlerësimi / vlerësimi i monedhës vendase vë në lëvizje aktorët kryesore ekonomikë pikërisht në përmirësimin e klimës financiare.

Ndërsa në dy variablat, ofertë monetare dhe kreditimi në valutë, ndikimi i dinamikës së ndryshimit të RER nuk ka qënë i rëndësishëm në nivelin e rëndësisë 5 % por 10 %. Në këtë rast impakti është më pak i rëndësishëm dhe për nivelin e besueshmërisë 95 % që morëm që në fillim, ky rezultat pranon hipotezën zero.

Dhe për nivelin e inflacionit apo çmimeve të mallrave të konsumit dhe nivelin e mjeteve valutore neto, luhatja e RER nuk ka patur ndikim fare për periudhën e studimit. Ky nivel shmangie i RER nuk ka qënë i lartë për t'u përcjellë ndjeshëm në këto tregues ekonomikë të vendit.

ANALIZA E SEKTORIT TË BIZNESIT MBI IMPAKTIN E LUHATJEVE TË KURSIT TË KËMBIMIT NË PERFORMANCËN EKONOMIKE TË DISA BIZNESEVE QË OPEROJNË NË QARKUN E TIRANËS.

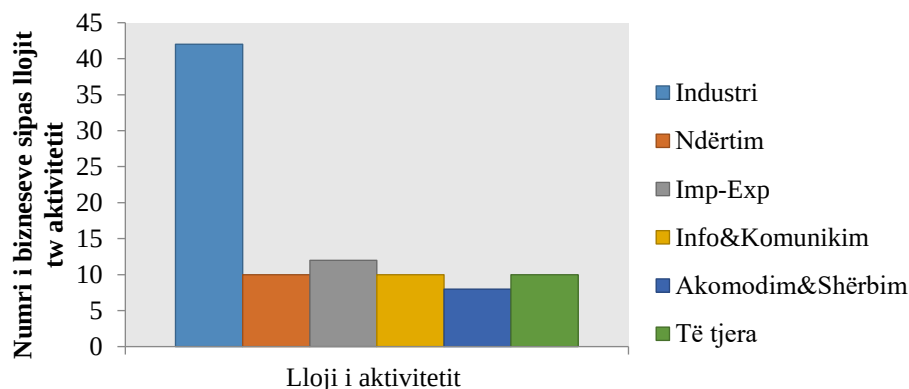


Figura 4.4 - Bizneset sipas llojit të aktivitetit që ushtrojnë

Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Me qëllim studimin e impaktit të luhatjeve të kursit të këmbimit në performancën e përgjithshme të aktivitetit tregtar të bizneseve që operojnë në vend, është përzgjedhur në mënyrë rastësore një mostër studimi që përbëhet nga rreth 100 firma që ushtrojnë aktivitet në qarkun e Tiranës. Vlerësimi që ka shprehur secili drejtues biznesi, pamvarësisht natyrës së aktivitetit që ai ushtron, është marrë nëpërmjet plotësimit të pyetësorit tonë me një përmbajtje mbi 20 pyetje cilësore¹³ si edhe nëpërmjet disa takimeve të drejtpërdrejta me ta. Përzgjedhja e firmave është rastësore dhe është synuar kryesisht sipërmarrje me zgjerim të aktivitetit brenda dhe jashtë vendit ose kanë si mjet pagesë / arkëtimi monedhat e huaja përveç monedhës vendase.

Qëllimi ynë ishte që struktura e pyetësorit të përmbante pyetje që lidhen me: llojin e aktivitetit që ushtrojnë, qëndrimin që kanë për monedhat e huaja dhe cila është më të përdorur gjatë aktivitetit tregtar, mbi tregun valutor në kryerjen e transaksioneve, mbi ndjeshmërinë që kanë lidhur me luhatjet e kursit të këmbimit në përfitueshmërinë e tyre, politikat e kreditimit në kompanisë.

Analiza e të dhënave përshkruese

Në pyetjet që japin një prezantim të biznesit mbi llojin e aktivitetit që ushtron, në mënyrë të specifikuar dhe grupmallrat që tregton me jashtë, përgjigjet përmbledhen si më poshtë;

¹³ Pyetësori i shpërndarë në mbi 300 adresa elektronike të bizneseve brenda qarkut të Tiranës.

Pjesa më e madhe e bizneseve të anketuar, aktivitetin e tyre e kanë të përqëndruar në Industri (në 42 raste), në Importe – Eksporte (12 raste) dhe nga aktivitetet e tjera kemi patur një numër pothuaj të njëjtë.

Mostra jonë e studimit ka treguar se natyra e aktivitetit që ushtrohet më shumë është tregëtia e Materialeve të ndërtimit dhe metale, si edhe Ushqime, pije e duhan. Në nivelin makroekonomik sipas databazës

statistikore të Institutit të Statistikave të Shqipërisë sektori i tregëtisë për vitin 2014 zë 47 % të sektorit të prodhuesëve të shërbimeve dhe ky sektor zë 85 % të totalit të ndërmarrjeve aktive të në këtë vit. Sektori i prodhuesëve të të mirave si: bujqësia, pyjet dhe peshkimi, industria, ndërtimi, përbëjnë vetëm 15 % të totalit të ndërmarrjeve aktive.

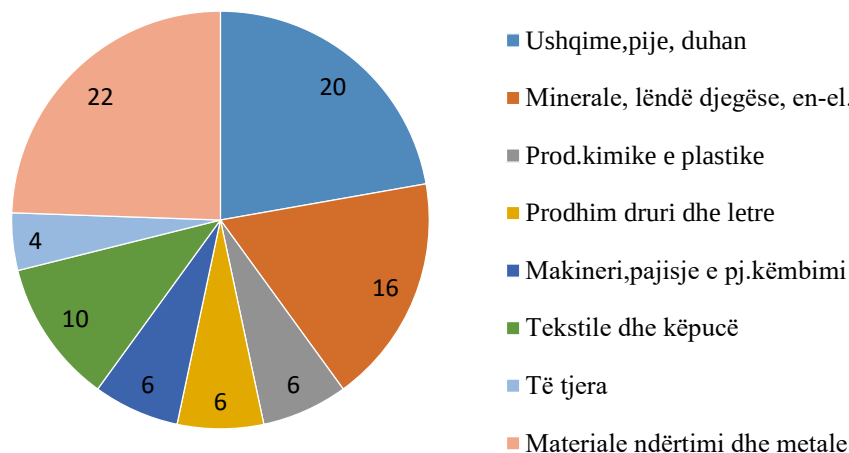


Figura 4.5 - Natyra e aktivitetit të bizneseve në studim

Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Ndërsa në pyetjen mbi llojin e aktivitetit të zhvillimit të tregëtisë jashtme pra, Import, Eksport apo të dyja, nga anketimi rezultoi se bizneset ishin përqëndruar me shumë në import në 48 raste, gjithashtu 28 biznese ushtronin të dyja aktivitetet dhe vetëm 16 biznese vetëm eksportonin. Edhe pse mostra jonë e

studimit nuk është shumë e madhe, ky rezultat dëshmon natyrën e zhvillimit të tregëtisë së jashtme të vendit gjatë periudhës së studimit, ku mbizotërojnë importuesit ndaj eksportuesëve të produkteve dhe shërbimeve të konsumit.

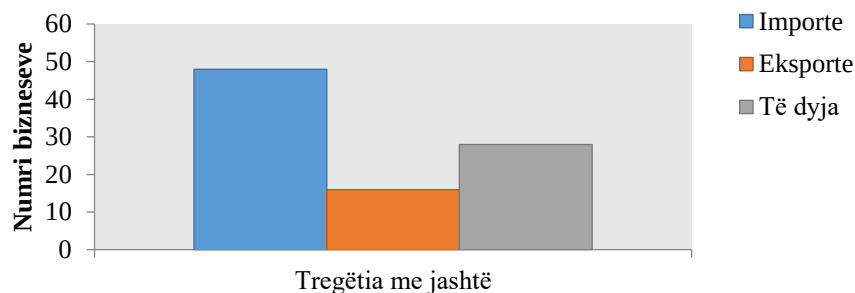


Figura 2 - Klasifikimi i bizneseve sipas zhvillimit të tregëtisë së jashtme

Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Ndërsa sa i përket vendeve partnere me të cilët këto biznese tregëtojnë më shumë janë Italia, Kosova, Greqia, Gjermania.

Sa i përket grupit të pyetjeve mbi vlerësimet që kanë për monedhat e huaja, bazuar në aktivitetin e tyre gjatë 5 viteve të fundit, këto biznese vlerësojnë monedhën europiane më të përdorurën në transaksionet e tyre krahasuar me dollarin amerikan. Ndërkohë, 56 biznese përdorin vetëm monedhën euro, 28 biznese zgjedhën opsionin një kombinim i të dy monedhave

dhe vetëm 8 biznese pohuan se përdornin dollarin amerikan.

Gjithashtu të njëjtin trend ka patur edhe vlerësimi që ata kanë dhënë mbi monedhën më të përdorur në mbajtjen e kursimeve të tyre. Pamvarësisht llojit të aktivitetit që ata ushtojnë (eksport, import apo të dyja) si edhe monedhës më të përdorur në transaksionet ndërkombëtare, rezultatet treguan se monedha europiane ishte monedha më e përdorur në mbajtjen e kursimeve korente të tyre.

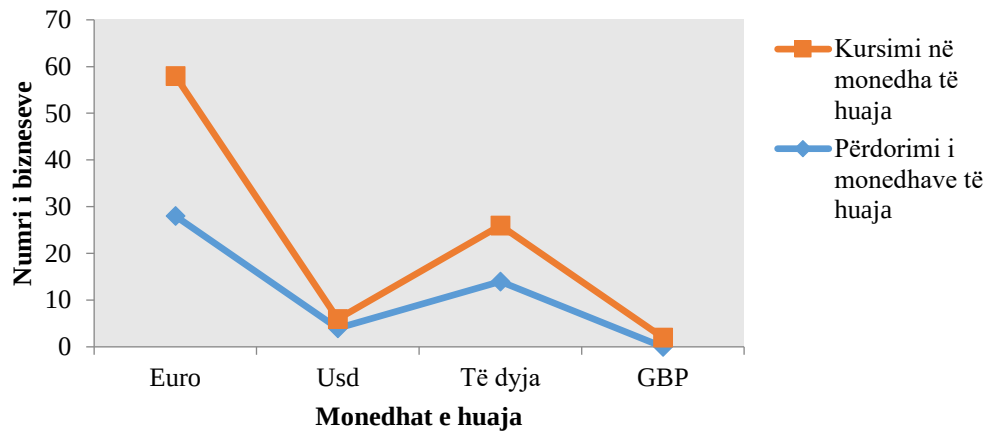


Figura 3 - Përdorimi i monedhave të huaja nga bizneset në transaksione dhe mbajtjen e kursimeve
Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Sipas figurës 4.7, përdorimi dhe kursimi në monedhë të huaj kanë ecur normalisht me të njëjtin trend, duke shprehur një korelacion pozitiv ndërmjet këtyre dy variablave. Monedha europiane si monedha me e përdorur në transaksione lidhet edhe me frekuencën e vendeve europiane me të cilët ata zhvillojnë tregëtinë e jashtme dhe kanë marrëveshtjet më të shumta bashkëpunimi. Nga ana tjetër, fakti që këto biznese zgjedhin të kursejnë më shumë në monedhën euro, tregon se kanë zgjedhur një strategji mbrojtëse mbi nivelin e kërkuar të likuiditetit si edhe minimizimin e nivelit të humbjeve si rezultat i luhatjeve të kursit të këmbimit Lek/Eur në tregun valutor. Kjo dëshmon se

këto janë biznese me eksperiencë të gjatë në treg dhe kanë njohuri të mira të tregut të këmbimit në vend.

Grupi i pyetjeve të mëposhtme lidhet me vlerësimet që bizneset kanë dhënë mbi nivelin e përfitueshmërisë si rezultat i luhatjeve të kursit të këmbimit në tregun valutor. Në konceptin e përfitueshmërisë, ne nuk insistim në përcaktim të raporteve specifike, tregues apo vlera konkrete financiare, por në konkluzionet e tyre mbi ndjeshmërinë e marzhit të fitimit vjetor gjatë 5 viteve të fundit, nëse kishte pësuar rritje, rënie apo kishte qëndruar pothuaj në të njëjtat nivele.

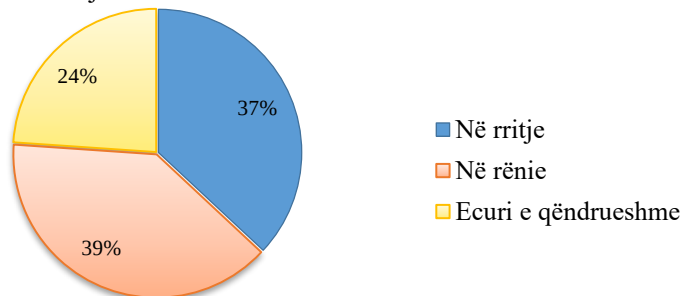


Figura 4 - Vlerësimi i përfitueshmërisë ndikuar nga luhatja e kursit të këmbimit
Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Sipas figurës 4.8 vlerësimet që kanë shprehur bizneset e anketuar mbi nivelin e përfitueshmërisë vjetore nëse ka qënë pothuaj në të njëjtin nivel, ka pësuar rritje apo ulje si rezultat i luhatjeve të kursit të këmbimit, ka qënë pothuaj i njëjtë. Më konkretisht, 36 biznese e vlerësojnë në rënie, 34 biznese e vlerësojnë se këto vite kanë patur një rritje të nivelit të përfitimit vjetor dhe 22 pohojnë se kanë qëndruar pothuaj në të njëjtat nivele si edhe më parë. Ky rezultat na tregon se luhatjet e kursit të këmbimit këto vitet e fundit nuk kanë ndihmuar shumë sektorin privat të shënojë rritje në

transaksione monetare, në zgjerim tregu jashtë vendit, apo ndërmarrjen e politikave të reja më të duhura.

Në mbështetje të vlerësimeve të tyre, shumica e bizneseve kanë pohuar se fuqizimi i monedhës europiane nuk ka ndikuar në zgjerim të aktivitetit por kanë mbajtur të njëjtin ritëm zhvillimi e në disa raste në tkurrje të tij. Rreth 20 % e bizneseve kanë menduar për gjetjen e politikave të reja ndërsa për 21 % të mostrës së studimit nuk ka ndikuar në veprimtarinë e aktivitetit të tyre.

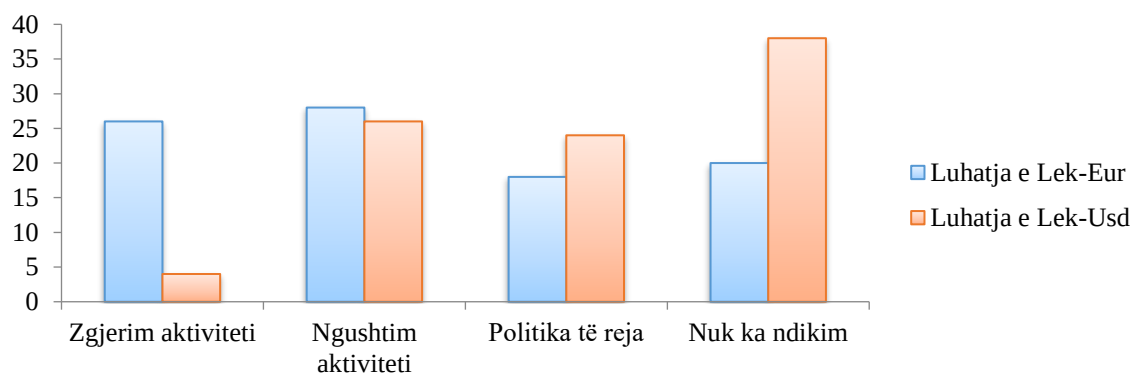


Figura 5 - Impakti i luhatjeve të kurseve të këmbimit në veprimtarinë operative të bizneseve
Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Ndërsa këto biznese kanë shprehur një qëndrim tjetër rreth luhatjeve që ka pësuar dollari amerikan, sepse për 41 % të bizneseve nuk ka patur asnjë ndikim, dhe për pjesën tjetër të bizneseve këto luhatje kanë sjellë ulje të aktivitetit ose ndërmarrjen e politikave të reja për zhvillimin e veprimtarisë ekonomike të tyre.

Grupi i fundit i pyetjeve lidhet me aftësinë likujduese të bizneseve, nivelin e kreditimit të tyre si edhe marrëdhëniet me klientët e furnitorët.

Bizneset e vlerësojnë aksesin e kredimarrjes si fleksibël pranë bankave të nivelit të dytë (52 prej tyre), ndërsa 36 biznese janë përgjigjur se kanë vënë re rritje

të kriterëve në kreditim nga sektori i bankar. Ndërsa në një raport pothuaj të njëjtë ishin përgjigjet se ata ishin duke shlyer një kredi, ishin në proces aplikimi dhe madje nëse kishin apo jo plane të kreditoheshin serisht në vijim. Kjo tregon për një mbështetje të vazhdueshme që ka sektori i bizneset për likuiditetet shtesë. Ndonëse zhvlerësimi i monedhës vendase këto 5 vitet e fundit këtyre bizneseve nuk i ka sjellë nivele të larta përfutueshmërie dhe zgjerimi të aktivitetit, kërkesa për likuiditet vjen edhe nga politika që kanë bizneset me njëri – tjetrin në marrëdhëniet furnitor – klient.

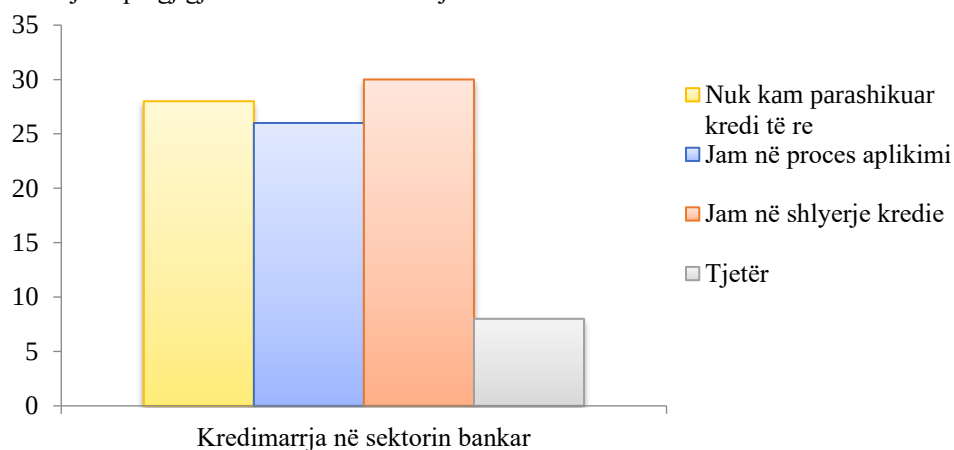


Figura 6 - Marrëdhënien e biznesit me nivelin e kreditimit në sistemin bankar
Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

Ndërsa marrëdhënien me furnitorët dhe klientët këto biznese e shohin përgjithësisht në një tendencë përkeqësimi gjatë kësaj periudhe sepse 23 prej bizneseve pohojnë se është ulur aftësia paguese e klientëve ndërsa 20 biznese pohojnë se marrëdhënia ka vijuar njësoj por klientët kanë dashur më tepër ditë në

likujdimin e faturave. Vetëm gjashtë biznese shohin se klientët dhe furnitorët me të cilët punojnë kanë patur një rritje të aftësisë paguese.

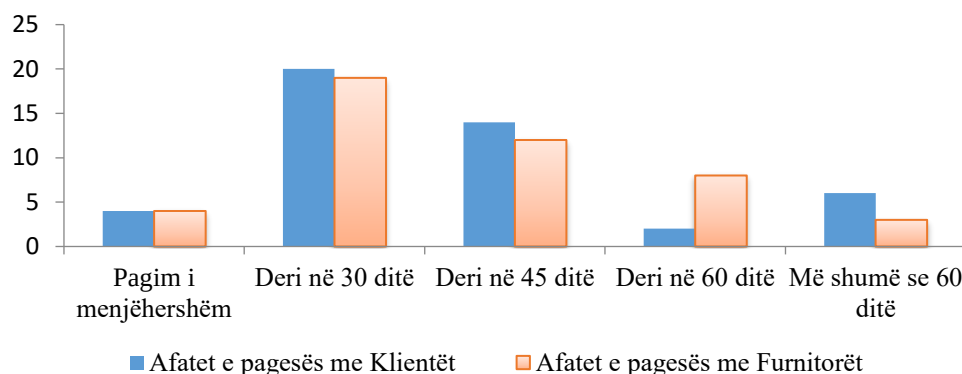


Figura 7 - Afatet e pagesës së bizneseve ndaj klientët dhe furnitorëve

Burimi: Llogaritjet e autores sipas pyetësorëve të mbledhur

4.2.2 Analiza statistikore e sektorit të biznesit

Në analizën statistikore të vlerësimit të pyetësorit mbi efektet e luhatjeve të kursit të këmbimit në aktivitetin e bizneseve gjatë 5 viteve të fundit, jemi bazuar në disa lidhje ndërmjet variablaeve më të rëndësishme që janë pjesë e pyetësorit dhe kanë rëndësi në përgjigjen e pyetjeve përbërëse të pyetjes kërkimore shkencore nr.2

H₀: Luhatjet e kursit të këmbimit nuk kanë patur impakt statistikisht të rëndësishëm në performancën e aktivitetit të bizneseve në vend

H_a: Luhatjet e kursit të këmbimit kanë patur impakt statistikisht të rëndësishëm në performancën e aktivitetit të bizneseve në vend

Vërtetimi i hipotezës kryesore do të mbështetet tezen që kemi ngritur për studim nëse diferencat ndërmjet dy variablaeve janë statistikisht të rëndësishme ose jo. Për këtë qëllim analizën e kemi strukturuar në ngritjen e 5 nënhipotezave mbështetëse të vërtetimit të hipotezës kryesore.

Nëse diferencat ndërmjet variablaeve nuk janë statistikisht të rëndësishme kjo do të thotë se ndryshimi i njërit variabël nuk ka impakt statistikisht të rëndësishëm në ecurinë e variablës tjetër.

H₀: Diferencat ndërmjet dy variablaeve nuk janë statistikisht të rëndësishme

H_a: Diferencat ndërmjet dy variablaeve janë statistikisht të rëndësishme

H₀₁: Monedha me të cilët kryen shumica e transaksioneve të bizneseve nuk ka lidhje të rëndësishme me monedhën me të cilën bizneset mbajnë kursimet e tyre

H₀₂: Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin që bizneset japin mbi nivelin e përfitueshmërisë si efekti i luhatjeve të kursit të këmbimit.

H₀₃: Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin e performancës së tyre si efekti i fuqizimi të monedhës europiane.

H₀₄: Lloji i aktivitetit që bizneset ushtrojnë nuk ka lidhje të rëndësishme me vlerësimin e performancës së tyre si efekti i fuqizimi të monedhës amerikane.

H₀₅: Afati kohor i pagesës së klientëve nuk ka lidhje të rëndësishme me afatin kohor të pagesës së furnitorëve të bizneseve

Në testimin e lidhjeve të shprehura si më sipër, kemi përdor rezultatet e koeficientit të korrelacionit të Pearson Chi-Square dhe rezultatit të p-value për secilën me një rëndësi statistikore 5 %.

Tabela 4.19 - Lidhja midis variablaeve mikroekonomikë

Nënhipotezat	Pearson Chi-Sq.	p-value	Rezultati
H₀₁	36.937	0.000	Nuk Vërtetohet
H₀₂	6.867	0.143	Vërtetohet
H₀₃	17.542	0.007	Nuk Vërtetohet
H₀₄	14.729	0.022	Nuk Vërtetohet
H₀₅		0.000	Nuk Vërtetohet

Burimi: Logaritjet e autoressipas programit statistikor Eviews 9.5

Duke iu referuar tabelës 4.19 e cila është një përmbledhje e rezultateve të testit të Pearson Chi-square me vlerat e koeficientit të tij dhe rezultatit të p-value. Mbi bazën e këtyre rezultateve kemi gjykuar mbi rëndësinë statistikore të lidhjeve të ndërtuara ndërmjet variablaeve më të rëndësishme të pyetësorit dhe që nëpërmjet tyre ne vlerësojmë impaktin e luhatjeve kursit të këmbimit

të monedhave të huaja më të përdorura ndaj monedhës vendase.

Rezultatet e analizës së sektorit të biznesit

Në realitet studimi i luhatjes së kursit të këmbimit në aktivitetin operativ të disa bizneseve që operojnë në qarkun e Tiranës, nuk ishte qëllimi primar i studimit por një pikë mbështetëse e analizës ekonomike që zhvilluam mbi impaktin që kishte RER në disa faktorë ekonomik – financiarë në vend. Dukeqënëse sektori privat është sektori me rëndësi të veçantë dhe peshë kryesore në zhvillimin ekonomik në vend, vazhdimisht i duhet kushtuar rëndësi dhe mbështetje si gjatë procedurave administrative po ashtu dhe në mbështetje financiare, përfshirjen në procese vendim-marrëse etj.

Pyetësori u hartua me përmbajtje pyetje cilësore me një vërshtim të përgjithshëm të ecurisë së aktivitetit operativ të bizneseve të cilët operojnë në tregun ndërkombëtar periudhën 2005-2015. Qëllimi kryesor i pyetësorit ishte që këto biznese të shprehnin eksperiencën e tyre për nivelin e përfitueshmërisë si efekt i luhatjes së kursit të këmbimit, marëdhëniet dhe vlerësimet që kishin për monedhat e huaja më të përdorura në transaksionet e tyre dhe pjesën e menaxhimit të aftësisë likuiduese të tyre.

Nga analiza e variablave kryesore të pyetësorit dhe ngritjes së disa nënhipotezave me ndërtimin e lidhjeve mes tyre nëse ekzistonin diferenca statistikisht të rëndësishme apo jo, ka rezultuar se:

☞ Së pari, bizneset të cilat përdorin vetëm monedhën usd amerikan në transaksione (që përbëjnë vetëm 8.7% të të anketuarëve) pohojnë se kursimet e tyre i mbajnë pothuaj në mënyrë të barabartë si në usd edhe në eur. Ndërsa nuk ndodh ky proporcion me ato biznese që për volumin më të madh të transaksioneve përdoin vetëm euro (që përbëjnë rreth 61 % të të anketuarëve) sepse 50 % e tyre operojnë dhe kursejnë në euro. Gjithashtu duke vlerësuar edhe përgjigjet e bizneseve që operojnë me të dy monedhat, vetëm 19 % mbajnë kursimet në të dy monedhat dhe rreth 11 % kursejnë vetëm në euro. Si rezultat, pjesa më e madhe e bizneseve të anketuar përdorin monedhën europiane në transaksione të tyre dhe në total mbi 61 % e këtyre bizneseve preferojnë të kursejnë në monedhën europiane.

☞ Së dyti, lloji i aktivitetit të ushtruar nga bizneset e anketuar (përqëndruar vetëm në eksport, vetëm në import apo ushtrimin e të dyjave) ka influencë në vlerësimet mbi nivelin e përfitueshmërisë së këtyre bizneseve si rezultat i luhatjeve të kursit të këmbimit të monedhës vendase me monedhat e huaja më të përdorura (euro dhe usd).

☞ Nga bizneset eksportuese që përbëjnë 17.4 % të të anketuarëve, vlerësojnë se:

○ 8.7 % e tyre kanë patur një rritje në nivelin e përfitueshmërisë si rezultat i luhatjeve të vlerësimit të monedhës vendase krahasuar me monedhat e huaja më të përdorura gjatë pesë viteve të fundit të ushtrimit të aktivitetit.

○ % vlerësojnë se niveli i përfitueshmërisë ka qënë në rënie dhe po kaq të anketuar vlerësojnë se luhatja e kursit të këmbimit nuk ka patur efekt domethënës në nivelin e përfitueshmërisë sepse ata kanë ruajtur një nivel të qëndrueshëm gjatë gjithë periudhës.

☞ Nga bizneset importuese që përbëjnë 52.2 % të të anketuarëve, vlerësojnë se:

○ Rreth 24 % e tyre kanë patur një performancë jo të mirë, duke shënuar rënie të niveli të përfitueshmërisë si efekt i luhatjes së kursit të këmbimit në treg

○ Për 17.4 % të bizneseve përfitimi vjetor ka ruajtur të njëjtat marzhe dhe nuk është ndikuar nga vlerësimi i monedhës

Për pjesën tjetër rreth 11 % e bizneseve përfitimi i tyre ka qënë në rritje

☞ Për bizneset që ushtronjë aktivitet importues dhe eksportues së bashku,

○ Rreth 17.5 % e tyre vlerësojnë se impakti i luhatjeve të kursit të këmbimit në treg ka qënë pozitiv duke shënuar rritje të përfitueshmërisë vjetore.

○ Dhe 11 % e tyre pohojnë të kundërtën, pra rënie të niveli të përfitueshmërisë.

Sa i përket këtij grupi biznesesh që ushtronjë të dyja aktivitetet, por pa i specifikuar se cilat transaksione zenë peshën më të madhe në totalin e trasaksioneve ndërkombëtare, mund të vlerësojmë se keto biznese më shumë kanë eksportuar sesa importuar (megjithëse diferenca janë të vogla).

Si rezultat, aktiviteti i bizneseve vendase është përqëndruar më shumë në importim të mallrave dhe produkteve dhe efekti i luhatjes së vlerës së monedhës vendase ndaj monedhave të huaja është vlerësuar të ketë sjellë rënie të nivelit të përfitueshmërisë vjetore gjatë periudhës së studimit (dhe rritje për bizneset eksportuese). Kjo do të thotë se Leku ka treguar pozita të qëndrueshme dhe mbiçmuese ndaj monedhës euro dhe usd amerikan si monedhat më të përdorura në tregun valutor.

☞ Së treti, me qëllim që të kishim një vlerësim më të ndarë të impaktit që ka luhatja e secilës monedhë të huaj mbi performancën e aktivitetit të bizneseve të anketuara, testuam rëndësinë statistikore të lidhjeve nëse lloji i aktivitetit që ushtrohet në importim apo eksportim të mallrave është i influencuar më shumë nga fuqizimi i euros apo dollarit amerikan. Teorikisht, fuqizimi i monedhave të huaja (ose zhvlerësimi i monedhës vendase) do të çojë në fitime më të ulta për importuesit dhe fitime më të larta për eksportuesit.

Si rezultat për grupin e bizneseve të anketuar që vetëm eksportojnë mallra dhe produkte vendase, peshën më të madhe në transaksionet e aktivitetit të tyre e ka patur monedha europiane fuqizimi i së cilës ka zhvlerësuar lekun shqiptar. Ky zhvlerësim monedhës vendase ul kostot (që realizohen në lekë) dhe rrit të ardhurat (që realizohen në euro). Ndërsa niveli i fuqizimit të usd ndaj lekut ka qënë më pak i ndjeshëm për këto biznese sepse 13 % e tyre (që përbën dhe shumicën) vlerësojnë se kjo luhatje nuk ka ndikuar fare në performancën e aktivitetit të tyre.

Për bizneset që importojnë vlerësimi që kanë për fuqizimin e monedhës europiane është i shpërndarë pothuaj proporcionalisht sepse 13 % e tyre pohojnë se zhvlerësimi i lekut ndaj euros ka sjellë ulje të përfitimeve, një performancë më të ulët (apo tkurrje) të aktivitetit. Ndërsa 19.2 % e këtyre bizneseve vlerësojnë se fuqizimi i usd amerikan i ka sjellë ulje të performancës së aktivitetit. Pra, pesha e luhatjeve të kursit të këmbimit Lek/Usd ka qënë me e ndjeshme në performancën e aktivitetit sesa luhatjet e kursit të këmbimit Lek/Euro. Këto luhatje i vlerësojnë më

shumë bizneset importuese të cilat të ardhurat i realizojnë në lekë dhe shpënzimet i kanë në monedhë të huaj. Fuqizimi i monedhave të huaja për ta përbën kosto më të larta (sepse blejnë monedhë të huaj në vend me një çmim më të lartë) dhe ulje të të ardhurave të cilat i realizojnë në lekë.

Ndërkohë, sipas pohimeve se fuqizimi i monedhës së huaj nuk ka ndikuar fare në performancën e aktivitetit por ka vijuar me një ecuri të qëndrueshme, tregon rëndësinë e impaktit të niveli të luhatjes së kursit të këmbimit në treg. Si rezultat, nuk ka ndikuar për 15.2 % të bizneseve importuese luhatja e euros dhe për rreth 11 % të tyre luhatja e usd. Sipas këtij rezultati vlerësojmë se monedha euro ka patur një nivel luhatje më të qëndrueshëm dhe më marzh më të ulët të shmangies sesa monedha usd ndaj monedhës vendase. dollari amerikan ka treguar se ka patur divergjencë në marzhe më të larta (sesa euro) ndaj lekut.

Gjithashtu rezultoni se këto biznese janë treguar të kujdesshme në vlerësimin e monedhës vendase dhe me qëllim ruajtjen e performancës së mirë të aktivitetit të tyre kanë ndërmarrë politika të reja përmirësuese.

☞ Së fundmi, në vlerësimin e politikës së kreditimit të kompanisë, menaxhimit të marëdhënieve likujduese ndërmjet furnitorëve dhe klientëve, ka rezultuar lidhje pozitive dhe statistikisht e rëndësishme, e cila shkon në një linjë të drejtë afate të gjata në blerje shoqërohen me afate të gjata në shitje.

KONKLuzionet

Me qëllim vërtetimin e hipotezave të ngritura për këtë studim si dhe metodave të zbatuara dhe analizuara rendisim si më poshtë konkluzionet e punimit:

☞ Rezultatet empirike tregojnë se kursi i këmbimit në Shqipëri përgjatë periudhës 2005 – 2015 ka qënë i luhatur / shmangur nga niveli i tij ekulibër. Sipas RER të vlerësuar me metodën e sjelljes së ekulibrit të kursit të këmbimit rezultoni se vazhdimisht ky kurs ka qënë me periudha nënvlerësimi dhe mbivlerësimi por niveli i shmangies nuk i ka kaluar 2 % nga niveli aktual i kursit të këmbimit.

☞ Rezultatet e studimit tregojnë se kursi i këmbimit ka patur impakt statistikisht të rëndësishëm (me një nivel besueshmërie 95 %) në dy faktorë: prodhimin e përgjithshëm në vend si edhe në nivelin e eksporteve të mallrave dhe produkteve vendase.

☞ Ndërsa me një nivel rëndësie 10 % kursi i këmbimit ka patur impakt të rëndësishëm në nivelin e ofertës monetare në treg dhe në nivelin e kreditimit në valutë të huaj nga sektori bankar.

Nga testimi i lidhjeve të pyetjeve më të rëndësishme të pyetësorit me qëllim studimin e impaktit të luhatjes së kursit të këmbimit në aktivitetin e bizneseve që operojnë në vend gjatë periudhës 2005 – 2015, rezultoni të jetë:

☞ Së pari, në testimin e lidhjes nëse monedha me të cilën bizneset mbanë kursimet e tyre ka lidhje të rëndësishme me monedhën me të cilën boneset operojnë rezultoni se: Pjesa më e madhe e bizneseve të anketuar përdorin monedhën europiane në transaksione të tyre dhe në total mbi 61 % e këtyre bizneseve preferojnë të kursejnë në monedhën europiane. Kjo do të thotë se monedha me të cilën bizneset kursejnë nuk

influencohet nga monedha me të cilat ata realizojnë transaksionet.

☞ Së dyti, në testimin e lidhjes nëse vlerësimi i impaktit të luhatjes së RER në ecurinë e aktivitetit ka lidhje statistikisht të rëndësishme me llojin e aktivitetit të ushtruar (import, eksport apo të dyja) rezultoni se: Aktiviteti i bizneseve vendase është përqëndruar më shumë në importim të mallrave dhe produkteve dhe efekti i luhatjes së vlerës së monedhës vendase ndaj monedhave të huaja është vlerësuar të ketë sjellë rënie të nivelit të përfitueshmërisë vjetore gjatë periudhës së studimit (dhe rritje për bizneset eksportuese). Kjo do të thotë se Leku ka treguar pozita të qëndrueshme dhe mbijmuese ndaj monedhës euro dhe usd amerikan si monedhat më të përdorura në tregun valutor.

☞ Së treti, me qëllim që të kishim një vlerësim më specifik për secilën monedhë të huaj (euro dhe usd amerikan) testuam rëndësinë statistikore të lidhjeve nëse lloji i aktivitetit që ushtrohet në importim apo eksportim të mallrave është i influencuar më shumë nga fuqizimi i euros apo dollarit amerikan.

○ Si rezultat për grupin e bizneseve të anketuar që vetëm eksportojnë peshën më të madhe në transaksionet e aktivitetit të tyre e ka patur monedha europiane fuqizimi i së cilës ka zhvlerësuar lekun shqiptar. Ky zhvlerësim monedhës vendase ul kostot (që realizohen në lekë) dhe rrit të ardhurat (që realizohen në euro). Ndërsa niveli i fuqizimit të usd ndaj lekut ka qënë më pak i ndjeshëm për këto biznese sepse 13 % e tyre (që përbën dhe shumicën) vlerësojnë se kjo luhatje nuk ka ndikuar fare në performancën e aktivitetit të tyre.

○ Për bizneset që importojnë vlerësimi që kanë për fuqizimin e monedhës europiane është i shpërndarë pothuaj proporcionalisht sepse 13 % e tyre pohojnë se zhvlerësimi i lekut ndaj euros ka sjellë ulje të përfitimeve, një performancë më të ulët (apo turrje) të aktivitetit.

Pra, pesha e luhatjeve të kursit të këmbimit Lek / Usd ka qënë me e ndjeshme në performancën e aktiviteve sesa luhatjet e kursit të këmbimit Lek / Euro.

Kursi i këmbimit Lekë / Euro ka patur një nivel luhatje më të qëndrueshëm dhe më marzh më të ulët të shmangies sesa kursi i këmbimit Lekë / Usd.

Këto luhatje i vlerësojnë më shumë bizneset importuese (zenë pjesën më të madhe) sepse fuqizimi i monedhave të huaja për ta përbën kosto më të larta dhe ulje të të ardhurave (të cilat i realizojnë në lekë).

Gjithashtu rezultoni se këto biznese janë treguar të kujdesshme në vlerësimin e monedhës vendase dhe me qëllim ruajtjen e performancës së mirë të aktivitetit të tyre kanë ndërmarrë politika të reja përmirësuese.

☞ Së katërti, në vlerësimin e politikës së kreditimit të kompanisë, menaxhimit të marëdhënieve likujduese ndërmjet furnitorëve dhe klientëve, ka rezultuar lidhje pozitive dhe statistikisht e rëndësishme, e cila shkon në një linjë të drejtë dhe nënkupton se afate të gjata në blerje shoqërohen me afate të gjata në shitje.

KUFIZIMET E STUDIMIT DHE REKOMANDIMET PËR PUNIME TË MËTEJSHME NË KËTË FUSHË

Sigurisht që çdo punim apo analizë empirike ka kufizimet e saj për të cilën krijohen gjithmonë hapësira për studime të tjera më specifike apo qoftë edhe më të zgjeruara. Edhe në këtë punim u ndeshëm me disa kufizime mbi të cilat japim edhe rekomandime për përmirësime të mëtejshme:

 Analiza e modelit mbetet e kufizuar për vetë numrin e faktorëve ekonomikë të përfshirë në model. Si edhe vlefshmëria e rezultateve mbetet vetëm në kuadrin e këtyre faktorëve të studiuar si edhe periudhës së përfshirë në studim. Modeli sugjerohet të zbatohet duke përfshirë edhe faktorë të tjerë makroekonomikë siç mund të rekomandojmë: remitancat, normat e interesit të tregut, investimet e huaja, etj.

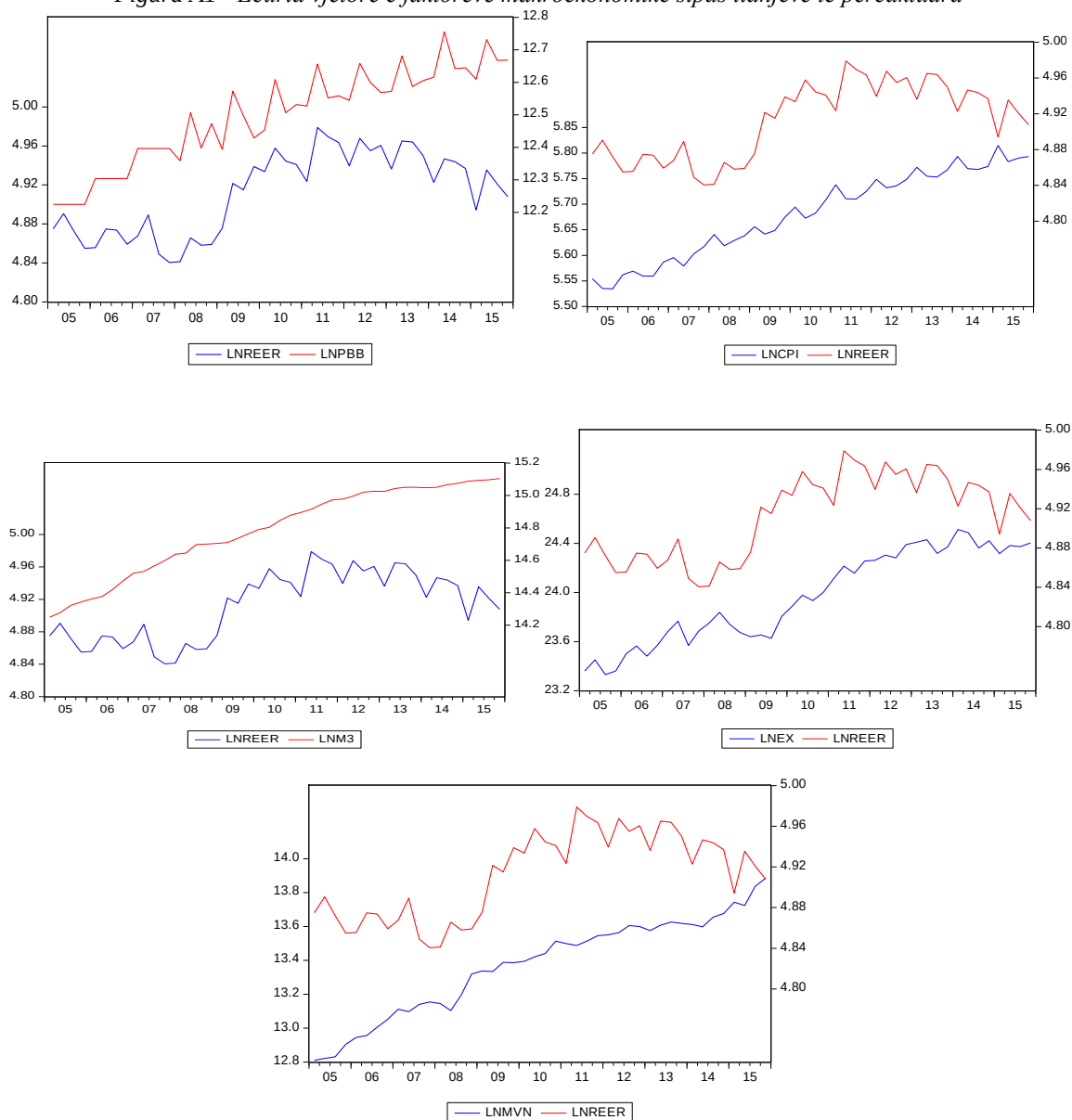
 Analiza e sektorit të biznesit ishte si rezultat i një vlerësimi me të dhëna cilësore dhe jo sasiore, kjo mund të na kufizojë në nivelin e sigurisë mbi besueshmërinë e rezultateve. Por ne nuk insistuam në

të dhëna sasiore sepse impakti i RER në biznese nuk ishte objektiv primar i studimit tonë.

 Mostra e limituar e subjekteve që u treguan të gatshëm të bashkëpunon për këtë studim, e përbërë prej rreth 100 firmash në lokalizuar në qarkun e Tiranës dhe me aktivitet ndërkombëtar, ka limituar vlerësimet e plota të impaktit të RER në këtë sektor.

Rekomandohet që nëse bëhet një studim i impaktit të luhatjeve të RER në sektorin e ndërmarrjeve të mesme dhe të mëdha që ushtojnë aktivitet ndërkombëtar, të grumbullohen të dhëna sasiore për ndërtimin e treguesëve financiarë, të synohet zgjerimi i mostrës në të gjithë Shqipërinë dhe zgjerimi i periudhës së studimit. Sigurisht që kjo çështje e limituar në studimin tonë duke marrë dimensionet më të mëdha, më specifike e konkrete do të përbëjë një temë shumë aktuale dhe të plotë studimi. Pse jo kjo mbetet si një objektiv në studime të mëtejshme post doktorale

Figura A1 - Ecuria vjetore e faktorëve makroekonomike sipas lidhjeve të përcaktuara



Burimi: Sipas përlllogaritjeve të autores dhe përdorimi të sistemit EvieWs

Tabelat A18 – Rezultatet e analizës në nivelin mikroekonomik për çdo lidhje të përcaktuar

Së pari:

Cila është monedha me të cilën operoni më shpesh? dhe Në ç'monedhë preferoni të mbani më shumë kursimet tuaja?

Crosstabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.937 ^a	6	.000
Likelihood Ratio	26.179	6	.000
Linear-by-Linear Association	15.265	1	.000
N of Valid Cases	46		

a. 9 cells (75.0%) have expected count less than 5. The minimum expected count is .17.

Së dyti:

vlërësoni përfitueshmërinë nga luhatjet e kursit të këmbimit në treg (në 5 vitet e fundit)

Aktiviteti i biznesit tuaj është përqëndruar më shumë në importe, eksporte apo të dyja dhe Si e

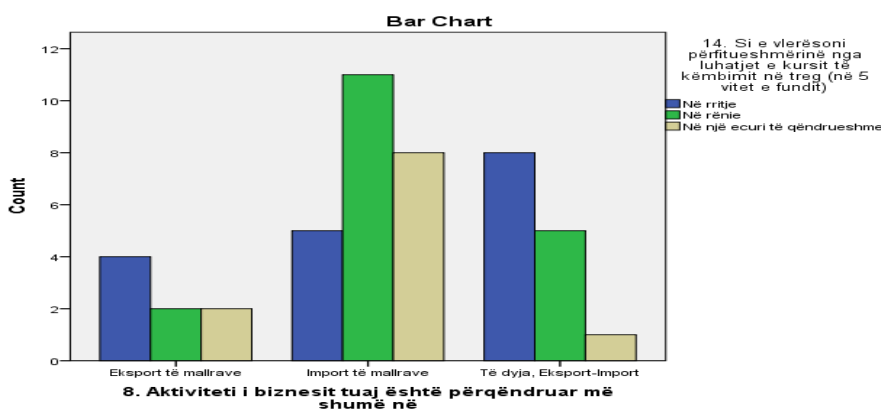
Crosstabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.867 ^a	4	.143
Likelihood Ratio	7.508	4	.111
Linear-by-Linear Association	1.386	1	.239
N of Valid Cases	46		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is 1.91.

Grafiku 1 – Rezultatet e lidhjes së dytë të dy variabla të zgjedhur



Së treti:

monedhës Euro këto 5 vitet e fundit ndaj monedhës vendase.

Aktiviteti i biznesit tuaj është përqëndruar më shumë në ... dhe Si ka ndikuar tek ju fuqizimi i

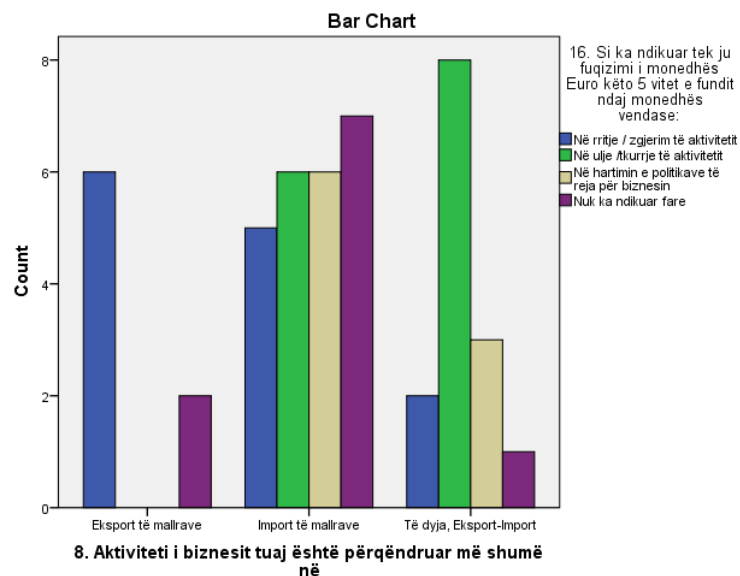
Crosstabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.542 ^a	6	.007
Likelihood Ratio	19.588	6	.003
Linear-by-Linear Association	.319	1	.572
N of Valid Cases	46		

a. 9 cells (75.0%) have expected count less than 5. The minimum expected count is 1.57.

Grafiku 2 – Rezultatet e lidhjes së tretë të dy variabla të zgjedhur



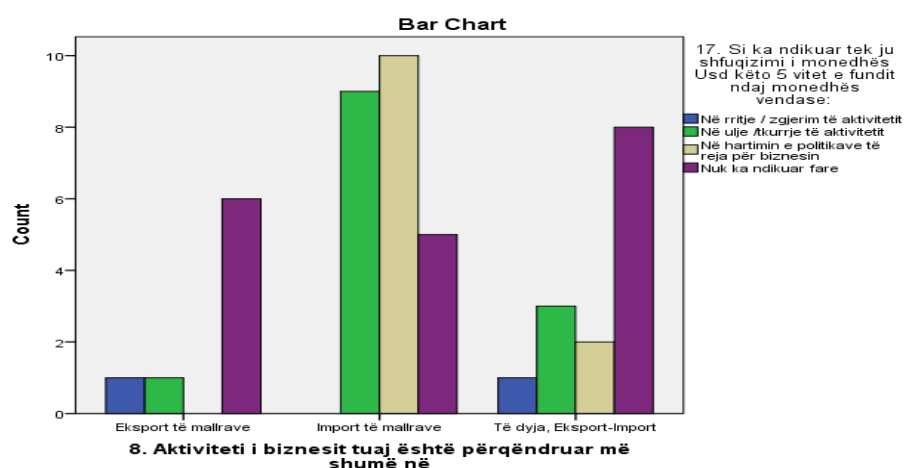
Së katërti; monedhës *Usd* këto 5 vitet e fundit ndaj monedhës
 Aktiviteti i biznesit tuaj është përqëndruar më vendase
 shumë në... dhe Si ka ndikuar tek ju shfuqizimi i

Crosstabulation
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.729 ^a	6	.022
Likelihood Ratio	17.369	6	.008
Linear-by-Linear Association	.004	1	.952
N of Valid Cases	46		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .35.

Grafiku 3 – Rezultatet e lidhjes së katërt të dy variablave të zgjedhur



Së pesti:

Politikat e kreditimit të kompanisë dhe A ka lidhje midis afateve të pagesës së furinitorëve dhe politikës së arkëtimeve?

Correlations

		22. Afatet e pagesës që ju aplikoni me Klientët tuaj janë:	23. Afatet e pagesës që ju keni vendosur me Furnitorët tuaj janë:
Spearman's rho	22. Afatet e pagesës që ju aplikoni me Klientët tuaj janë: Sig. (2-tailed)	1.000	.686**
	N	46	46
	23. Afatet e pagesës që ju keni vendosur me Furnitorët tuaj janë: Sig. (2-tailed)	.686**	1.000
	N	46	46

** . Correlation is significant at the 0.01 level (2-tailed).

References:

1. (n.d.). "Money, Exchange Rates and Purchasing Power Parity" Lecture 7.
2. Aberola, E., & Navia, D. (2007). "Equilibrium exchange rates in the new EU members: external imbalances vs real convergence". Spain: Banco de Espana No.0708.
3. Ali, T. M., Mahmood, M. T., & Bashir, T. (2015). "Impact of Interest Rate, Inflation and Money Supply on Exchange Rate volatility in Pakistan". *World Applied Sciences Journal*, 33(4), 620-630.
4. Avramovic, D. (1964). "Economic Growth and External Debt". Baltimore: John Hopkins University Press.
5. Baffes, J., Elbadawi, I. A., & O'Connell, A. A. (1997). "Single-Equation Estimation of the Equilibrium Real Exchange Rate". Washington: The World Bank Development Research Group.
6. Banka Botërore. (2015). *Raport i Regullt Ekonomik për Evropën Juglindore-"Përballimi i përmbytjeve, forcimi i rritjes"*. Banka Ndërkombëtare për Rindërtim dhe Zhvillim / Banka Botërore.
7. Banka e Shqipërisë. (2007). "Deklarata e Politikës Monetare të Bankës së Shqipërisë për 6-m e dytë të vitit 2007". Tiranë: Banka e Shqipërisë.
8. Banka e Shqipërisë. (2009). "Deklarata e Politikës Monetare për 6-m e dytë 2009". Tiranë: Banka e Shqipërisë.
9. Banka e Shqipërisë. (2009). "Raporti i Stabilitetit Financiar". Tiranë: Banka e Shqipërisë.
10. Banka e Shqipërisë. (2013). "Raporti i politikës monetare për 3m e katërt të vitit 2013". Tiranë: Banka e Shqipërisë.
11. Banka e Shqipërisë. (2015). "Dokumenti i Politikës Monetare". Tiranë: Banka e Shqipërisë.
12. Banka e Shqipërisë. (2015). "Raporti i Politikës Monetare për 3-m e katërt të vitit 2015". Tiranë: Banka e Shqipërisë.
13. Bayoumi, T., Clark, P. B., Symansky, S., & Taylor, M. (1994). "The Robustness of Equilibrium Exchange Rate Calculations to Alternative Assumptions and Methodologies". In J. Williamson, *Estimating Equilibrium Exchange Rates*. Washington: Institute for International Economics.
14. Bollano, J., & Ibrahimaj, D. (2013). "Kursi Real Efektiv i Këmbimit për vendet e Rajonit: Ndërtimi i një baze të dhënash". *Buletini i Bankës së Shqipërisë*, 2, pp. 135-156.
15. Bunesco, L. (2014). "The impact of the debt on exchange rate variation in Romania". *Economics and Sociology*, 7(3), 104-115.
16. Cakrani, E. (2014). "Kursi real i këmbimit dhe ndikimi i tij në ekonomi: Rasti i Shqipërisë". Tiranë: Phd Disertacion, Universiteti i Tiranës.
17. Cakrani, E., Koprencka, L., & Resulaj, P. (2013). "Do Migrant Transfers cause Dutch disease in Albania?". *International Conference on Economic and Social Studies*. Saajevo: ICESoS.
18. Cassino, E., & Oxley, D. (2013). "How does the exchange rate affect the real economy? A literature Survey". New Zealand Treasury Working Paper.
19. Çeliku, E., & Metani, I. (2011). "Pozicioni konkurrues i ekonomisë shqiptare në terma të produktivitetit e të kostos së punës". Tiranë: Banka e Shqipërisë.
20. Chatterjee, S., & Mursagulov, A. (2012). "Fiscal policy and the Real Exchange Rate". IMF Working Paper.
21. Chin, L., & Chee-Hong, L. (2013). "The effects on Trade Openness on Malaysian Exchange Rate". Faculty of Economics and Management, Universiti Putra Malaysia., Department of Economics. Munich personal RePEc Archive Paper.
22. Choudhri, E., & Khan, M. (2005). "Real Exchange Rates in Developing Countries: Are Balassa Samuelson Effects Present?". *IMF Staff Papers*, 52(3), pp. 388-409.
23. Clark, P. B., & MacDonald, R. (1998). "Exchange Rates and Economic Fundamentals: A Methodological Comparison of BEERs and FEERs". IMF Working Paper.
24. Clark, P. B., & MacDonald, R. (2000). "Filtering the BEER: A Permanent and Transitory Decomposition". IMF Working Paper, Research Department.
25. Clark, P., & MacDonald, R. (1999). "Exchange Rates and Economic Fundamentals: A Methodological Comparison of BEERs and FEERs". In R. MacDonald, & J. Stein, *Chapter 10 in Equilibrium Exchange Rates*. London, UK: Kluwer Academic Publishers.,
26. Clark, P., Bartolini, L., Bayoumi, T., & Symansky, S. (1994). "Exchange Rates and Economic Fundamentals: A Framework for Analysis".
27. Connolly, M., & Devereux, J. (1995). "The Equilibrium Real Exchange Rate: Theory and Evidence

for Latin America'. In J. L. Stein, & P. R. Allen, *Fundamental Determinants of Exchange Rates* (pp. 154-81). New York: Oxford University Press.

28. Coudert, V. (2004, February). "Measuring the Balassa-Samuelson effect for the countries of Central and Eastern Europe?". *Banque De France Bulletin Digest*, pp. 23-43.

29. Coudert, V. (2004). *"Measuring the Balassa-Samuelson effect for the countries of Central and Eastern Europe"*. France: Banque de France Monthly Digest No. 122.

30. De Gregorio, J., Giovannini, A., & Wolf, H. (1994). "International Evidence on Tradables and Nontradables Inflation". *European Economic Review*, 38, 1225-1244.

31. Departamenti i Stabilitetit Financiar dhe i Statistikave. (2015). *"Pozicioni i Investimeve Ndërkombëtare"*. Tiranë: Banka e Shqipërisë.

32. Detken, C., Alistair, D., Jerome, H., Smets, F., & Carmen, M. (2002). "Determinants of the Effective Real Exchange Rate of the Synthetic Euro: Alternative Methodological Approaches". *Australian Economic Papers*, 41, 404-441.

33. Dias, P., & MacDonald, R. (2007). *"Behavioural equilibrium exchange rates estimates and implied exchange rate adjustments for ten countries"*. Washington DC: Peterson Institute of.

34. Dornbusch, R. (1984, April). *"External Debt, Budget deficits and Equilibrium Exchange Rates"*. Massachusetts Avenue Cambridge: National Bureau of Economic Research.

35. Driver, P. B., & Westaway, P. F. (2004). *"Concepts of Equilibrium Exchange Rates"*. Bank of England Working Paper(248).

36. Edwards, S. (1987). *"Exchange Rate Misalignments in Developing Countries"*. University of California. Los Angeles: National Bureau of Economic Research.

37. Edwards, S. (1989). "Real Exchange Rates in the Developing Countries: Concepts and Measurement". *National Bureau of Economic Research*(2950).

38. Edwards, S. (1993). "Openness, Trade Liberalization and Growth in Developing Countries". *Journal of Economic Literature*, 1358-93.

39. Edwards, S., & Ahmed, L. (1986). "Economic Adjustment and Exchange Rates in Developing Countries".

40. Edwards, S., & Savastano, M. A. (1999). *"Exchange rates in emerging economies: What do we know? What do we need to know?"*. Cambridge: NBER Working Paper Series.

41. Egert, B., & MacDonald, R. (2006). *"Monetary transmission mechanism in transition economies: surveying the surveyable"*. CESIFO working paper.

42. Egert, B., Lommatzsch, K., & Lahreche-Revil, A. (2007). "Real Exchange Rates in Small open OECD and Transition Economies: Comparing apples with oranges?". *Cesifo Working Paper*(1928).

43. Eichengreen, B., & Gupta, P. (2006, January 18). *"The real exchange rate and export growth: Are services different?"*. Retrieved January 18, 2013, from CEPR's Policy Portal: [http://voxeu.org/article/real-](http://voxeu.org/article/real-exchange-rate-and-export-growth-are-services-different)

[exchange-rate-and-export-growth-are-services-different](http://voxeu.org/article/real-exchange-rate-and-export-growth-are-services-different)

44. Elbadawi, I. A. (1994). "Estimating long-Run Equilibrium Real Exchange Rates". In J. Williamson, *Estimating Equilibrium Exchange Rates* (pp. 93-131). Washington DC: Institute for International Economics.

45. Farquee, H. (1995). "Long-Run Determinants of the Real Exchange Rate: A Stock-Flow Perspective". *IMF Staff Papers*, 42, 80-107.

46. Fejzo, R. (2007). "Një vështrim analizues i shërve kohore të depozitave, kredive dhe mjeteve valutore neto të Bankës së Shqipërisë". *Artikuj të botuar në buletin ekonomik të Bankës së Shqipërisë gjatë një dekade*, 149-179.

47. Frankel, J. A., & Rose, A. K. (1994). "A Survey of Empirical Research on nominal exchange rates". *NBER Working Paper*.

48. Frenkel, J., & Mussa, M. (1986). "Assets Markets, Exchange rates and the Balance of Payments". In E. Grossman, & K. Rogoff, *Handbook of International Economics* (p. 1986). Amsterdam: North Holland.

49. Gastyan, V., & Lane, P. (2008). *"The composition of Government Spending and the Real Exchange Rate"*. Dublin: Trinity College.

50. Goldberg, L. S. (2005). *"Exchange Rates and Foreign Direct Investment"*. New York: Princeton Encyclopedia of the World Economy, Princeton University Press.

51. Goldstein, M., & Officer, L. H. (1979). "New measures of prices and productivity for tradable and nontradable goods". *International Association for Research and Income and Wealth*, 413-427.

52. Grupi i Bankës Botërore. (2015). *"Kudri i partneritetit i Bankës Ndërkombëtare për Rindërtim dhe Zhvillim, Korporatës Ndërkombëtare Financiare dhe Agjensië shumëpalëshe të garantimit të Investimeve për periudhën 2015-2019"*. Tiranë: Banka Botërore.

53. Hassan, G. M., & Holmes, M. J. (2010). *"Remittances and the Real Effective Exchange Rate"*. Hamilton, New Zealand: Department of Economics, University of Waikato.

54. Hinkle, L. E., & Nsengiyumva, F. (2001). "External Real Exchange Rates: Purchasing Power Parity, the Mundell-Fleming Model, and Competitiveness in Traded Goods". In L. E. Hinkle, & P. J. Montiel, *Exchange Rate Misalignment- Concepts and Measurement for Developing Countries* (p. 41). New York: Oxford University Press Inc.

55. Hoda, B. (2012). *"Kursi ekuilibër i këmbimit në njw ekonomi në zhvillim"*. Tiranë: Banka e Shqipërisë.

56. Howells, P., & Bain, K. (2007). *"Financial Markets and Institutions" - Foreign exchange markets* (5th ed.). England: Pearson Education Limited.

57. IMF. (2010). *"The Equilibrium Exchange Rate: Alternative Concepts and their Applications in IMF Surveillance"*. IMF.

58. Isard, P., & Faruquee, H. (1998). *"Exchange Rate Assessment: Extensions of the Macroeconomic Balance Approach"*. Washington DC: IMF Occasional Paper No 167.

59. Jaupllari, S. (2014). *"Tregtia e jashtme dhe zhvillimi ekonomik në ndikimin e proceseve liberalizuese: Rasti i Shqipërisë"*. Tiranë: Univestiteti i Tiranës, Fakulteti i Ekonomisë.
60. Juselius, K. (2006). *"The Cointegrated VAR Model: Methodology and Applications"*. Oxford: Oxford University Press.
61. Lafrance, R., & St-Amant, P. (1999). *"Real Exchange Rate Indexes for the Canadian Dollar"*. Canada: Bank of Canada Review.
62. Lane, P. R., & Milesi-Ferreti, G. M. (2004). "The transfer problem revisited: net foreign assets and real exchange rates". *The Review of Economics and Statistics*, LXXXVI(4), 841-857.
63. Levin, J. H. (1997). "Monety Supply Growth and Exchange Rate". *Journal of Economic Integration*, 344-358.
64. Lutkepohl, H., Saikkonen, P., & Trenkler, C. (2000). *"Maximum Eigenvalue Versus Trace Tests for the Cointegrating Rank of a VAR Process"*. Germany: Humboldt Universitat, Institut fur Statistik und Okonometrie, Berlin.
65. Lutkepohl, H., Trenkler, C., & Saikkonen, P. (2000). *"Maximum Eigenvalue versus Trace tests for the Cointegrating rank of a VAR process"*. Berlin: Humboldt University Berlin.
66. MacDonald, R. (2000). *"Concepts to calculate equilibrium Exchange Rates: An overview"*. Germany: Economic Research Group of Deutsche Bundesbank.
67. MacDonald, R., & Clark, P. (2000). *"Filtering the BEER: A Permanent and Transitory Decomposition"*. IMF.
68. Madeley, J., & Solagral. (2001). "The Impact of Trade Liberalisation on Food Security in the South". *CIDSE Background Paper*.
69. Madura, J. (2008). *"International Financial Management"* (Vol. 9). USA: Thomson South-Western.
70. Meese, R., & Rogoff, K. (1988). "What is Real? The Exchange Rate-Interest Differential Relation over the modern Floating-Rate period". *The Journal of Finance*, 43(4).
71. Meidani, R. (2010). *"Fazat kryesore të tranzicionit shqiptar (1990-2012)"*. Retrieved 2010, from Shqipëria.com portali shqiptar: <https://www.shqiperia.com>
72. Melvin, M., & Norrbin, S. C. (2013). *"International Money and Finance"* (Vol. 8th). ElsevierInc.
73. Mirzaeenezhad, M. R., Mohammadi, T., & Tabas, H. M. (2012, October). "The effect of the real effective exchange rate fluctuations on macroeconomic indicators (Gross Domestic Product, Inflation and Money Supply). *Interdisciplinary Journal of Contemporary Research in Business*, 4(6), 1079-1103.
74. Mishkin, F., & Eakins, S. (2012). *Financial markets and Institutions*. Pearson Education, Inc.
75. Mitre, O. (2013). *"Performanca e eksporteve në Shqipëri 2005-2015: Përfaqseje CMS"*. Tiranë: Buletini i Bankës së Shqipërisë.
76. Muço, M., & Stavri, A. (2000). *"Bazat teorike të programit monetar"*. Tiranë: Banka e Shqipërisë.
77. Muço, M., Papapanagos, H., & Sanfey, P. (1998). *"The determinants of official and free-market exchange rates in Albania during transition"*.
78. Muço, M., Sanfey, P., & Taci, A. (2003). "Inflacioni, Kurset e këmbimit dhe roli i politikës monetare në Shqipëri". *"Ekonomia Shqiptare : Arritje dhe Sfida"* (pp. 315-334). Sarandë: Banka e Shqipërisë.
79. Muktarbek, A. (2012). *"Remittances and Real Exchange Rate in CIS Countries"*. Budapest, Hungary: Central European University.
80. Mussa, M. (1979). "Empirical regularities in the behavior of exchange rates and theories of the foreign exchange market". *Carnegie-Rochester Conference Series on Public Policy*, 11, pp. 9-57. doi:[https://doi.org/10.1016/0167-2231\(79\)90034-4](https://doi.org/10.1016/0167-2231(79)90034-4).
81. Mussa, M. (1984). "The Theory of Exchange Rate Determination". In J. Bilson, & R. Marston, *Exchange Rate Theory and Practice* (pp. 13-78). Chicago: University of Chicago Press.
82. Rogoff, K. (1996). "The Purchasing Power Parity Puzzle". *Journal of Economic Literature*, 34(2), 647-668.
83. Roudet, S., Saxegaard, M., & Tsangarides, C. G. (2007). *"Estimation of Equilibrium Exchange Rates in the WAEMU: A Robustness Analysis"*. African Department: International Monetary Fund.
84. Saheed, Z. S., Sani, I. E., & Idakwoji, B. O. (2014). "Impact of Public External Debt on Exchange Rate in Nigeria". *International Finance and Banking*, 15-26.
85. Salko, D., Beci, B., & Kodra, K. (2014). "Analizë e ndikimit të kursit të këmbimit, bilancit tregtar dhe çmimeve të konsumit në kuadër të krizës financiare". *Seventh International Conference* (pp. 22-33). Kosovë: Kolegji i Menaxhmentit Internacional "Globus".
86. Sene, B. (2004). "Impact du fardeau virtuel de la dette sur le taux de change réel d'équilibre des pays en développement : un modèle théorique". *EURISCO*.
87. Singer, D. A. (2008). *"Migrant Remittances, Financial Globalization and Exchange Rate Regimes in the Developing World"*. Cambridge: Department of political Science Massachusetts Institute of Technology.
88. Siregar, R. Y. (2011). *"The Concepts of the Equilibrium Exchange Rate: A Survey of Literature"*. Malaysia: The South East Asian Central Banks Research and Training Centre.
89. Taçi, S. (2002). *"Borxhi i Jashtëm i Shqipërisë dhe shërbimi i tij"*. Tiranë: Banka e Shqipërisë.
90. Turner, P., & Van't dack, J. (1993). *"Measuring International price and Cost Competitiveness"*. Bank for International Settlements, Monetary and Economic Department.
91. Vika, I. (2006). *"Kursi Real Efektiv i Këmbimit në Shqipëri, konceptet dhe matja e tij"*. Tiranë: Banka e Shqipërisë.
92. Vika, I., & Luçi, E. (2011). *"Ekulibri i kursit real të këmbimit Lekë-Euro-Sai shmangur është ai?"*. Tiranë: Banka e Shqipërisë.
93. Williamson, J. (1985). "The Exchange Rate System". *Policy Analyses in International Economics*, 5.

94. Williamson, J. (1994). "Estimates of FEERs". *Estimating Equilibrium Exchange Rates*.
95. Wren-Lewis, S., Westway, P., Soteri, S., & Barrell, R. (1991). "Evaluating the U.K.'s Choice of Entry Rate Into the ERM". *Manchester School Supplement*, 59.
96. Xiangming, L. (2003). "Trade Liberalization and Real Exchange Rate movement". IM Working Paper.
97. Yong, C., & Wee Ling, O. (2012). "PPP and the Monetary Model of Exchange-Rate Determination: The Case of Singapore". Nanyang Technological University, Nanyang Business School, Singapore.
98. Zakaria, M., & Ghauri, A. B. (2011). "Trade Openness and Real Exchange Rate: Some evidence from Pakistan". *The Romanian Economic Journal*(39), 201-229.
99. Zhang, Z. (2010). "Understanding the behavioral equilibrium exchange rate model via its application to the valuation of Chinese renminbi". China: Munich Personal RePEc Archive.
100. Zisi, A. (2014). "Ndikimi i Investimeve të Huaja Direkte në rritjen ekonomike dhe Faktorët nxitës në përthithjen e tyre. Rasti i Shqipërisë". Durrës: Universiteti i Aleksandër Moisiu.

GLOBAL FINANCIAL CRISIS: RESPONSES TO STABILIZE ECONOMY

Norchaeva S.

A recent graduate of Westminster International University in Tashkent with First Class Honours

ORCID: 0009-0000-2165-4829

<https://doi.org/10.5281/zenodo.14947175>**Abstract**

The Global Financial Crisis of 2007-2008, often known as the Great Recession, was one of the most catastrophic economic downturns in recent history. This research investigates the influence on major financial indicators, including stock market indices and the London Interbank Offered Rate (LIBOR). The crisis caused huge drops in global financial markets, including important indexes like the Dow Jones Industrial Average, S&P 500, and their overseas counterparts. Investor confidence dropped, leading to lower business investments and consumer spending, worsening the crisis. Simultaneously, LIBOR fluctuated dramatically as banks refused to lend, resulting in a credit liquidity crisis. To address the financial crisis, the United States government employed a variety of intervention tactics, including monetary policies, fiscal stimulus packages, and banking sector rescue initiatives. Measures like the Troubled Asset Relief Program (TARP) and the American Recovery and Reinvestment Act (ARRA) were critical in stabilizing markets and restoring economic confidence. The article also analyzes post-crisis regulatory initiatives, such as the Dodd-Frank Act, which try to prevent future financial crises. Despite early concerns and criticism, these steps helped to ensure the financial system's long-term recovery.

Keywords: Global Financial Crisis, Stock Market Decline, LIBOR Fluctuations , Monetary Policy, Fiscal Stimulus, TARP, ARRA, Financial Regulation

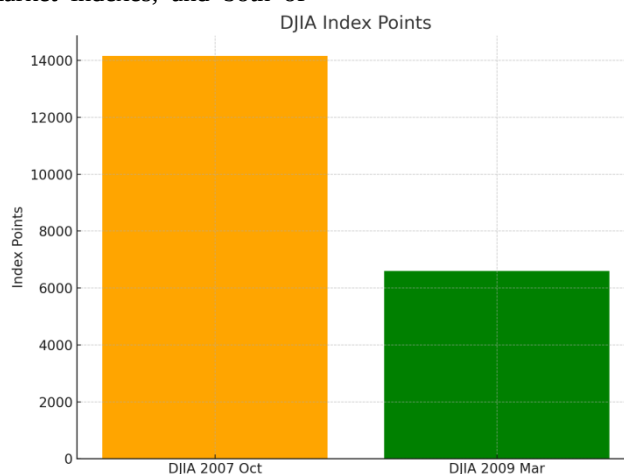
Introduction

After the Great Depression, the Financial crisis which occurred in the late 2000s, also known as Great Recession, is considered to be one of the most serious economic declines in the history. This case affected the whole world, including such industrialised and developed countries as United States as well. The Financial Crisis had a very noticeable impact on many market indicators, mainly Stock Market Index and the London Interbank Offered Rate (LIBOR).

During the period of Financial Crisis, an essential indicator of the economy of finances, the Stock Market Index, experienced a dramatic decline. The Dow Jones Industrial Average (DJIA) and the S&P 500 are the well-known U.S. stock market indexes, and both of

them decreased remarkably during the Great Recession. In October 2007, DJIA (Graph 1) reached its high points of around 14,165 in the US stock market. However, in March 2009, the DJIA experienced a sharp fall of roughly 6,594 points which means by 53.4% (Amadeo, 2019). Most of the big institutions faced the credit crisis which led to the noticeable decline in the housing bubble burst. Furthermore, the investors' confidence in the stock market dropped rapidly. Fluctuations in the stock market were an initial signal for majority of investors and financial markets, and such volatility led the economic crisis to worsen by unconditionally depressing the funds and investments.

Graph 1



Global stock market also experienced similar decline. Admittedly, all financial markets across the world are connected to some extent, and the Financial Crisis had a worldwide effect on them. Especially, the U.S. financial system caused major shockwaves which were incredibly noticeable to all interconnective financial markets. Additionally, some substantial mar-

kets in Asia, Europe and other developing countries declined as well (Board of Governors of the Federal Reserve System, 2020).

The financial crisis not only impacted key stock indexes in the United States, but it also caused huge declines in worldwide financial markets. Because economies are interconnected, investor confidence worsened globally, resulting in a significant drop in stock prices

across several markets. In Europe, the FTSE 100 (United Kingdom), CAC 40 (France), and DAX 30 (Germany) all lost more than 40% between 2007 and 2009. Similarly, markets in Asia, such as the Nikkei 225 (Japan) and the Shanghai Composite Index (China), saw significant drops, owing mostly to lower exports and decreased industrial production.

One of the most direct implications of the stock market drop was a sharp reduction in business investment. As stock prices plunged, businesses struggled to acquire cash through equity markets, resulting in postponed expansion plans, employment freezes, and cost-cutting measures. Furthermore, because stock market performance is directly related to consumer confidence, falling indices resulted in lower consumer spending, exacerbating the economic crisis.

The crisis also exposed serious problems in the financial system, such as poor risk assessment methods, excessive leverage, and regulatory loopholes that allowed institutions to make high-risk bets without proper scrutiny. The fall of Lehman Brothers and the bailout of AIG, among other financial behemoths, highlighted the weaknesses in the global banking system. As stock prices continued to fall, governments and central banks were forced to intervene with extraordinary monetary and fiscal measures to keep financial markets stable.

Although stock markets finally recovered because to bold governmental interventions, the Great Recession had a long-term influence on financial rules. Governments throughout the world implemented tougher financial regulation, such as the Dodd-Frank Act in the United States, to promote more openness and accountability in financial markets, lowering the danger of a similar stock market crash in the future.

Discussion

The Global Financial Crisis (GFC) of 2007-2008 exposed serious flaws in financial markets, notably stock indexes and interbank lending rates. The collapse of the United States housing bubble sparked the crisis, resulting in large losses for financial institutions and the downfall of major banks like Lehman Brothers. Investor confidence plummeted, resulting in global stock market collapses, while the London Interbank Offered Rate (LIBOR) rose owing to a liquidity crunch in banking systems.

Governments responded with strong policies. The United States implemented the Troubled Asset Relief Program (TARP) to stabilize financial institutions and provided liquidity through the Federal Reserve's Quantitative Easing (QE) policy. Furthermore, the American Recovery and Reinvestment Act (ARRA) was passed to spur economic recovery through fiscal stimulation. Despite these initiatives, there have been complaints about their long-term efficacy, particularly considering moral hazard and growing national debt.

Regulatory measures, such as the Dodd-Frank Act, were intended to avoid future financial crises by enhancing transparency and lowering systemic risk. While these policies helped to stabilize the economy, there is ongoing disagreement over their effectiveness in averting future crises and guaranteeing long-term financial resilience.

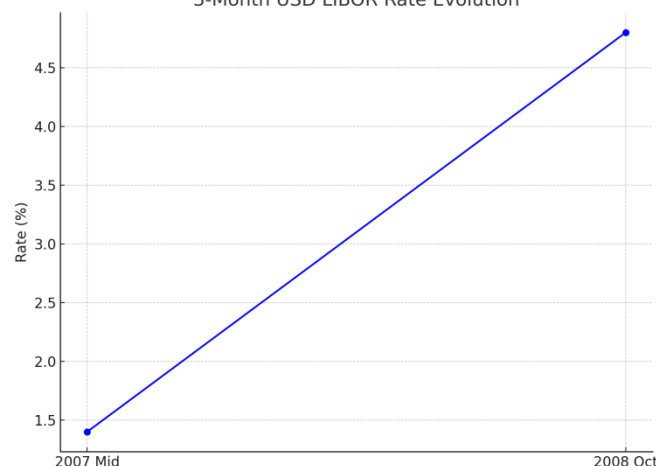
Impact on LIBOR (London Interbank Offered Rate)

The standard interest rate among giant banks to lend minor banks, LIBOR, also experienced remarkable fluctuations over the period of financial crisis. For several decades, the LIBOR has an essential impact on the such financial services sector as mortgages, credit cards and education loans. Majority banks became unsure about the market condition, as there was a big chance for bankruptcy and the default in the market. Thus, several global banks hesitated to lend the money to interbanks which, meanwhile, led the interest rates to increase (McBride, 2020). Even though most of the central banks tried to keep liquidity in the sectors, the LIBOR rates (Graph 2) increased sharply in the U.S market, from 1.4% in the middle of 2007 to over 4.8% in October, 2008 (Eikon, 2020). Borrowing prices climbed due to the rising LIBOR rates, making an already difficult economic situation even worse for individuals and business entities. The financial liquidity was substantially affected by the increase in the LIBOR, and this was followed by the severity of credit crisis as well.

During the crisis period, majority of banks misrepresented the market circumstances which lead further chaos in the LIBOR system. LIBOR's fundamental strategies also experienced a markable changes which was caused because of its domination in the market (Financial Conduct Authority, 2017).

Graph2

3-Month USD LIBOR Rate Evolution



The subsequent connection between financial market sectors and their dependency to each other was really crucial, as one sector can affect heavily to the whole market. Several global market-related issues, financial recession and corporate failures urged the Stock Indexes and LIBOR to consider about the importance of stability of the market more deeply (Bernanke, 2015).

In order to mitigate the financial crisis which was the biggest concern in the while global economy, The U.S. initiated the projects and took sustainable steps to keep the stability of the financial market. The U.S. developed several comprehensive structures for the positive restoration of Stock Market Index and LIBOR. During a stock market decline and a rise in LIBOR rates, signaling a lack of faith in the interbank lending market, the U.S. administration acknowledged the pressing need for extensive actions to avoid a complete economic breakdown. There are many ways to classify the United States government's market intervention attempts; they include fiscal policy measures, monetary policy initiatives, and rescue programmes designed to stabilise the economy and financial sector. In addition to reducing the crisis's immediate effects, each of these initiatives aimed to set the stage for sustained improvement and security over the long-term period.

The steep increase in LIBOR during the financial crisis has far-reaching effects for both financial institutions and individual borrowers. As banks grew more unwilling to lend to one another due to higher credit concerns, business and consumer borrowing costs rose dramatically. Many firms struggled to get short-term loans needed for day-to-day operations, resulting in widespread financial difficulty and bankruptcy. Similarly, individual borrowers with adjustable-rate mortgages saw their interest payments rise, aggravating the already dire housing situation.

One of the most pressing worries during the LIBOR increase was the systemic danger presented by liquidity shortages. Large banks, fearing collapse, began hoarding cash rather than lending, severely limiting credit availability in the global financial system. The credit crisis caused a significant downturn in economic activity, with falling investments and employment losses across numerous industries. The shortage of liquidity and increasing LIBOR rates compelled regulators to take exceptional steps to restore trust in the financial system.

To solve liquidity problems, governments and central banks throughout the world implemented forceful monetary interventions. The Federal Reserve, Bank of England, and European Central Bank worked together to pump cash into financial institutions, decrease interest rates, and offer emergency lending facilities. One of the most notable solutions was the establishment of swap lines between central banks, which allowed them to trade currencies while stabilizing the global financial system. In addition, the United States government used the Troubled Asset Relief Program (TARP) to infuse direct capital into large financial institutions, preventing interbank lending from collapsing completely.

Following the crisis, the LIBOR manipulation scandal surfaced, exposing that some big banks had in-

accurately misrepresented their borrowing costs in order to preserve a sense of stability. This resulted in sweeping financial sector changes, including the move from LIBOR to alternative benchmarks such as SOFR (Secured Overnight Financing Rate), which improved transparency and reduced systemic risks in financial markets.

Monitory Policy Initiatives

The Federal Reserve, the U.S. central Bank, applied some new monitory policy measurements during the Financial Crisis period. Admittedly, Board of Directors of the Federal Reserve System (2020) mentions that one of the crucial steps was to make rate of federal funds more accessible by reducing the rates from 5.25% in the fourth quarter of 2007 to minimum of 0-0.25% in December 2008 which was the lowest rate in the history of the Federal Reserve. By launching this initiative, the U.S. Central Bank aimed at increasing the money transactions, spendings and investments in the nation, which simultaneously motivated corporations and individuals to borrow more money due to low rates. The Federal Reserve bought the vast number of mortgage-backed securities and banknotes by using Quantitative Easing (QE) program in order to improve the liquidity of the financial markets (Bernanke, 2015). Thanks to such measure, step-by-step, the markets started to gain confidence again.

In addition to decreasing interest rates and launching the Quantitative Easing (QE) program, the Federal Reserve implemented a number of additional monetary policy instruments to help stabilize the financial system. One major tool was the Term Auction Facility (TAF), which allowed banks to borrow cash at reduced interest rates by utilizing collateral, so alleviating liquidity strains in the banking industry. This initiative was designed to boost lending and keep the acute credit constraint from deepening.

Furthermore, the Federal Reserve entered into currency exchange arrangements with other central banks, including the European Central Bank, Bank of England, and Bank of Japan, to assure US dollar liquidity in international markets. These agreements were critical in averting the collapse of international financial activities, since many institutions throughout the world suffered significant dollar shortages.

To help calm financial markets, the Federal Reserve extended emergency credit lines to non-traditional financial institutions such as investment banks and insurance firms, representing an unprecedented extension of its lending capacity. The Fed's strong actions were designed not only to restore confidence in the economy, but also to lay the basis for long-term recovery. Low interest rates, asset purchases, and emergency finance all contributed to avoiding a wider economic collapse and paving the way for financial stability.

Fiscal Policy Measures

Several essential measurements were implemented by the U.S. Congress to stimulate the economic situation and aid the most affected sectors due to the Economic Recession. One of these steps was the American Recovery and Reinvestment Act (ARRA) in 2009, and this fiscal stimulus program cost amounted to \$787 billion Recovery.gov (2020). There were reductions in

taxations, benefits for jobless community, and new initiatives for education, healthcare, infrastructure which were major industries benefited with the help of ARRA program during the Crisis period. The main purpose of this stimulus package program was to help the community and industries which were severely affected, and provide them with economic sustainability in a long run.

Aside from direct financial aid, the American Recovery and Reinvestment Act (ARRA) contains measures to help small companies and energy programs. A component of the stimulus package went toward loan guarantees and assistance for small firms, allowing them to continue operations and retain personnel amid the economic crisis. Furthermore, green energy initiatives were prioritized, with monies going toward renewable energy projects, energy efficiency improvements, and updating the country's power system.

Infrastructure expenditure was critical for employment growth, including investments in transportation, public works, and technological development. The administration intended to restore trust in the economy by allocating cash to initiatives with long-term economic advantages. While the success of ARRA has been contested, many economists believe that the stimulus package helped avert a deeper recession, boosted consumer spending, and provided the groundwork for slow economic recovery in the post-crisis period.

Financial Sector Rescue Programs

The majority banks which owned toxic assets started to suffer severely from the Global Crisis, and the U.S. government launched the Trouble Asset Relief Program (TARP) in October 2008 in order to mitigate the case. The Program was dedicated to purchase the toxic assets from suffering large financial institutions, and give cash to them in order to prevent them from potential bankruptcy. Initially, \$700 billion was authorised for the TARP (U.S. Department of the Treasury, 2020). In order to improve the confidence of the individuals in the banks and financial systems, the Federal Deposit Insurance Corporation (FDIC) employed strategies of backing up several major bank debt (FDIC, 2009).

In addition to acquiring toxic assets, TARP set funds directly into large financial institutions, rescuing banks on the verge of collapse. This method, known as the Capital Purchase Program (CPP), sought to restore liquidity and increase lending to firms and individuals. Furthermore, TARP monies were eventually extended to automakers like General Motors and Chrysler, averting additional job losses in the industrial sector. Although contentious, these actions were credited with avoiding a major financial crisis and establishing the framework for economic recovery, with many banks repaying their TARP funding after financial stability was restored.

Regulatory Reforms

The U.S. government took a number of essential steps to prevent the financial system from the future possible crises. For instance, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act launched financial introduction of Consumer Financial Protection Bureau (CFPB) which provided the

most suffered banks with liquidity assets. The purpose of this financial regulation was to reduce the major financial institution's dependency on taxpayers fund (Pub.L. 111–203).

Notably, the Federal Government of the United States launched the vast number of regulations so as to mitigate the severe impact of the financial crisis on the economy and financial markets. As aforementioned, the American Recovery and Reinvestment Act (ARRA) and the Troubled Asset Relief Program (TARP) were two major and effective governmental rescue efforts among the other rescue efforts initiated by the U.S Government. In the history of the Global Recession, these two programs played an essential role to stabilize the market.

In addition to Dodd-Frank, additional banking stress tests were implemented to determine financial institutions' ability to weather future economic downturns. The Volcker Rule, a fundamental feature of Dodd-Frank, sought to prevent banks from engaging in hazardous speculative trading with consumer deposits, therefore decreasing systemic risk. Furthermore, greater capital requirements were placed on banks to guarantee that they had enough reserves to absorb any losses. These measures sought to improve transparency, protect consumers, and restore trust in financial markets. While some criticized the measures for being unduly restrictive, they played an important role in increasing the resilience of the US financial sector.

Troubled Asset Relief Program (TARP)

The U.S. Government implemented the Trouble Asset Relief Program (TARP) which was built in order to relieve the financial pressure of several sectors in the market, and this program was built by the Emergency Economic Stabilisation Act in 2008. By implementing the TARP, the Government aimed at buying toxic assets from major banks, and give them cash in hand straight in order to help them to maintain their liquidity in a more substantial position (U.S. Department of the Treasury, 2020). By implementing this program, automotive companies, insurance businesses and banks were provided with direct capitals in order to restore the liquidity. An initial funding of \$700 billion was authorised for the TARP, however, the fund was reduced to \$475 billion by the Dodd-Frank Wall Street Reform and Consumer Protection Act (U.S. Department of the Treasury, 2020). This program had a significant impact on stopping the further widespread reduction in banking industry and other big financial entities.

TARP did more than only stabilize financial institutions; it also helped to restore market confidence by proving the government's commitment to averting a total economic catastrophe. The initiative not only addressed liquidity shortages, but also helped to unfreeze credit markets, allowing firms and households to obtain loans again. Furthermore, the Home Affordable Modification Program (HAMP) was established under TARP to help struggling homeowners avoid foreclosure by granting loan modifications to make mortgage payments more manageable.

TARP was first viewed with suspicion, but many economists believe it was a necessary action to avert a larger financial crisis. The majority of the bailout money were eventually repaid, and the government

even made a little profit on certain investments. However, the initiative raised disputes over moral hazard, with some opponents claiming it fostered irresponsible behavior among financial organizations. Despite its difficulties, TARP remains one of the most important financial interventions in American history, influencing future economic crisis management measures.

American Recovery and Reinvestment Act (ARRA)

During the Great Recession, the American Recovery and Reinvestment Act (ARRA) was a noticeable measurement of its time. This stimulus program was signed by the President Barack Obama on February 17, 2009. The program worth amounted to \$787 billion which was used to implement the tax cut, unemployment incentives and alternative energy power initiatives. The ARRA program was cited as the single biggest economy effort in the whole U.S. history (Recovery.gov, 2020). The long-term goal of the ARRA was to set feasible regulatory framework in the economy system, and it was also dedicated to open new job opportunities for the society in order to decrease the ever-growing unemployment rate. In addition to tax cuts and unemployment benefits, the ARRA provided major money for infrastructure projects such as road building, public transit enhancements, and school renovations, which resulted in thousands of new jobs around the country. The program also prioritized expenditures in scientific research, healthcare modernization, and broadband expansion with the goal of promoting long-term economic development and technical innovation.

Another important aspect of ARRA was its assistance to state and local governments, who were experiencing significant budget deficits owing to decreased tax receipts. By giving financial assistance to these governments, the initiative helped to avoid significant layoffs of public sector personnel like as teachers, police officers, and healthcare staff.

Despite early criticism, further research indicated that ARRA performed a critical role in stabilizing the economy, increasing GDP, and avoiding a longer recession. While questions about its effectiveness continue, ARRA remains one of the most ambitious fiscal stimulus programs ever deployed, influencing future economic recovery efforts.

Effectiveness of TARP (Troubled Asset Relief Program)

The effectiveness level of TARP has been in the circle of several major debates among economist, government bodies and the public. Critics consider that all the measurements were taken for the cost of taxpayer's fund, and therefore the CEOs of most of the big companies did not take the responsibility of the whole community effectively. Additionally, they confidently gave the fund to those giant companies, as they were considered as „too big to fail” (Barofsky, 2012). Furthermore, some other critics pointed out that such big investment fund program did a very little in the housing industry, which made the whole society to suffer heavily from this for the next several decades.

On the other hand, the vast number of investigations have shown that the TARP took several important steps in financial sectors. In 2010, the majority part of

funds were reimbursed and recovered. The initial allocation cost was lower than the funds which were reimbursed by the institution, making up \$11 billion profit at the end (Congressional Budget Office, 2019). The TARP saved approximately 1 million jobs and prevented banks from more severe system collapse which certainly were the big step to prevent the U.S. economy from the possible further recession.

Beyond the banking industry, TARP had a larger influence on rebuilding trust in the US economy. The program's deployment reassured investors and worldwide markets that the US government was dedicated to stabilizing the financial system, so preventing additional panic and stock market falls. This indirect effect was critical in avoiding an extended economic slowdown by ensuring that banks had enough capital to continue lending to firms and consumers.

Despite its achievements, TARP remained contentious, with many detractors claiming that it did not adequately address the foreclosure issue. While the program was designed to help financial institutions, millions of American homeowners continued to experience mortgage defaults, resulting in enormous asset losses and long-term economic suffering. The Home Affordable Modification Program (HAMP) was created as a supplementary program to help homeowners, but its efficacy was restricted owing to strict qualifying restrictions and poor implementation.

Another major source of contention was the perceived unfairness of bailouts, with many claiming that the government's action benefitted Wall Street more than Main Street. The idea of "moral hazard" became a prominent worry, with opponents fearing that bailing out failed financial firms would promote excessive risk-taking in the future.

Nonetheless, in retrospect, TARP is largely recognized for avoiding a catastrophic financial collapse, and the majority of the monies were subsequently returned. The initiative established a precedent for future crisis management by emphasizing the advantages and disadvantages of large-scale government intervention in financial markets.

Effectiveness of ARRA (American Recovery and Reinvestment Act)

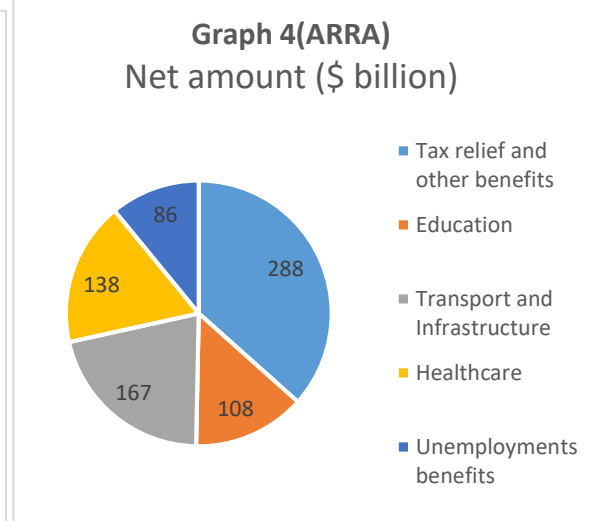
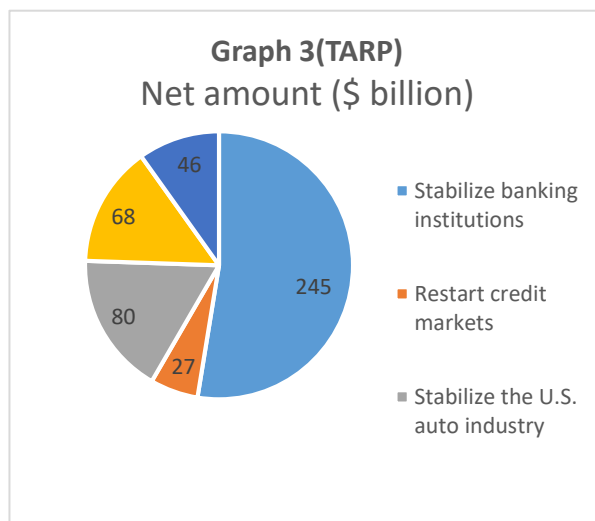
The efficacy of the American Recovery and Reinvestment Act (ARRA) on the economy of the U.S. was discussed widely. Supporters of the ARRA program note that it was considerably helpful to reduce the unemployment rates, increase the education quality and expand the healthcare. Notably, implementation of this program caused the noticeable increase in GDP which amounted to roughly 2.3% (Council of Economic Advisers, 2014).

Contrarily, Critics claim that ARRA program was ineffective due to several complaints of small businesses about the loans, and many suggests that the funds could have been spent in a more effective way (Taylor, 2011). However, since number speak louder as a proof, the economists and politicians consider that ARRA was one of the most efficient rescue efforts.

In general, both TARP and ARRA were vital implementations and programs during the financial crisis with its considerable contribution to the economy

growth of the U.S. market. Even though both programs have its critics, TARP was initiated to improve the financial system, while ARRA was dedicated to increase economic recovery after Great Recession. Comparing

the fund management of TARP(Graph 3) and ARRA(Graph 4), the funds were directed logically and professionally by targeting the all the struggling sectors during the crisis period.



The article of „The Global Financial Crisis: What Have We Learned?“ by Ray Ball, in the Journal of Applied Corporate Finance, describes the analysis of financial fluctuations during the Great Recession period of 2007 and 2008 years. The article analyzes the contributors of the crisis, the effects on the financial institutions and financial market sectors. Ball’s analysis of governmental bodies reaction to the crisis was also important part of the article to understand the regulatory implementations of that period. It also mentions the researchers, economists that took several essential steps against potential further disruptions in the economy market.

According to researches of Ball(2009), the ineffective corporate governance frameworks and wrongly-applied risk management strategies in several big financial entities had the contribution to the Global Crisis to some extent. The author cites that EMH(Efficient Market Hypothesis) fails were not main reasons. However, the main reasons of the Global Recession were the negligence of governmental principles in introducing new financial ideas which were not completely understood by the society, and therefore it led the misuses, misconsumptions and chaos in the financial services. In conclusion, Ball(2009) analyzes market efficiency’s impact on investments and regulatory actions, while summarizing the general effects of EMH(Efficient Market Hypothesis) on financial crisis.

ARRA was intended to stimulate the economy, but its short- and long-term consequences are still debated. Supporters say that the legislation avoided a deeper recession by pouring funding into essential areas like as infrastructure, education, and healthcare, resulting in millions of new employment. The Congressional Budget Office (CBO) estimates that the ARRA saved or created nearly 2.5 million jobs between 2009 and 2011, dramatically lowering the unemployment rate relative to forecasts without government involvement. Tax cuts and direct financial support to states also helped to stabilize consumer spending, a major driver of economic recovery.

In addition to increasing jobs, ARRA had a revolutionary effect on the energy industry. The act provided major funding for renewable energy projects, energy efficiency improvements, and research into sustainable technology. This investment paved the way for the expansion of the solar and wind power sectors in the United States, lowering reliance on fossil fuels and encouraging long-term economic sustainability.

Despite these gains, opponents claim that ARRA was not as successful as expected. One of the most common concerns was the sluggish distribution of cash, which reduced the immediate impact on economic recovery. Many infrastructure projects take years to begin owing to bureaucratic barriers, delaying the anticipated stimulus benefits. Furthermore, small enterprises frequently encountered difficulty in obtaining loans, as banks were unwilling to lend despite the availability of government-backed funding.

Another major argument against ARRA was its cost-effectiveness. Some opponents argue that the stimulus program was excessively substantial, increasing national debt greatly without yielding corresponding economic advantages. Others argue that a more focused strategy, such as direct assistance to small firms and middle-class people, would have delivered greater outcomes. Despite these concerns, most economists agree that ARRA was important in stabilizing the economy and averting the Great Recession from becoming a long-term slump.

In retrospect, ARRA and TARP represented two complimentary approaches to economic recovery: one aimed to stabilize financial institutions and credit markets, while the other emphasized job creation, consumer spending, and long-term economic investments. The efficiency of these initiatives is still being studied, but their influence on post-crisis economic policy and banking rules is apparent.

Conclusion

The Global Financial Crisis of 2007-2008 exposed major weaknesses in financial systems throughout the

world, resulting in a dramatic decrease in stock markets, interruptions in interbank lending, and a collapse in investor confidence. To avoid a deeper economic downturn, governments and central banks adopted strong measures such as monetary policy modifications, fiscal stimulus packages, and financial rescue operations. The Troubled Asset Relief Program (TARP) and the American Recovery and Reinvestment Act (ARRA) were instrumental in stabilizing financial institutions and promoting economic development.

Despite these initiatives, arguments over their long-term efficacy persist, notably around moral hazard and mounting public debt. The crisis also prompted regulatory measures like the Dodd-Frank Act, which intended to improve financial supervision and prevent future disasters. While these steps helped to spur economic recovery, the crisis highlighted the importance of ongoing financial regulation, competent risk management, and global collaboration in ensuring financial stability.

The lessons from the crisis emphasize the significance of proactive policy responses and strong regulatory frameworks in mitigating future economic shocks. Moving forward, preserving openness and building financial resilience will be important to guaranteeing stability in an increasingly linked global economy.

References:

1. Amadeo, K. (2019) 'History of the 2008 Stock Market Crash', *The Balance*, 25 June. Available at: <https://www.thebalance.com/dow-jones-industrial-average-history-3306171>
2. Amadeo, K. (2019) 'Dow Jones Industrial Average History: DJIA by Year', *The Balance*, 25 June. Available at: <https://www.thebalance.com/dow-jones-industrial-average-history-3306171>
3. Ball, R. (2009) 'The global financial crisis: What have we learned?', *Journal of Applied Corporate Finance*, 21(4), pp. 8–16.
4. Barofsky, N.M. (2012) *Bailout: An inside account of how Washington abandoned Main Street while rescuing Wall Street*. New York: Free Press.
5. Bernanke, B.S. (2015) *The courage to act: A memoir of a crisis and its aftermath*. New York: W.W. Norton & Company.
6. Board of Governors of the Federal Reserve System (2020) 'Federal Reserve issues FOMC statement'. Available at: https://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm
7. Board of Governors of the Federal Reserve System (2020) 'Financial crisis response in charts'. Available at: <https://www.federalreserve.gov/publications.htm>
8. Congressional Budget Office (2019) *Report on the troubled asset relief program - March 2019*. Available at: <https://www.cbo.gov/publication/55094>
9. Federal Deposit Insurance Corporation (FDIC) (2009) 'FDIC announces plan to free up bank liquidity'. Available at: <https://www.fdic.gov/news/press-releases/2009/pr09001.html>
10. Financial Conduct Authority (2017) 'The future of LIBOR'. Available at: <https://www.fca.org.uk/news/speeches/the-future-of-libor>
11. McBride, J. (2020) 'LIBOR: The London Interbank Offered Rate', *Council on Foreign Relations*, 19 October. Available at: <https://www.cfr.org/background/understanding-libor-scandal>
12. Pub.L. 111–203, H.R. 4173 (2010) *Dodd-Frank Wall Street Reform and Consumer Protection Act*. Available at: <https://www.congress.gov/111/plaws/publ203/PLAW-111publ203.pdf>
13. Recovery.gov (2020) 'The Recovery Act'. Available at: <https://web.archive.org/web/20200101000000/recovery.gov>

THE INTERPLAY OF MARKETING CAPABILITIES: BRIDGING MARKET ORIENTATION AND PRODUCT INNOVATION TO BOOST MARKETING PERFORMANCE IN CREATIVE MSMEs IN SURAKARTA CITY

Rani Cahyaning Putri

Management Study Program, Atma Bhakti College of Economics, Indonesia

Rini Handayani

Management Study Program, Atma Bhakti College of Economics, Indonesia

INTERAKSI KAPABILITAS PEMASARAN: MENJEMBATANI ORIENTASI PASAR DAN INOVASI PRODUK UNTUK MENINGKATKAN KINERJA PEMASARAN PADA UMKM KREATIF DI KOTA SURAKARTA

Rani Cahyaning Putri

Program Studi Manajemen, Sekolah Tinggi Ilmu Ekonomi Atma Bhakti, Indonesia

Rini Handayani

Program Studi Manajemen, Sekolah Tinggi Ilmu Ekonomi Atma Bhakti, Indonesia

<https://doi.org/10.5281/zenodo.14947177>

Abstract

The purpose of the study is to examine empirically related marketing performance that can be enhanced by the influence of market orientation and product innovation with mediating variables, specifically marketing capabilities. Partial Least Square (PLS) is the research method used in the study. The study's population consisted of all MSMEs operating in Surakarta City's creative industry sector. Non-random sampling is accomplished by using an accidental sampling technique. The questionnaire was distributed to 75 Creative Industry MSMEs and became the primary data that would be used in the data processing process. The study's conclusions indicate that market orientation and product innovation have a positive but not significant effect on marketing performance. Consequently, marketing capabilities are greatly enhanced by product innovation and market orientation, and marketing performance is positively and significantly impacted by marketing capabilities. Marketing capabilities can mediate the effects of market orientation and product innovation on marketing performance.

Abstrak

Tujuan dari penelitian ini adalah untuk menguji secara empiris terkait kinerja pemasaran yang dapat ditingkatkan dengan pengaruh orientasi pasar dan inovasi produk dengan variabel mediasi, khususnya kapabilitas pemasaran. Partial Least Square (PLS) adalah metode penelitian yang digunakan dalam penelitian ini. Populasi penelitian ini terdiri dari seluruh UMKM yang beroperasi di sektor industri kreatif Kota Surakarta. Pengambilan sampel secara non-random dilakukan dengan menggunakan teknik accidental sampling. Kuesioner disebarkan kepada 75 UMKM Industri Kreatif dan menjadi data primer yang akan digunakan dalam proses pengolahan data. Penelitian ini menemukan bahwa orientasi pasar dan inovasi produk berpengaruh positif pada kinerja pemasaran, tetapi tidak signifikan. Kapabilitas pemasaran sangat ditingkatkan oleh inovasi produk dan orientasi pasar, dan kinerja pemasaran dipengaruhi secara positif dan signifikan oleh kapabilitas pemasaran. Kapabilitas pemasaran dapat memediasi pengaruh orientasi pasar dan inovasi produk terhadap kinerja pemasaran.

Keywords: Product Innovation, Market Orientation, Marketing Capabilities, Marketing Performance.

Kata Kunci: Inovasi Produk, Orientasi Pasar, Kapabilitas Pemasaran, Kinerja Pemasaran

I. INTRODUCTION

Small and Medium Enterprises (SMEs) in developing countries are considered a way to increase growth, industrialization, and sustainable growth [1]. Likewise, with MSMEs in Indonesia, many priority programs have been launched by the government to increase the growth of MSMEs by the goals of the SDGs. It is even considered a security when the economy is in bad condition [2].

In this case, MSMEs receive considerable attention for their role in developing business financial capital and creating new jobs.

Tanjung et al. [3] said in their research that globalization has adverse effects on many people in countries around the world. The globalization of international trade has resulted in increased competition in the business world. The private sector, which consists of small businesses, has become a significant economic force in

Indonesia. The contribution of MSMEs to the Indonesian economy is enormous, as evidenced by their significant impact on gross domestic product (GDP). In their research, [3] additionally, 60,4% of the investment has been absorbed by small and medium-sized businesses (MSMEs), which can employ 97% of the labor force, or 116 million people, and generate value and propel the Indonesian economy. In Indonesia, micro, small, and medium-sized enterprises (MSMEs) have expanded dramatically, and the MSME sector has shown resilience in the face of globalization's challenges.

Micro, small, and medium-sized businesses are vital to the economies of Indonesia and other nations. They can offer the community a range of economic services and generate jobs. In addition to encouraging economic expansion and assisting in the establishment of national stability, MSMEs also contribute to the process of income distribution and growth [4].

Surakarta City has many historical sites and diverse cultures that domestic and foreign visitors can explore. The cultural diversity of Surakarta City can be used as a tool to develop innovative industries that enhance Indonesia's economic expansion and image. It becomes a business opportunity for the people of Surakarta City to do business and produce various creative products to gain profit and become reliable employment. Some creative products that can be produced are handicrafts, batik cloth, art and antique products, and so on.

Creative industries produce goods and services, generating added value primarily based on creativity and (intellectual) knowledge. They can be sourced from ideas, art, and forms of technology that successfully create wealth [5]. The creative industry is a sector that emphasizes the creativity, skills, and talents of managers to add value to products and employment. Some things related to the creative industry include innovation, culture, and technology. Marketing performance is an activity that positively impacts the effectiveness of generating sales to market products. A highly competitive environment has formed among MSMEs due to their growth in various regions. As a result, marketing performance is seen as crucial to winning the competition as it defines the achievement of MSMEs throughout the entire marketing process [6].

However, marketing initiatives are crucial to MSMEs' development for their performance and success to grow and endure alongside their operations, where customer orientation remains the focus of attention. Marketing performance can be a benchmark for businesses to measure how well the marketing process is running, which is part of achieving business goals. The research process in marketing is very important to improve business performance; businesses need to increase the amount of funds allocated to grow their current business units to improve performance [7].

In the business sector, product innovation is crucial because it can result in new products that address appearance, systems, procedures, and other factors [8]. Product innovation is the key so that MSME players continue differentiating in an increasingly broad market. According to [9] innovation is a key element of business strategy and is considered crucial for companies to compete successfully in domestic and international markets. To meet consumer needs by utilizing product innovation, the company ensures that the business it produces can still attract customers to buy it, and it is designed to be more relevant to what customers want [10].

Product innovation variables are used in this study because innovative MSME industries are more likely to adopt new concepts more quickly and adaptively in practice. The creative industry is closely related to product innovation and increasingly diverse consumer needs and wants to want something different before making business people in this field motivated to update and add something new to their products. Customer-focused businesses foster greater creativity by creating innovative goods and impactful marketing campaigns [8].

Creative industry businesses are not only directly

required to innovate products, but businesses in this industry sector must also be able to adapt to market competition and change quickly to meet the needs of their clients. Businesses must prioritize market orientation in their operations if they want to gain the trust of their clients [8]. Businesses can improve their marketing performance by generating and satisfying customers, which is market orientation's primary objective, through ongoing consumer needs and preferences assessment. Market orientation is crucial to efforts to improve marketing performance because it allows businesses to process market data faster, anticipate market trends, and take more appropriate actions in response to changing customer needs [11].

MSMEs can improve their marketing performance and capitalize on their market power by applying innovation activities to their products. They are market-oriented, balanced, or mediated by strong marketing capabilities. Research and development is a strategic factor determining business operations, and the company's innovation efforts seek to generate a competitive advantage [12]. Businesses that can best understand consumer demand and offer their target customers the greatest benefits will be able to gain a larger market share [13].

As demonstrated by earlier studies [10], [14] marketing performance is positively and significantly impacted by product innovation and market orientation. In addition, previous research by [15] revealed that market orientation impacts marketing performance. Nevertheless, a study gap carried out by [16] demonstrate that there is no appreciable impact of product innovation on marketing performance. Research by [17] The findings indicate no discernible relationship between product innovation on marketing performance.

Marketing capabilities are the collective skills and knowledge, and the community's ability to implement organizational processes that facilitate the coordination of marketing campaigns converted into business assets [18]. This study will use marketing capabilities to mediate the relationship between marketing performance, market orientation, and product innovation. MSMEs' marketing capabilities may need to be improved to maximize the advantages of applied product innovation and market orientation and ensure a strong correlation between these factors and marketing performance.

Several studies conducted in the previous year revealed that product innovation variables impact marketing capabilities; research [19] is one of them. Research on how market orientation affects marketing capabilities has been tested. According to research conducted in the past year, market orientation has a positive and significant impact on marketing capabilities [20]. Numerous researchers have examined the impact of marketing capabilities on marketing performance; one study conducted by [18], [21], [22] proves that marketing capabilities owned by a business can improve marketing performance in a business. The study's findings can subsequently be used to inform and evaluate MSMEs to enhance their marketing performance. This study will probably show and present strong arguments regarding whether the independent variables used can affect the marketing performance of MSMEs in Surakarta

City's creative sector and whether the marketing capabilities variable can mitigate the effects of the independent variables on the dependent variable.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

A. Literature Review

a. Product Innovation

One key component of growth strategy is innovation, which can help businesses expand into new markets, gain a competitive edge, and increase their market share [23]. Ramadhani et al. [24] claim that innovation is very important in business because it allows companies to create something new from a product, appearance, and procedure. Rosmiyani [25] points out that the capacity of a company to develop and execute new and valuable ideas is what innovation means. Innovation is critical for businesses to capitalize on new opportunities and gain a competitive advantage. Businesses that continuously innovate will have the ability to control the market.

According to Kawira [26], Innovation is an iterative process that starts with discovering new markets and/or service opportunities and leads to tasks about development, production, and marketing to achieve commercial success. Product innovation gives SMEs additional chances to boost revenue and sales while broadening their consumer base [8].

b. Market Orientation

Market information is any activity that includes information about target market competitors and customers and activities spread across the company. It describes how a business looks for information about consumer and competitor orientation and market conditions [8]. Market orientation's main objective is to create and satisfy customers by continuously evaluating their needs and desires, which will improve MSMEs' marketing performance [24]. This is justified by the idea that a company with a market-oriented organizational culture that understands the needs of its customers and the goods that its rivals are selling will be better able to focus its innovation efforts on addressing unmet customer needs [27].

A successful and effective organizational culture that adds value to customers to enable the company to outperform competitors is known as market orientation [2]. Market-oriented companies routinely collect data about their external stakeholders to create products that provide customers with greater value. MSME actors may be more negatively impacted by a weak market orientation than large corporations. MSMEs may perform worse if they lack the funds to cover possible business failures, particularly long-term ones [28].

c. Marketing Capabilities

The definition of capabilities, according to Rosmayani [25] It is the business's capacity to establish target markets, set competitive prices, produce high-quality goods, distribute them efficiently, select the best marketing strategy and use resources with steps that are as effective and efficient as possible to create added value as part of efforts to carry out marketing activities to fulfill customer needs. In addition, an integrated process that is deliberate and intended to apply a collection of resources, knowledge, and business capabilities

about market demand can also be understood as marketing capabilities.

Arramadhan Daulay [19] describes marketing capabilities as a comprehensive process intended to use the knowledge, capabilities, and resources acquired by a business to meet customer demands, add value, and meet competitive demands. The ability of the business to price, advertise, and distribute its goods is known as marketing capabilities. Strong marketing skills can influence enhancing the company's marketing performance [29].

Marketing capabilities enable a firm to add value by responding to competitive threats, capitalizing on market opportunities, and adapting its products and services to market conditions [30]. According to Qureshi (2010), a business unit's marketing processes in six different areas corporate management, pricing, product development, distribution channel, marketing research, and promotion lead to its marketing capabilities.

d. Marketing Performance

Marketing performance is used to identify strategy effectiveness. It is one area of business performance that can be improved if companies choose and implement the best actions [31]. Furthermore, Rosmayani [25] Marketing performance gauges the effectiveness of all marketing initiatives or the performance of the company's product market. Marketing performance results from an organization's business and marketing strategies collaborating [20].

The field of (business) performance measurement, which includes marketing performance measurement, aims to shed light on company performance to make business strategy implementation easier [8]. With the right marketing performance measurement, companies can make business decisions based on data and facts for higher-quality performance growth. Business people will strive to meet the needs of various marketing tools; their customers aim to outperform their competitors [32]. According to Badollahi et al. [9], the primary goal of performance measurement is to encourage management to exercise initiative when conducting business operations. Companies must measure performance to achieve their goals.

B. Hypothesis Development

Effect of Product Innovation on Marketing Capabilities

Consumers need innovation to fulfill their desires according to their respective needs. As a result, companies in the industry must develop new products to meet customer demand [31]. Product innovation can strengthen marketing capabilities because products that are increasingly differentiated, have more value, and provide satisfaction for consumers will create a competitive advantage, increasing attractiveness in the marketing process. The company will strive to market its products thoroughly and develop its market share, ultimately contributing to increasing its marketing capabilities.

According to [33], product Innovation has an important role in improving marketing capabilities where competition is increasingly competitive, the desire for sustainable product innovation to increase marketing capabilities. This statement is backed up by earlier studies by [19] and [34], with findings showing that

market capabilities are positively and significantly impacted by product innovation. The following hypothesis is developed based on prior research and the explanation of hypothesis development:

H1: *Product innovation positively and significantly impacts Marketing Capabilities.*

Effect of Market Orientation on Marketing Capabilities

Market orientation refers to how much a business generates, shares, and responds to market intelligence about its competitors, customers' needs, strategies, and actions, as well as the needs and capabilities of its channels and the broader business environment [35]. Market orientation can encourage businesses to continuously understand consumers, competitors, and the dynamics that occur in the market. These factors will impact the marketing capabilities of MSMEs by providing in-depth market knowledge, increasing responsiveness, and ensuring superior marketing strategies.

Maryono et al. [17] argue that businesses implementing the most efficient market culture orientation can improve business performance and buyer behavior. This assertion is consistent with the findings of earlier studies carried out by [17], [20], which concluded that market orientation can enhance, positively impact, and significantly impact a company's marketing capabilities. The following hypothesis is developed using the description of hypothesis development and prior research:

H2: *Market orientation positively and significantly impacts marketing capabilities.*

Effect of Marketing Capabilities on Marketing Performance

Many of the firm's capabilities span multiple functional areas and are visible at different levels. However, the marketing function is usually linked to the capabilities related to the deployment of market resources [35]. Market capabilities include understanding consumer needs, preferences, and behavior through market research and data analysis.

With a firmer grasp of marketing and strong capabilities, businesspeople can create more effective and relevant strategies, increasing the influence of MSMEs' marketing capabilities on marketing performance. These findings are supported by the research that was carried out by [17], [18], [36], which concludes that good marketing capabilities can improve marketing performance in business. The following hypothesis has been developed based on previous studies and the explanation of hypothesis development.:

H3: *Marketing capabilities positively and significantly impact marketing performance.*

Effect of Product Innovation on Marketing Performance

A business's ability to launch new products will allow it to lead and reduce the possibility that competitors will do so first [18]. The study conducted by [31] mentions a conclusion that the more innovative entrepreneurs make their products, the more marketing performance will increase. Nizam et al. [37] argue that businesses can innovate, allowing companies to continue selling their products.

Innovation successful businesses are one step ahead of their rivals. Businesses can rely on meeting

customer demand to increase marketing effectiveness and boost sales. According to Ramadhani et al. [24], the success of a business in maintaining the continuity of product sales of its products lies in its ability to innovate. This aligns with findings from earlier studies by [14], [24], [45], [31], [38]–[44], which demonstrates how product innovation implemented by business actors can enhance the company's marketing performance. The following hypothesis has been developed based on previous studies and the explanation of hypothesis development:

H4: *Product innovation positively and significantly impacts marketing performance.*

Effect of Market Orientation on Marketing Performance

Control over business direction is influenced by market orientation, which forces companies to respond to information collected by concentrating more on customers, markets, and product related information. Market orientation sets goals and creates a customer-focused organization that meets expectations to outperform competitors [46]. Market-oriented businesses will conduct marketing activities based on a deep understanding of consumers, markets, and competitors in the same business sector.

Through activities that are more focused on consumer needs, businesses will carry out marketing activities that are of higher quality, effective, efficient, and more relevant, the results of which will be able to drive customer satisfaction, loyalty, and long-term profits, which means that marketing performance in the business has improved. This description is reinforced by previous research by [20], [35], [47], [48] According to the study, market orientation significantly and favorably affects marketing performance. The following hypothesis is established by describing the hypothesis development process and referencing prior research, and the following hypothesis is formed:

H5: *Market orientation positively and significantly impacts marketing performance.*

Effect of Product Innovation on Marketing Performance through Marketing Capabilities

At certain times, the market will experience product saturation, so producers must make updates or what is known as product innovation to re-attach buying interest in consumers or the market they are targeting. However, in practice, there are still several *research gaps* that reveal the results of research that innovations made by businesses have not been able to improve marketing performance.

Research conducted by Wulandari et al. [16] asserts that there is little correlation between product innovation and marketing performance. This indicates that product innovation alone cannot ensure the best possible boost in marketing performance because rivals can imitate the innovations. The effect of product innovation on marketing performance will be mediated in this instance by marketing capabilities.

Through product innovation driven by good marketing capabilities, business people can effectively communicate to the market about the innovative products they produce, including product advantages, uniqueness, and things that make products different from those produced by competitors. This assertion is

supported by studies carried out by [12], which reveal the research results that marketing capabilities accompanied by technology use capabilities can mediate. Product innovation's effect on business performance, including marketing performance. The following hypothesis is developed based on explaining hypothesis development and prior research substantiating this claim:

H6: *Product innovation positively and significantly impacts marketing performance through marketing capabilities.*

Effect of Market Orientation on Marketing Performance through Marketing Capabilities

Market orientation involves gathering, sharing, and reacting to market intelligence to gain market share, which in this case is consumers and potential customers, as well as information about competitors and current and potential customers. According to [17], business actors who can manage market information effectively distribute this information to all company units and emphasize continuous proficiency in changing customer needs are considered capable of increasing their marketing capabilities.

To achieve marketing performance, it is not

enough to be skillful in managing a product and producing satisfied customers; businesses need to form customer loyalty. Therefore, businesses must have capabilities. Through good marketing capabilities, the market orientation carried out by business people will continuously improve the market performance of the marketing process. This statement is reinforced by research conducted by [2], [7], [17], [49] shows that market orientation influences marketing performance through marketing capabilities, according to research findings. The following theory is established in light of the explanation of hypothesis development and earlier studies that substantiate this claim:

H7: *Market orientation positively and significantly impacts marketing performance through marketing capabilities.*

C. Research Framework

The research conceptual framework, which is grounded in theory and previous research, explains the relationship between research variables. The impact of the independent variables on the dependent variable will be visualized, and the direction of the research will be demonstrated. The study's conceptual framework is shown in Figure 1 below.

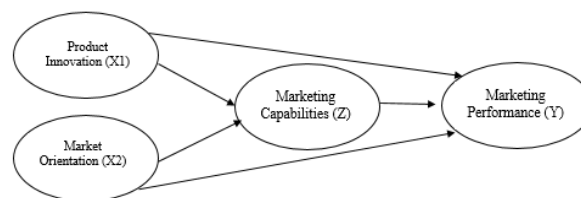


Figure 1. Research Framework

III. RESEARCH METHODS

A quantitative research design was employed to understand how the independent and dependent variables relate. This study will process primary data, and the data source will be gathered by distributing questionnaires that contain statements and closed questions. Each Creative Industry MSME will be given one questionnaire with 15 statements measured using a Likert scale of 1 - 5.

The study's population consists of all MSMEs in the Surakarta City area that are involved in the creative industry. The *non-random side* is a sampling method used with an *accidental sampling* technique. Sourced from data from the Office of Cooperatives, MSMEs, and Industry of Surakarta City states that in 2024, the number of MSMEs recorded operating in Surakarta City amounted to 14,339 MSMEs with various types of sectors. The number of creative industry MSMEs in Surakarta City is unlimited or *infinite*. Using a calculation of 5 x 15 indicators, the minimum number of samples required for the study was determined to be 75 MSMEs in the creative industry. According to [50], 5 - 10 respondents for each indicator is the ideal minimum number of samples needed for the PLS analysis process.

Data processing in this study used SmartPLS Version 4 software. The quality of the data used was tested with validity and reliability tests. Reliability testing is identified by evaluating the *composite reliability* and *Cornbach's alpha* values. Furthermore, the validity test is measured by *convergent validity*, namely through the

loading factor value evaluation process. According Ghazali & Latan [51] If the minimum AVE value is 0,50, the loading factor value is deemed valid, and if the minimum values of *Cornbach's alpha* and *composite reliability* are 0,60, the data is considered reliable.

The structural model (inner model) in this study is tested by calculating the coefficient of determination (R^2) and assessing the Goodness of Fit (GoF). The degree to which exogenous factors can be explained is determined by the coefficient of determination (R^2). This study tested the hypothesis with a statistical significance level at the 5% alpha level. The hypothesis's significance level indicates whether the hypothesis can be accepted or rejected statistically if the *t-statistic* value is greater than the *t-table* value of 1,992, the hypothesis is accepted or can compare the *p-value* results with the α value. The hypothesis is accepted if the *t-statistic* value exceeds the *t-table* and the *p-value* is less than 0,05. Direct effects (*path coefficient*) and indirect effects are the two effects measured in this study.

IV. RESULTS AND DISCUSSION

A. RESULTS

Respondent Characteristics and Descriptive Statistics

The questionnaire was distributed to 75 Creative Industry MSMEs in the Greater Solo area. Respondents who participated were mostly female, namely 54 people (72%). Meanwhile, there were 21 male respondents (28%). Most respondents were 21-30 years old (39%),

with the age of the MSME business that was most respondents above 5 years, as many as 26 MSMEs or 35%. Respondents in the study were creative industry entrepreneurs in Surakarta City, which consisted of various types of creative industries. These industries include handicrafts, application and game development, creative culinary, creative interiors, creative fashion that raises cultural elements, and other creative businesses such as making bouquets, floral arrangements, and other industries that have creative elements.

Descriptive statistics provide information about the characteristics of the variables in the study, including standard deviation and average (*mean*). Each of the four current constructs has an average value greater

than four and a standard deviation value greater than zero. This concludes that the respondents' answers are relatively diverse and tend to the right, namely in answers that agree with the statements on the indicators.

Data Quality Test

Validity Test

In this study, the validity of the data used was tested through 2 methods: convergent validity and discriminant validity. Indicator scores can meet valid data quality if the *loading factor* is above 0.70. The test results on the data show that all indicators used have proven valid. Below are the results of *Cross-Loading* Indicators between constructs in the study.

Table 1. Cross Loading of Indicators between Constructs

	Product Innovation	Market Orientation	Marketing Capabilities	Marketing Performance
PI1	0,786	0,590	0,530	0,548
PI2	0,709	0,366	0,364	0,366
PI3	0,758	0,464	0,474	0,464
PI4	0,763	0,519	0,550	0,519
MO1	0,499	0,904	0,506	0,504
MO2	0,477	0,906	0,517	0,542
MO3	0,332	0,784	0,360	0,310
MC1	0,412	0,397	0,724	0,593
MC2	0,506	0,458	0,767	0,647
MC3	0,459	0,358	0,786	0,658
MC4	0,576	0,431	0,761	0,650
MP1	0,582	0,441	0,733	0,775
MP2	0,463	0,365	0,592	0,740
MP3	0,509	0,364	0,657	0,783
MP4	0,356	0,470	0,539	0,739

Source: Primary Data, processed 2025

Reliability Test

A variable can be considered reliable if its value is more significant than 0.60 in both Cronbach alpha and composite reliability results [52]. The overall construct

reliability test results, as displayed in Table 2 below, are higher than 0,60, indicating very good Composite Reliability and Cronbach Alpha values.

Table 2. Reliability Test Results

Construc	Cronbach Alpha	Composite Reliability
Product Innovation	0,750	0,759
Market Orientation	0,836	0,876
Marketing Capabilities	0,756	0,758
Marketing Performance	0,757	0,764

Source: Primary Data, processed 2025

Structural Model Test Results (Inner Model)

The structural model (*inner model*) can be tested to see R² values (*R square*), significant values, and the

relationship between constructs. The R² value determines whether the independent variables can affect the dependent variable. The R Square value is shown below in Table 3.

Table 3. R Square Value

Construct	R – Square
Marketing Capabilities	0,478
Marketing Performance	0,725

Source: Primary Data, processed 2025

In addition to R² as an inner model test, this study employs Q² Predictive Relevance. This shows the goodness of fit model (GoF); a model is considered good if its predictive relevance is high and its Q² value is greater than zero [51]. The observation value in this study is good, as shown by the calculation of the Predictive Relevance Q² value of 0,634.

The following calculation generates the *Predictive Relevance* Q² value:

$$Q^2 = 1 - (1 - R1^2) (1 - R2^{(2)})$$

$$\begin{aligned}
 &= 1 - (1 - 0,478^2) (1 - 0,725^2) \\
 &= 1 - (1 - 0,228) (1 - 0,525) \\
 &= 1 - (0,772) (0,475) \\
 &= 1 - 0,366 \\
 &= 0,634
 \end{aligned}$$

Using SmartPLS software version 4, the hypothesis was tested using the *Partial Least Square* (PLS) analysis method. The following figure provides an interpretation of the test results:

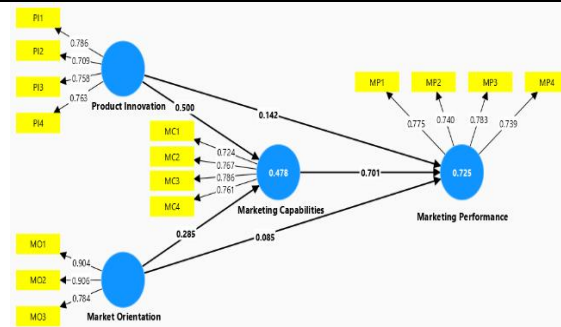


Figure 2. Full Research Model

Table 4 below provides information on the influence between variables obtained from data processing. Every unit increase in product innovation will have a 0,500 impact on marketing capabilities, according to the calculated product innovation coefficient on marketing capabilities. Additionally, the market orientation variable yields a marketing capabilities coefficient value of 0,285, meaning that for every unit increase in market orientation, marketing capabilities will rise by 0,285.

According to the marketing capabilities construct on marketing performance, which has a coefficient estimate value of 0,701, every unit increase in marketing

capabilities will translate into a corresponding increase in marketing performance of 0,701. The product innovation construct then yields an estimated coefficient of 0,142 on marketing performance, meaning that if product innovation increases by one unit, it will have a 0,142 increase in marketing performance. Finally, the market orientation construct's estimated coefficient of influence on marketing performance is 0,085, indicating that the research findings show that every unit increase in market orientation will have an increasing effect on marketing performance of 0,085.

Table 4. Inner Model Statistical Results (Direct Effects)

Relationship between Constructs	Estimated coefficient	t - statistic	p-value	Conclusion
Product Innovation -> Marketing Capabilities	0,500	5,550	0,000	Hypothesis 1 accepted
Market Orientation -> Marketing Capabilities	0,285	3,060	0,002	Hypothesis 2 accepted
Marketing Capabilities -> Marketing Performance	0,701	7,424	0,000	Hypothesis 3 accepted
Product Innovation -> Marketing Performance	0,142	1,607	0,108	Hypothesis 4 Rejected
Product Innovation -> Marketing Performance	0,085	1,116	0,264	Hypothesis 5 Rejected

Source: Primary Data, processed 2025

The outcomes of testing the five aforementioned hypotheses are explained below. The hypothesis in this study will be accepted or rejected based on the p-value and t-statistic:

1. The t value in the analysis of the impact of product innovation on marketing capabilities is 5,550 > the t table value of 1,992, and the p-value is 0,000 < 0,05; based on these results, it indicates that **hypothesis 1 is accepted**.

2. The calculated t value in the analysis of the impact of market orientation on marketing capabilities is 3,060 > the t table value is 1,992, and p-value is 0.002 < 0,05; these results conclude that **hypothesis 2 is accepted**.

3. **Hypothesis 3 is accepted**, t - statistic in the analysis of the relationship between marketing capabilities and marketing performance is 7.424 > the t - t-table of 1,992, and p-value is 0.000 < 0.05.

4. **Hypothesis 4 is rejected**, based on the test results of the effect of product innovation on marketing performance, which show a t value of 1.067 < the t table value of 1,992 and p-value of 0,108 > 0,05.

5. The calculated t value of the product impact analysis on marketing capabilities is 1,116 < the t table value of 1,992 and p-value of 0,264 > 0,005, based on these results, it means that **hypothesis 5 is rejected**.

This study uses marketing capabilities as an intervening variable, and the inner model's statistical results for indirect effects are in addition to the inner model's results for the direct effect mentioned above. According to the estimated coefficient of the relationship between product innovation and marketing performance mediated by the marketing capabilities construct, marketing performance can increase by 0,351 for every unit increase in product innovation if marketing capabilities are used as a mediator.

The estimated coefficient on the next indirect effect is 0,200. With the marketing capabilities construct serving as a moderator between the two constructs, a one-unit increase in the market orientation construct can result in a 0,200 increase in marketing performance. The findings of the study's inner model statistics testing for indirect effects are shown in Table 5 below.

Table 5. Inner Model Statistical Results (*Indirect Effects*)

Relationship between Construct	Estimated coefficient	t - statistic	p-value	Conclusion
Product Innovation -> Marketing Capabilities -> Marketing Performance	0,351	4,605	0,000	Hypothesis 6 accepted
Orientasi Pasar -> Marketing Capabilities -> Marketing Performance	0,200	2,781	0,005	Hypothesis 7 accepted

Source: Primary Data, processed 2025

The t-statistic and *p-value* are the basis for deciding whether to accept or reject the hypothesis of indirect effects in this study, as shown in Table 6 above; here are the results:

1. The impact of product innovation analysis on marketing performance through marketing capabilities has a calculated t value of 4,605 > the t table value of 1,992, and the sig is 0,000. According to these findings, the value is 0,000 < 0,05, indicating that **hypothesis 6 is accepted**.

2. In the analysis of how market orientation affects marketing performance through marketing capabilities, given that the p-value is 0,005 < 0,05 and the calculated t-value is 2,781 > the t-table value of 1,992, **hypothesis 7 is accepted**.

B. Discussions

The first hypothesis's test results demonstrate that respondents' reactions to the impact of product innovation on marketing capabilities were both favorable and significant. According to [19], companies benefit through involvement in more innovative and value-added marketing efforts. The results of this investigation align with studies conducted by [19], [34]. Product innovation can enrich marketing strategies, increase effectiveness, and assist companies in creating more value for consumers, ultimately strengthening and improving overall marketing capabilities.

The second hypothesis's test results demonstrate that respondents' reactions to the impact of market orientation on marketing capabilities were both favorable and significant. Most respondents concurred and acknowledged that market orientation would significantly and favorably affect the company's marketing capabilities. The results concluded that market orientation positively and significantly affects marketing capabilities in Creative Industry MSMEs in Surakarta City. According to [17], market orientation focuses on consumer decisions in buying a product. Sufficient focus on competitors and customer orientation is necessary to deliver optimal outcomes and satisfy customer needs and preferences. According to the study's findings, Surakarta City's creative industry MSMEs' marketing capabilities are positively and significantly impacted by the orientation that these players practice. This study's results align with research [17], [20], [48], this indicates that marketing capabilities are positively and significantly impacted by market orientation.

Furthermore, the third hypothesis testing revealed that marketing capabilities can positively and significantly impact marketing performance. Marketing capabilities carried out by creative industry MSME players in Surakarta City can directly affect marketing performance. Marketing capabilities owned by Creative Industry MSMEs in Surakarta City can increase the effectiveness of marketing strategies to accelerate the achievement of company goals. According to [49], if a

company has adequate capabilities regarding marketing strategy, this factor will provide tangible benefits in the form of increased marketing performance. This study's research line was carried out by [18], [21], [53].

The fourth hypothesis shows that respondents gave a positive but insignificant response. The marketing performance of Surakarta City's MSME players in the creative industry has not been significantly impacted by their innovations. This happens because of several factors that trigger the insignificance of innovation on marketing performance, namely that the innovations made are not by customer needs, so the product's innovation is considered irrelevant and cannot significantly improve performance in the marketing process. The study's findings indicate that product innovation alone cannot enhance the marketing performance of Surakarta City's creative industry MSMEs. However, product innovation is still vital because it can maintain business competitiveness in the market through product innovation. According to this research, studies carried out by [16], reveal the results of research that product innovation cannot significantly impact increasing marketing performance.

Additionally, respondents gave a positive but not significant response to the fifth hypothesis regarding the impact of market orientation on marketing performance. Marketing performance cannot be directly impacted by market orientation. Market orientation implemented by the creative sector, the marketing performance of MSME players in Surakarta City has not been significantly impacted. This occurs due to several factors, such as the creative industry. MSMEs may understand the needs of their customers but do not carry out proper execution, so marketing strategies run ineffectively and cannot significantly impact marketing performance. Another factor is that creative industry MSMEs are too focused on today's market conditions without any attention to future *trends* so that marketing strategies quickly experience saturation; this can cause a decrease in marketing performance because products and promotional strategies are no longer relevant to customer needs. Research conducted by [17] and research by [49] these studies support the findings of this study, which show that a company's market orientation hasn't been able to significantly affect marketing performance.

Hypothesis testing in this study was carried out using two methods: direct hypothesis testing and indirect hypothesis testing. To determine whether the moderating factors employed in this study can serve as a link to enhance the influence of product innovation and market orientation on marketing capabilities, indirect testing is employed. Product innovation can create advantages, but customers may not realize the product's added value without a strong marketing strategy. Marketing capabilities can help communicate the advantages of these

innovations to the market. Marketing capabilities play a role in ensuring that innovative products can be accepted and appreciated and have an optimal impact on the marketing carried out by the company [54]. The test results for the sixth hypothesis demonstrate that marketing capabilities can act as a mediator in the relationship between product innovation and marketing performance. Research conducted by [12] aligns with this research. The study's findings demonstrate that the relationship between product innovation and business performance, including marketing performance, can be mediated by technological capabilities used to optimize marketing performance.

The seventh hypothesis states that marketing capabilities can lessen the impact of market orientation on marketing performance. Market orientation carried out by creative industry MSMEs in Surakarta City can significantly affect marketing performance with marketing capabilities to mediate its influence on marketing performance. Companies can process market information obtained through the market orientation process into a superior marketing strategy with the right market segmentation, competitive pricing, and a more effective promotion strategy. Without good marketing capabilities, the information obtained from the market orientation process is not optimally utilized to improve marketing performance. According to [49], market orientation will impact marketing performance if adequate marketing capabilities mediate the influence of both. The findings of this study support those of research by [2], [7], [17], [49], it suggests that marketing capabilities can act as a mediator in the relationship between market orientation and marketing performance.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

The following describes the conclusions based on data processing and discussion. Product innovation and product orientation variables positively and significantly impact marketing capabilities. This demonstrates how MSMEs use product innovation and market orientation strategies in Surakarta City's creative industry sector, which can impact their increased marketing capabilities. According to this study, marketing capabilities have a positive and significant impact on the marketing performance of MSMEs in Surakarta City's creative industry.

On the other hand, neither product innovation or market orientation variables directly affect the marketing performance of creative industry MSMEs in Surakarta City. In this case, marketing capabilities successfully act as a mediator in the influence of product innovation and market orientation on the marketing performance of creative industry MSMEs in Surakarta City. This conclusion means that product innovation can positively and significantly impact the marketing performance of creative industry MSMEs in Surakarta City through good marketing capabilities. Through effective marketing capabilities, market orientation can also have an indirect impact on the marketing performance of MSMEs in the creative industry in Surakarta City.

B. Suggestion

According to the findings of the study on how

market orientation and product innovation affect marketing performance using marketing capabilities as an intervening variable, researchers provide several suggestions for further research and creative industry MSME players in the Surakarta City area. Advice for the creative sector for MSME owners, including those in the creative industry, to have a greater influence on marketing performance, they must continuously enhance and reassess product innovation and market orientation; MSME managers should provide more added value to products and increase communication with consumers and improve after-sales service.

Suggestions for future researchers, namely: Future researchers are advised to be able to use more recent and relevant variables and indicators in research so that testing of marketing performance can be explored more broadly. Future researchers are also expected to expand and increase the sample size in the study so that the research is of higher quality and produces new findings that can support past and future research.

References:

1. B. . Buli, "Entrepreneurial orientation, market orientation and performance of SMEs in the manufacturing industry: Evidence from Ethiopian enterprises," *Management Research Review*, vol. 40, no. 3, 2017, doi: <https://doi.org/10.1108/MRR-07-2016-0173>.
2. M. S. Hidayat, Sudarmiatin, I. Mukhlis, and A. Hermawan, "the Influence of Entrepreneurial Orientation, Market Orientation, Learning Orientation on Marketing Performance Mediated By Sme Marketing Capabilities To Support the Achievement of the Sustainable Development Goals," *Journal of Lifestyle and SDG'S Review*, vol. 4, no. 1, pp. 1–22, 2024, doi: [10.47172/2965-730X.SDGsReview.v4.n00.pe01729](https://doi.org/10.47172/2965-730X.SDGsReview.v4.n00.pe01729).
3. A. Tanjung, Hermiyetti, H. Parkhurst, and F. C. Young, "Marketing Performance: Digital Marketing and Marketing Ability Moderated by Government Policies (The Owner of Snack UMKM in Bekasi Regency)," *Maneggio Journal*, vol. 1, no. 6, pp. 1–11, 2024.
4. S. Hidayat and Murwatiningsih, "Pengaruh Orientasi Pasar dan Kewirausahaan terhadap Kinerja Pemasaran melalui Kapabilitas Pemasaran pada UMKM Lanting di Kecamatan Kuwarasan Kabupaten Kebumen," *Management Analysis Journal*, vol. 7, no. 1, pp. 98–109, 2018.
5. K. Muller, C. Rammer, and J. Truby, "The Role of Creative Industries in Industrial Innovation," *ECONSTOR*, vol., no. 08, p. 109, 2009, [Online]. Available: https://www.researchgate.net/publication/46457620_The_Role_of_Creative_Industries_in_Industrial_Innovation
6. A. Puspaningrum, "Market Orientation, Competitive Advantage and Marketing Performance of Small Medium Enterprises (SMEs)," *Journal of Economics, Business, & Accountancy Ventura*, vol. 23, no. 1, pp. 19–27, 2020, doi: [10.14414/jebav.v23i1.1847](https://doi.org/10.14414/jebav.v23i1.1847).
7. A. Riswanto, Rasto, H. Hendrayati, M. Saparudin, A. Z. Abidin, and A. P. Eka, "The role of

- innovativeness-based market orientation on marketing performance of small and medium-sized enterprises in a developing country,” *Management Science Letters*, vol. 10, no. 9, pp. 1947–1952, 2020, doi: 10.5267/j.msl.2020.2.019.
8. D. Utami, L. E. H. Mulyono, and L. . Furkan, “The Effect of Market Orientation and Product Innovation to Increase Marketing Performance Moderated by Creativity,” *International Journal of Social Science Research and Review*, vol. 5, no. 1, pp. 20–36, 2022.
9. I. Badollahi, I. M. Narsa, and B. Basuki, “The effect of market orientation, innovation, organizational learning and entrepreneurship on Firm Performance,” *Journal of Entrepreneurship Education*, vol. 22, no. 3, 2019.
10. S. Suharti, Z. Anissa, and Yusuf, “Market Orientation And Product Innovation In Improving Competitive Advantage And Its Impact On Market Performance,” *International Journal of Social Service and Research*, vol. 4, no. 05, pp. 1266–1271, 2024, doi: 10.46799/ijssr.v4i05.804.
11. H. . Athar, “Foreign Tourist Food Preference in Lombok: A Qualitative Research In Costumer Behaviour,” *Dinasti International Journal of Digital Business Management*, vol. 1, no. 3, 2020.
12. D. Agustia, S. D. Haryanto, Y. Permatasari, and P. N. Midiantari, “Product innovation, firm performance and moderating role of technology capabilities,” *Asian Journal of Accounting Research*, vol. 7, no. 3, pp. 252–265, 2022, doi: 10.1108/AJAR-12-2021-0266.
13. M. Ejrami, N. Salehi, and S. Ahmadian, “The Effect of Marketing Capabilities on Competitive Advantage and Performance with Moderating Role of Risk Management in Importation Companies,” *Procedia Economics and Finance*, vol. 36, no. 16, pp. 22–28, 2016, doi: 10.1016/s2212-5671(16)30012-0.
14. R. N. Dahana, N. K. Indrawati, and Mugiono, “Competitive Advantage to Mediate the Influence of Product Innovation and Entrepreneurial Orientation on Marketing Performance in Small and,” *Journal of Applied Management (JAM)*, vol. 19, no. 2, pp. 413–423, 2020, [Online]. Available: <https://www.ajhssr.com/wp-content/uploads/2020/08/N2048136145.pdf>
15. D. Dahmiri, J. Junaidi, J. Johannes, S. Yacob, and S. Indrawijaya, “The Impact of Market Orientation on Marketing Performance: Exploring the Moderating Role of Competitive Advantage,” *Business: Theory and Practice*, vol. 25, no. 1, pp. 164–174, 2024, doi: 10.3846/btp.2024.20174.
16. D. Wulandari, W. K. Widodasih, K. Satpatmantya, and B. Rochayata BR, “Pengaruh Orientasi Kewirausahaan dan Inovasi Produk Terhadap Kinerja Pemasaran Melalui Keunggulan bersaing Sebagai Variabel Mediasi Pada UMKM Percetakan Di Kab. Bekasi,” *SEIKO: Journal of Management & Business*, vol. 7, no. 1, pp. 151–168, 2024.
17. Maryono, Taharuddin, Fitriyadi, Humaidi, and R. M. Hidayat, “Kemampuan Orientasi Pasar Dan Kewirausahaan Untuk Meningkatkan Kinerja Pemasaran IKM Kerajinan Kain Sasirangan Melalui Kapabilitas Pemasaran Dinamis,” *Jurnal Bisnis dan Pembangunan*, vol. 13, no. 1, pp. 97–115, 2024.
18. I. Murniawaty, C. H. Munafitri, and N. Farliana, “Membangun Kinerja Pemasaran Melalui Orientasi Pasar, Inovasi Produk, dan Kapabilitas Pemasaran,” *SAINS: Jurnal Manajemen dan Bisnis*, vol. 13, no. 2, pp. 257–275, 2021, [Online]. Available: <https://jurnal.untirta.ac.id/index.php/jsm>
19. W. A. Arramadhan Daulay, “Analisis Pengaruh Inovasi, Pengambilan Resiko, Otonomi, dan Reaksi Proaktif Terhadap Kapabilitas Pemasaran Ukm Kuliner,” *Jurnal Akuntansi, Manajemen, Bisnis dan Teknologi (AMBITEK)*, vol. 3, no. 2, pp. 159–166, 2023, doi: 10.56870/ambitek.v3i2.87.
20. I. H. Hatta, “The Effect of Market Orientation, Entrepreneurship towards the Marketing Capability and Performance,” *International Journal of Business and Management Invention ISSN*, vol. 4, no. 7, pp. 62–68, 2015, [Online]. Available: www.ijbmi.org
21. F. Sudirjo, A. Y. Rukmana, H. Wandan, and M. L. Hakim, “Pengaruh Kapabilitas Pemasaran, Digital Marketing Dalam Meningkatkan Kinerja Pemasaran UMKM Di Jawa Barat,” *Jurnal Bisnisan : Riset Bisnis dan Manajemen*, vol. 5, no. 1, pp. 55–69, 2023, doi: 10.52005/bisnisan.v5i1.134.
22. W. Tumbur, M. L. Tobing, A. Zaenuri, M. Si, and A. S. Ramadhan, “Meningkatnya Marketing Performance Perusahaan Konstruksi Sebagai Dampak Hubungan Yang Signifikan Antara Digital Marketing Capabilities Terhadap Service Quality,” vol. 3, no. 1, pp. 95–109, 2023, [Online]. Available: <http://journal.stiestekom.ac.id/index.php/dinamikapag>
23. G. Gunday, G. Ulusoy, K. Kilic, and L. Alpkan, “Effects of innovation types on firm performance,” *International Journal of Production Economics*, vol. 133, no. 2, pp. 662–676, 2011, doi: 10.1016/j.ijpe.2011.05.014.
24. F. Ramadhani, A. Kusumah, and W. L. Hardilawati, “Pengaruh Inovasi Produk, Orientasi Pasar Dan Marketing Digital Terhadap Kinerja Pemasaran Ukm Pada Masa Pandemi Covid-19 Di Pekanbaru,” *Economics, Accounting and Business Journal*, vol. 2, no. 2, pp. 344–354, 2022, [Online]. Available: <https://jom.umri.ac.id/index.php/eaccountbis/article/view/153>
25. Dr. Rosmayani, *Kinerja Pemasaran: Impelentasi Industri Kecil Berbasis Inovasi*. Surabaya: Pustaka Aksara, 2022. [Online]. Available: www.pustakaaksara.co.id
26. K. D. Kawira, “The Effect of Product and Service Innovation on the Performance of Micro, Small and Medium Enterprises in Kenya,” *Journal of Marketing and Communication*, vol. 4, no. 1, pp. 2617–359, 2021, [Online]. Available: <https://stratfordjournals.org/journals/index.php/journal-of-marketing/article/view/681>
27. A. Sihvonen, M. Jaakkola, J. Frosen, and H. Tikkanen, “Market orientation, innovation capability and business performance: Insights from the global financial crisis,” *Baltic Journal of Management*, vol. 9, no. 2, pp. 134–152, 2014, doi: 10.1108/BJM-03-2013-0044.
28. A. Wójcik-Karpacz, J. Karpacz, and J.

- Rudawska, "The impact of market orientation on the performance of msme operating in technology parks: The role of market dynamism," *Journal of Entrepreneurship, Management and Innovation*, vol. 17, no. 2, pp. 29–52, 2021, doi: 10.7341/20211722.
29. H. Khan and Z. Khan, "The efficacy of marketing skills and market responsiveness in marketing performance of emerging market exporting firms in advanced markets: The moderating role of competitive intensity," *International Business Review*, vol. 30, no. 6, 2021, doi: <https://doi.org/10.1016/j.ibusrev.2021.101860>.
30. E. Bil and E. Özdemir, "The effect of technological innovation capabilities on companies' innovation and marketing performance: A field study on Technopark companies in Turkey," *Journal of Life Economics*, vol. 8, no. 3, pp. 361–378, 2021, doi: 10.15637/jlecon.8.3.08.
31. A. N. Waliuddin and F. Umar, "The Impact of Product Innovation on Marketing Performance," *Proceedings of the 2nd International Conference of Strategic Issues on Economics, Business and, Education (ICoSIEBE 2021)*, vol. 204, no. ICoSIEBE 2021, pp. 328–335, 2022, doi: 10.2991/aebmr.k.220104.050.
32. A. Al Sokkar, M. Alghizzawi, J. Al - Gasawneh, and T. M. A. Hmeidan, "The Effectiveness of E-Marketing on Marketing Performance in Jordanian Telecommunications Companies: Exploring the Mediating Role of the Competitive Environment," *SN Computer Science*, vol. 6, no. 58, 2025, doi: 10.1007/s42979-024-03595-6.
33. N. Farida, "Determinants of Marketing Performance: Innovation, Market Capabilities and Marketing Performance," *Jurnal Dinamika Manajemen*, vol. 7, no. 1, p. 59, 2016, doi: 10.15294/jdm.v7i1.5759.
34. I. H. Hatta, "Analisis Pengaruh Inovasi, Pengambilan Resiko, Otonomi, dan Reaksi Proaktif Terhadap Kapabilitas Pemasaran Ukm Kuliner Daerah di Jabodetabek," *Jurnal Manajemen Pemasaran*, vol. 8, no. 2, pp. 90–96, 2014, doi: 10.56870/ambitek.v3i2.87.
35. N. A. Morgan, D. W. Vorhies, and C. H. Mason, "Research notes and commentaries market orientation: Marketing capabilities, and firm performance," *Strategic Management Journal*, vol. 30, no. 8, pp. 909–920, 2009, doi: 10.1002/smj.764.
36. B. Salisu, L. J. Abu-Bakr, and S. H. A. Rani, "The Influence of Marketing Capability on Firm Performance: An Empirical Evidence from Nigeria," *European Journal of Business and Management*, vol. 9, no. 32, pp. 147–154, 2017.
37. M. F. Nizam, E. Mufidah, and V. Fibriyani, "Pengaruh Orientasi Kewirausahaan, Inovasi Produk dan Keunggulan Bersaing terhadap Pemasaran UMKM," *Jurnal EMA - Ekonomi Manajemen Akuntansi*, vol. 5, no. 2, pp. 100–109, 2020.
38. D. Gemina, E. Silaningsih, and K. Nisa, "Kinerja Pemasaran Berbasis Orientasi Pasar serta Inovasi Produk pada Industri Mikro, Kecil dan Menengah Makanan Ringan Kabupaten Subang," *INOBI: Jurnal Inovasi Bisnis dan Manajemen Indonesia*, vol. 2, no. 2, pp. 251–264, 2019, doi: 10.31842/jurnal-inobis.v2i2.88.
39. S. Harini, E. Silaningsih, and M. E. Putri, "Pengaruh orientasi pasar , kreativitas dan inovasi produk terhadap kinerja pemasaran UMKM," *Jurnal Inspirasi Bisnis dan Manajemen*, vol. 6, no. 1, pp. 67–82, 2022.
40. Nurjaya, A. Affandi, H. Erlangga, D. Sunarsi, and Jasmani, "The Effect of Product Promotion and Innovation Activities on Marketing Performance in Middle Small Micro Enterprises in Cianjur," *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, vol. 4, no. 1, pp. 528–540, 2021, doi: 10.33258/birci.v4i1.1636.
41. Tri Imaliya, Asri Winanti Madyoningrum, and Widya Nurcahyaningih, "Keunggulan Bersaing, Promosi Pemasaran Media Sosial Dan Inovasi Produk Terhadap Kinerja Pemasaran Pelaku Usaha Ukm Kecamatan Tuntang Kabupaten Semarang," *Jurnal Manajemen, Bisnis dan Kewirausahaan*, vol. 3, no. 3, pp. 77–92, 2023, doi: 10.55606/jumbiku.v3i3.3379.
42. A. Nataya and J. E. Sutanto, "The Effect of Product Innovation and Service Innovation towards Marketing Performance (Case Study on Plastic Produces in Surabaya)," *International Journal of Business and Management Invention (IJBMI)*, vol. 7, no. 8, pp. 61–66, 2014.
43. Khamaludin *et al.*, "The influence of social media marketing , product innovation and market orientation on Indone- sian SMEs marketing performance," *International Journal of Data and Network Science*, vol. 6, pp. 9–16, 2022, doi: 10.5267/j.ijdns.2021.11.002.
44. H. Aksoy, "How do innovation culture, marketing innovation and product innovation affect the market performance of small and medium-sized enterprises (SMEs)?," *Technology in Society*, 2017, doi: 10.1016/j.techsoc.2017.08.005.This.
45. H. Kartika, "The Role of Social Media Marketing, Product Innovation and Market Orientation on Marketing Performance: An Empirical Study on SMEs in Banten," *International Journal of Social and Management Studies (Ijomas)*, vol. 02, no. 05, pp. 1–10, 2021.
46. S. Suparman and E. Ruswanti, "Market Orientation, Product Innovation on Marketing Performance Rattan Industry in Cirebon Indonesia," *IOSR Journal of Economics and Finance*, vol. 08, no. 01, pp. 19–25, 2017, doi: 10.9790/5933-0801031925.
47. L. Y. . Sin, O. Yau, and A. Tse, "Market Orientation And Business Performance," *Journal Global Marketing*, vol. 13, no. 1, 2000, doi: 10.4314/ajfm.v13i1.24386.
48. D. W. Vorhies and M. Harker, "The Capabilities and Perfor Mance Advantages of Market-Driven Firms: An Empirical Investigation," *Australian Journal of Management*, vol. 25, no. 2, pp. 145–171, 2000, doi: 10.1177/031289620002500203.
49. S. Hidayat and Murwatiningsih, "Pengaruh Orientasi Pasar dan Kewirausahaan terhadap Kinerja Pemasaran melalui Kapabilitas Pemasaran pada UMKM Lanting di Kecmatan Kuwarasan Kabupaten Kebumen," *Management Analysis Journal*, vol. 7, no. 1, pp. 120–128, 2018.
50. Ghazali, *Struktural Equation Modelling Metode Alternatif Dengan Partial Least Square*. 2008.

51. I. Ghozali and H. Latan, *Partial Least Square konsep, metode dan aplikasi menggunakan WarpPLS 5.0*. Universitas Diponegoro, 2016.
52. Ghozali, Susanto, and R. S. Handayani, "Faktor-Faktor Yang Memengaruhi Penerimaan Dan Penggunaan Sistem Informasi Pengelolaan Keuangan Daerah (SIPKD) Dalam Perspektif The Unified Theory Of Acceptance And Use Of Technology 2 (Utaut 2) Di Kabupaten Semarang,," *Jurnal Akuntansi dan Auditing*, vol. 15, no. 1, pp. 37–68, 2018.
53. W. T. M. Tobing, A. Zaenuri, and A. S. Ramadhan, "Meningkatnya Marketing Performance Perusahaan Konstruksi Sebagai Dampak Hubungan Yang Signifikan Antara Digital Marketing Capabilities Terhadap Service Quality,," *Jurnal Manajemen Sosial Ekonomi (Dinamika)*, vol. 3, no. 1, pp. 95–109, 2023, [Online]. Available: <https://journal.stiestekom.ac.id/index.php/dinamika/article/view/368%0Ahttps://journal.stiestekom.ac.id/index.php/dinamika/article/download/368/330>
54. T. Asashi and I. P. G. Sukaatmadja, "Peran Inovasi Produk dalam memediasi Pengaruh Orientasi Pasar terhadap Kinerja Pemasaran,," *E - Jurnal Manajemen UNUD*, vol. 6, no. 4, pp. 1816–1845, 2017.

JURISPRIDENCE

A NEW FRENCH BILL AGAINST FOOD WASTE TO BE SUPPORTED

Arash Derambarsh

is deputy mayor in the town of Courbevoie. He is at the origin of the law against food waste passed on 3rd February 2016 in France. In Sweden in 2019, he received the « WIN WIN Gothenburg Sustainability Award ». ¹⁴ is affiliated with YEREVAN STATE UNIVERSITY (ARMENIA) for seeking Ph.D in Law in 12.00.01 specialization (Theory and History of State and Law, history of state and legal teachings) <https://doi.org/10.5281/zenodo.14947179>

Abstract

The objective of this analysis is to highlight the urgency of quickly obtaining a new effective law against food waste.

Indeed, the alarming situation with regard to the social and environmental emergency requires a change in the law.

Indeed, with on the one hand an increase in impoverishment in our country and increasingly long queues at the « soup kitchen » and on the other hand the emergence of worrying global warming, citizens expect effective, innovative and adapted legal tools.

Let us recall that the French law of 3rd February 2016 had positive consequences that we will study.

However, we must go further with a new bill against food waste in order to adapt the legal framework to the current situation.

This is the objective of this legal analysis.

Keywords: Food Waste, European Law, sustainable development, Food lost, Bill, French Law, Food Waste, FAO

INTRODUCTION

The Food and Agriculture Organization of the United Nations (FAO) estimates that thirty percent of the food produced worldwide is wasted.

This amounts to one out of every three foods worldwide.

However, according to the Food and Agriculture Organization (FAO), 783 million people globally faced hunger in 2022, and 3.1 billion people lacked access to a good food in 2021.

At the same time, the organization estimates that, globally, « 13% of food is lost in the distribution chain, from post-harvest to pre-retail and that an additional 17% of food is wasted at the household, food service and retail levels. »^{15 16}

The demand for food items has increased globally in recent decades due to changes in eating patterns and demographic growth.

The restrictions that agriculture faces—such as yield limits, technological integration, natural disasters, climate change, urbanization-related loss of agricultural lands, and scarcity of water resources—are placing growing pressure on agricultural productivity.

To fulfill the food supply, reducing losses and waste might be a key lever in addition to raising agricultural productivity.

It is impossible to distinguish clearly between the two concepts of « losses » and « waste » due to the wide variety of circumstances under which they arise across nations.

According to the FAO, 30% of food produced worldwide is wasted.

1.3 billion tons of food, or more than half of the world's grain supply, are lost or wasted annually worldwide, from agricultural production to ultimate consumption.

The issue at hand is worldwide : 670 million and 630 million tons of food are wasted annually in wealthy and developing nations, respectively.

According to FAO estimates, there will be an additional 2.3 billion people on Earth by 2050, bringing the total population to more than 9 billion. By 2100, there will be more people on the planet than 11 billion.

Food production will need to expand in order to keep up with the population's continued need for food.

Demand for food will continue to increase and it will be necessary to intensify food production to feed this population.

If this trend continues, the FAO estimates that global food production will have to increase by 40 to 70% by 2050 to meet needs.

It won't be sufficient to increase output at this rate of waste.

By examining the true demands of the consumer, we must investigate the strategies that should be used at every link in the food chain.

At every level, progress is achievable.

To create solutions that both « feed more » and « feed better » for a growing population, all stakeholders must band together.

¹⁴ « Nobel Prize for sustainable development: lawyer Arash Derambarsh rewarded » : <https://clever-energies.com/en/nobel-prize-for-sustainable-development-lawyer-arash-derambarsh-rewarded/>

¹⁵ FAO - 2022

¹⁶ United Nations Environment Program, 2021

Food waste and food insecurity are therefore two complex and interdependent phenomena. Food waste is a major problem, both environmentally and socially.

It represents a loss of valuable resources and can have a negative impact on people in food insecurity.

Therefore, the concept of food insecurity is often reduced to the question of access to sufficient food in quantity and quality.

The French law of 3rd February 2016 quickly proved its beneficial effects:

- More than 10 million meals are distributed each year in France.

- A 22% increase in food donations to charities.

However, due to the increase in impoverishment within the middle class and the establishment of increasingly long queues for the "soup kitchen", added to this a decrease in food donations to charities, it is necessary to provide even bolder responses.

Hence the filing of a new French bill against food waste in order to go further.

It is precisely because there is a social emergency and a crisis at the level of the food chain that it is appropriate to legally regulate these dysfunctions and economic imbalances.

So, can a new legal framework better regulate the food donation system ?

Our analysis responds to this problem with a requirement to accelerate the legislative process at the national level.

MAIN PART

I- A food scandal in front of social and environmental emergency

For a long time, food contributions were the subject of a controversy as most supermarkets tossed away their unsold stock instead of donating it to the underprivileged or nonprofit organizations.¹⁷

The fact that the Observatory of Inequalities estimates that 5.3 million individuals in France lived below the poverty level in 2023 makes this scenario much more concerning.¹⁸

Therefore, in order to put an end to this plague, specific answers had to be given.

The #StopFoodWaste movement led to the adoption of a legislation in France requiring retailers to give unsold food, preventing over 10 million meals from ending up in landfills and resulting in a 22% increase in food contributions to charitable organizations.¹⁹

Every grocery store in the European Union continues to discard more than 40 kg of food every night, despite the fact that more than 95.3 million people (or 22% of the population) live in poverty and frequently struggle to provide for their families in 2022.²⁰

The #StopFoodWaste campaign's straightforward solution to this issue was to pass a national law encouraging stores to donate unsold food instead of throwing it out.

Passed on 3rd February 2016²¹, the new law seeks to tackle food waste by obliging all French supermarkets to give away their unsold food and distribute it to those in need, ensuring that nothing is wasted. Supermarkets are free to support the aid association or charity of their choice, and every citizen can apply to create an authorised association to assist in food distribution.

Over 10 million meals are prevented from ending up in landfills each year thanks to the regulation, which has also increased food donations to social assistance organizations by more than 22%. In addition to mobilizing volunteers and streamlining the distribution of food contributions through affiliated organizations, the initiative has increased public awareness of the problem of food waste at the municipal level.

II- The French city of Courbevoie as a driving force against food waste

Since the adoption of the law against food waste, voted on 11th February 2016, supermarkets have been required to donate their unsold food to charities. A world first.

In accordance with **LAW No. 2016-138** of 11th February 2016 relating to « *the fight against food waste* »²², supermarkets whose sales area exceeds the surface area threshold of 400 square meters are required to donate their unsold consumable food to a charity. Failing this, the fine is 3,750 euros.

In 2019, an amendment increased the penalties in force. The one targeting food retailers that have not signed a donation agreement with an association, goes from a third-class fine (of a maximum amount of 450 euros) to a fifth-class fine (1,500 euros maximum). The amount of the administrative fine incurred for the destruction of consumable foodstuffs increases from 3,750 euros to 10,000 euros.²³

Senator Esther BENBASSA explained the purpose of her amendment in the following terms on 20th September 2019 :

« *It has been noted that some distribution players are still recalcitrant when it comes to applying the 2016*

¹⁷ The Telegraph « Iceland staff 'pour bleach onto waste food to stop homeless people eating it' » : <https://www.telegraph.co.uk/foodanddrink/foodanddrinknews/7564402/Iceland-staff-pour-bleach-onto-waste-food-to-stop-homeless-people-eating-it.html>

¹⁸ France Info : https://www.francetvinfo.fr/societe/plan-pauvrete/precarite-en-2023-5-3-millions-de-personnes-vivraient-sous-le-seuil-de-pauvrete-en-france_6304863.html

¹⁹ Anti-food waste law: what results after 18 months ? (Le Figaro – 2018) : <https://www.lefigaro.fr/economie/le-scan-eco/2018/10/16/29001-20181016ARTFIG00007-loi-anti-gaspillage-alimentaire-quel-bilan-apres-18-mois.php>

²⁰ Poverty in Europe (Statista 2023) : <https://fr.statista.com/infographie/17748/niveaux-de-pauvrete-en-france-et-en-europe/>

²¹ Law No. 2016-138 of 11th February 2016 relating to the fight against food waste : <https://www.legifrance.gouv.fr/jorf/id/JORFARTI000032036290>

²² LOI n° 2016-138 du 11 février 2016 relative à la lutte contre le gaspillage alimentaire : <https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000032036289/>

²³ Amendement présenté par la sénatrice Esther BENBASSA : https://www.senat.fr/amendements/2018-2019/728/Amdt_213.html

Law. It is therefore deemed necessary by the information report of June 12, 2016 on the evaluation of Law No. 2016-138 to make the penalties incurred more stringent so that they are more dissuasive.

The penalty for non-compliance is currently punishable by a fixed penalty of the third class. This amendment therefore proposes to increase it to a fine of the fifth class.

The penalty for destroying consumable foodstuffs is an administrative fine of 3,750 euros, which currently only applies to distributors in the food sector. This amendment proposes to increase this fixed fine to 10,000 euros ».

Thus, this law has quickly proven its beneficial effects :

- More than 10 million meals are distributed each year in France.
- A 22% increase in food donations intended for charitable associations.

This assessment is therefore positive, but we must go further and improve the law due to the increase in impoverishment in our country and the long queues for the « Meal Center ».²⁴

Indeed, charities complain of a drop in donations. We must therefore find new solutions.

Since 2020, the City of Courbevoie has been pursuing a dynamic and bold policy to combat food waste and hunger.

And the results are remarkable: more than 500,000 meals saved and distributed to charities.

On 31st Friday January 2025, Courbevoie city welcomed agents of the Food and Agriculture Organization of the United Nations (FAO) for a major international conference.²⁵

Many guests were present, including **Jacques KOSSOWSKI** (Mayor of Courbevoie city), **Divine NAGANJE NIJE** (Deputy Director of the Agri-Food Systems and Food Safety Division of FAO), **Myriam ANNETTE** (International Expert, Prevention and Reduction of Food Losses and Waste, at the FAO Regional Office for Europe and Central Asia), **Reza NAJIB** (FAO Programme Officer), **Roselyne BACHELOT-NARQUIN** (former Minister), **Jean-Jacques BOUYA** (Minister of State of Congo Brazzaville), **Frédéric SIMONIN** (Starred Chef, Meilleur Ouvrier de France 2019), **Franck PAPAZIAN** (President MediaSchool and co-president of the CCAF), **Manon MONTESSUIT** (chef), **Nabil ZEMMOURI** (Anti-waste Chef), **Karim BOUAMRANE** (Mayor of Saint-Ouen-sur-Seine city), **Joelle CECCALDI RAYNAUD** (Mayor of Puteaux city and President of POLD) and **Marie-Do AESCHLIMANN** (French Senator).

²⁴ « L'appel des Restos du cœur, révélateur des difficultés de tout un secteur face à la hausse des besoins » : https://www.lemonde.fr/societe/article/2023/09/07/l-appel-des-restos-du-c-ur-revelateur-des-difficultes-de-tout-un-secteur-face-a-la-hausse-des-besoins_6188233_3224.html

²⁵ « Le combat de Courbevoie contre le gaspillage alimentaire inspire d'autres élus et collectivités » : <https://www.echoidf.fr/de-nouvelles-actions-contre-le-gaspillage-alimentaire/>

²⁶ « Green Cities Initiative » (FAO) : <https://www.fao.org/green-cities-initiative/network/en>

The United Nations agents were able to note that indeed, more than 500,000 meals were saved and redistributed to charitable associations so that the poor (middle class representing single mothers or fathers raising several children, retirees, unemployed or students) could eat their fill.

And thanks to these results, the city of Courbevoie has been recognized as an « **FAO Green City** ». ²⁶

And this change provides solutions to the current social situation in our country which is alarming.

This social situation also demonstrates that even in a city that appears « well-off », poverty has multiple facets. Poverty is increasing and the middle class is declining.

Thus in an alarming report, Secours Catholique estimated that nearly 10% of French people resort to food aid.²⁷

Indeed, « between 5 and 7 million people » had recourse to food aid in 2020, warns Secours Catholique in its annual report on the state of poverty in France published on the basis of data from the General Directorate for Social Cohesion (DGCS).²⁸

The city of Courbevoie has therefore shown inventiveness in its fight against food waste. ²⁹

The city of Courbevoie has therefore shown inventiveness in its fight against food waste.

It was therefore decided that with the help of several start-ups and social and economic actors, a charter against food waste would be voted on each year in all spheres of activity in the city:

- 2020 with all supermarkets located in the city without delimitation of surface area
 - 2021 with hospital catering
 - 2022 with school catering
 - 2023 with food stores (food stores, restaurants, bakeries, markets)
 - 2024 with retirement homes and nursing homes.
- These commitment charters, a first in France, have a multiple objective :
- Create synergies so that everyone can take part in this fight and adapt their practices
 - Participate in raising awareness among the general public about the fight against food waste
 - Contribute to reducing the economic impact of this waste
 - Set up food donation partnerships for associations in accordance with the law
 - Promote partnerships with municipal associations
 - Organize « anti-waste » promotions, particularly for products close to their use-by date (UBD)
 - Offer wholesale or unit sales in order to adapt the quantities purchased and reduce packaging

²⁷ « Pauvreté en France : 10% de la population a eu besoin d'une aide alimentaire en 2020 » (Université Paris Saclay) : <http://www.ritm.universite-paris-saclay.fr/poverty-in-france-10-of-the-population-needed-food-aid-in-2020/>

²⁸ Site Ville de Courbevoie : <https://www.ville-courbevoie.fr/2195/lutte-contre-le-gaspillage-alimentaire.htm>

²⁹ The law on Food Waste - From Courbevoie to Assembly : <https://resource.co/article/law-food-waste-courbevoie-assembley-10198>

- Promote the development of fresh products, and develop awareness-raising marketing operations (operation « Ugly Fruits and Vegetables », etc.)
- Conduct a discussion with suppliers in order to define a control strategy against food waste (product quality charters, etc.)
- Act to recover waste.

On the strength of all this work, the FAO designated the city of Courbevoie as a « **World Green City** » in 2024, thus granting it formal recognition.

III-A new bill proposal to go further

It is precisely on this alarming situation that Senator Marie-Do AESCHLIMANN was asked to propose a new law to go further.

A « *Bill to strengthen the fight against food waste* » was therefore submitted to the Senate on 20th January 2025 and whose Text bears the reference number 247 (2024-2025).

The proposal was simple : modify the law against food waste promulgated on February 11, 2016.

- Reduce the current ceiling of 400 m² imposed on supermarkets to reduce it to at least 100 m² in order to include more than 5,000 additional points of sale.
- Increase the current fines of the 5th class representing 10,000 euros to 20,000 euros against supermarkets that continue to throw away unsold edible food.

It is precisely Senator Marie-Do AESCHLIMANN who is carrying this « *Bill to strengthen the fight against food waste* » tabled in the Senate on 20th January 2025 and whose Text bears the reference number 247 (2024-2025).

Here is the explanatory statement of **Senator Marie-Do AESCHLIMANN**

Ladies and Gentlemen,

Every year, millions of tons of food are wasted in France, even though part of the population struggles to eat properly. This aberration, which is at once ethical, social and economic, requires renewed mobilization against food waste. Under Article L. 541-15-1 of the Environmental Code resulting from Law No. 2020-105 of 10th February 2020 relating to the fight against waste and the circular economy, food waste is defined as "any food intended for human consumption which, at any stage of the food chain, is lost, thrown away or degraded".

On a global scale, the equivalent of one billion meals would have been wasted every day in 2022, according to a report by the United Nations Environment Programme (UNEP). A waste that the director of UNEP(*) describes as a "global tragedy".

In France, according to data from the Ministry of Agriculture and Food Sovereignty, food waste represented 4.3 million tons of food in 2022.

The worrying increase in food insecurity - which today affects 16% of the French population2(*) - makes throwing away edible food even more unacceptable. For the year 2023, it is estimated that 2 to 3 million3(*) people benefited from food aid distributed by associations.

This development is closely linked to the context of food inflation. After an 11% price increase in 2022, the Observatory published by rural Families recorded a

further 16% price increase for fruits and vegetables in 2023.

In addition, according to the Observatory of Food Vulnerabilities created by the Nestlé Foundation, 37% of French people declared themselves to be food insecure in 2023, compared to 11% in 2015. This study also reveals that young people aged 18-24 are particularly affected, as are women, single people and single-parent families4(*).

With an estimated cost of 16 billion euros per year in France and 1,000 billion dollars for the global economy5(*), food waste has consequences that are not negligible on the economic level.

Finally, its environmental cost is particularly significant since it represents 8 to 10% of global greenhouse gas emissions6(*). According to the Waste and Resources Action Program (WRAP), if it were considered a country, food waste would be the "third largest emitter of greenhouse gases behind the United States and China". In France, the Agency for Ecological Transition (ADEME) estimates this impact at 15.3 million tonnes of CO₂ equivalent, or 3% of all our emissions7(*).

The fight against food waste is therefore a major ethical, ecological, social and economic challenge for our society. Since signing the National Pact to Combat Food Waste in 2013, France has resolutely taken up this issue by strengthening its legislative arsenal in order to raise awareness and involve all stakeholders in the food chain in the fight against food waste, in particular through the practice of food donations, which is an essential lever in the fight against poverty.

Thus, as a result of the successive laws adopted over the last ten years, the list of stakeholders affected by the obligation to conclude food donation agreements with associations has continued to grow. Initially applied to distributors with a sales area of more than 400 m², this obligation has been extended to operators of collective catering serving more than 3,000 meals per day as well as to operators in the agri-food industry and wholesale trade whose turnover exceeds 50 million euros.

At the same time, the associative world, communities, but also companies and players in the food sector, have also committed to developing virtuous initiatives aimed at reducing waste. This is the case, for example, of the city of Courbevoie, in Hauts-de-Seine, where under the leadership of Arash Derambarsh, deputy mayor, a Charter of Commitment against Food Waste signed with local stakeholders has made it possible to save and redistribute 400,000 meals in four years. In 2024, this proactive approach earned Courbevoie the title of "green city" awarded by the Food and Agriculture Organization (FAO), the specialized agency of the United Nations (UN)8(*).

Despite real awareness at all levels since 2013, due to a lack of tools and indicators, it has not been possible to accurately assess the volume of food waste sources and their evolution. The objective assigned by the anti-waste law for a circular economy (AGEC) of February 20, 2020, proclaiming a goal of reducing food waste by 50% by 2025 compared to 2015, has consequently proven to be ineffective. However, the 2025 horizon is nonetheless a pivotal date in the fight against

this scourge. The volume of 4.3 million tons of wasted food, measured in 2022, remains alarming in light of the food insecurity issues facing our country. This figure highlights the contrast between stated ambitions and concrete actions, recalling the urgency of intensifying our efforts to reduce waste while ensuring a better redistribution of food resources to vulnerable populations.

At the origin of more than a third of food waste, the agri-food industry, distribution and out-of-home consumption still represent a considerable source of food that should be valorized in order to limit losses, develop donations and meet the growing need for food aid.

This law intends to act more specifically on this source by broadening the scope of the actors concerned, by strengthening the obligation for these actors to communicate their data on wasted food annually and by toughening the sanctions applicable to companies that make them unfit for consumption.

Article 1st extends the scope of the obligation for businesses and operators to propose agreements to donate their unsold goods to food aid associations in order to combat waste. On the one hand, by lowering the threshold of businesses concerned by the said obligation from 400 m2 to 200 m2, which would allow the inclusion of some 5,000 local businesses in the scope of the law. On the other hand, by including food wholesale operators whose annual turnover exceeds 25 million euros, agri-food industry operators whose turnover exceeds 25 million euros and collective catering operators whose number of meals prepared exceeds 2,000 meals per day in this system. This article provides for the submission of a summary document of the donations made by these operators no later than 1 February of each year. This must be sent to the services of the General Directorate for Competition, Consumer Affairs and Fraud Control (DGCCRF). The Government must also submit, within twelve months, a report on the quality and compliance of donations to associations.

Article 2nd draws conclusions from the shortcomings in the application of the law by strengthening its control. Indeed, the DGCCRF investigation carried out throughout 2021 resulted in 345 establishments visited, 66 warnings, and 2 injunctions. The rate of establishments in anomalous is 20.87%. The anomalies noted are the absence of a proposed agreement, agreements not signed or not respecting the required formalities9(*). The operators concerned will also have to establish a quantified and exhaustive assessment, on an annual basis, of the quantities of food wasted.

Article 3rd toughens the sanctions against companies that make food unfit for consumption by replacing the fixed fine set at a maximum of 0.1% with a fine of between 0.1% and 0.5% of turnover. The aim is to combat the downward trend in donations within the large-scale distribution sector, deplored by many associations10(*).

Article 4th constitutes the financial guarantee of this bill.

* 1 UN, "UN Food Waste Index Report: World Wastes More Than a Billion Meals a Day," UN Environment Programme, March 27, 2024.

* 2 Marianne Bléhaut, Mathilde Gressier, Antoine Bernard de Raymond, "The Resourcefulness of People Who Don't Always Have Enough to Eat," Crédoc, September 2023.

* 3 Food Bank Study: "Profiles" Who Are the People Who Receive Food Aid?

* 4 Nestlé France Foundation, "1st Observatory of Food Vulnerabilities," November 16, 2023.

* 5 Ministry of Ecological Transition and Territorial Cohesion, Food Waste, June 12, 2024.

* 6 UN, op. cit..

* 7 "State of play of the masses of food waste and its management at the different stages of the food chain", ADEME, May 2016.

* 8 Louise Simondet, "Fight against food waste: the city of Courbevoie rewarded by the United Nations", France 3 Paris-Île-de-France, October 25, 2024.

* 9 Directorate General for Competition, Consumer Affairs and Fraud Control, "Professionals: how to avoid food waste".

* 10 In their 2023 activity report, the ANDES association notes, for example, that the share of donations from large retailers in the supply of solidarity grocery stores has fallen, from 35% in 2022 to 22% in 2023.

The overhaul of the agri-food system, aid for charitable associations and the fight against hunger therefore require the vote on this « Bill aimed at strengthening the fight against food waste » put forward by Senator Marie-Do AESCHLIMANN and which should be supported.

CONCLUSION

As we have analyzed, the social situation is alarming. And faced with this, citizens are legally helpless.

Indeed, the legal tools made available to citizens must be updated and systematically adapted in order to respond to daily concerns: combating food waste and helping to reduce hunger.

As studied in the main part, it is necessary to vote on a new law against food waste because food donations have decreased. However, since the legal framework is insufficiently adapted, this bill will be welcome.

References:

Books

1. « Food waste : why we had to make supermarkets give it away » (Arash Derambarsh – Resource) : <https://resource.co/article/food-waste-why-we-had-make-supermarkets-give-it-away-10853>

2. « For a European law against food waste » (The president of the Hauts-de-France region, Xavier Bertrand, Arash Derambarsh, deputy mayor in Courbevoie and Marc Simoncini, entrepreneur, are calling for a European law against food waste - JDD) : <https://www.lejdd.fr/Politique/xavier-bertrand-veut-une-loi-europeenne-contre-le-gaspillage-alimentaire-3772679>

3. « French councillor calls on Europe to adopt 'food waste' supermarket law » (Arash Derambarsh – Guardian) : <https://www.theguardian.com>

ian.com/world/2015/jul/09/french-food-waste-council-calls-on-ec-supermarkets-law

4. « Let's put an end to food waste in Europe » (Arash Derambarsh – Le Monde) : https://www.lemonde.fr/idees/article/2015/07/21/met-tons-fin-au-gaspillage-alimentaire-en-europe_4692338_3232.html

5. « Why we had to bring mass distribution to bear on food waste » (Arash Derambarsh – Huffington Post) : https://www.huffingtonpost.fr/actualites/article/pourquoi-nous-devions-faire-plier-la-grande-distribution-sur-le-gaspillage-alimentaire_71285.html

6. Åsa Stenmarck (IVL), Carl Jensen (IVL), Tom Quested (WRAP), Graham Moates (IFR) : « Estimates of European food waste levels » FUSIONS (2016)

7. BAKKER E. DE, DAGEVOS H., 2012, « Reducing Meat Consumption in Today's Consumer Society: Questioning the Citizen-Consumer Gap », *Journal of Agricultural and Environmental Ethics*, 25, 6, p. 877-894.

8. Balanza, R., Garcia-Lorda, P. Perez-Rodrigo, C., Aranceta, J., Bullo Bonet, M., Salas-Salvado, J. (2007) Trends in food availability determined by the Food and Agriculture Organization's food balance sheets in Mediterranean Europe in comparison with other European areas. *Public Health Nutrition*: 10(2), 168–176.

9. BARNARD A.V., 2016, *Freegans: Diving into the Wealth of Food Waste in America*, Minneapolis, Univ Of Minnesota Press, 280 p.

10. BLAIR D., SOBAL J., 2006, "Luxus Consumption: Wasting Food Resources Through Overeating", *Agriculture and Human Values*, 23, 1, p. 63-74.

11. BRADSHAW C., 2013, "The environmental business case and unenlightened shareholder value", *Legal Studies*, 33, 1, p. 141-161.

12. COHEN L., 2003, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America*, New York, Vintage, 576 p.

13. DESOUCHEY M., 2010, « Gastronationalism: Food Traditions and Authenticity Politics in the European Union », *American Sociological Review*, 75, 3, p. 432-455.

14. ERIKSSON M., STRID I., HANSSON P.-A., 2015, « Carbon footprint of food waste management options in the waste hierarchy – a Swedish case study », *Journal of Cleaner Production*, 93, p. 115-125.

15. EVANS D., 2014, *Food Waste: Home Consumption, Material Culture and Everyday Life*, London, Bloomsbury Academic, 136 p.

16. EVANS D., MCMEEKIN A., SOUTHERTON D., 2012, « Sustainable Consumption, Behaviour Change Policies and Theories of Practice », dans WARDE A., SOUTHERTON D. (dirs.), *The Habits of Consumption*, Helsinki, Finland, Helsinki Collegium for Advanced Studies, p. 123-129.

17. EVANS, D., CAMPBELL, H., MURCOTT, A. (dirs.), 2013, *Waste Matters: New Perspectives on Food and Society*, 1^{re} édition, Malden, MA, Wiley-Blackwell, 250 p.

18. Farmers : the reasons for despair. Bankruptcies, lobbies, malnutrition, pollution - the consequences of a system » (Arash Derambarsh, Eric de la Chesnais

- Plon) : <https://www.lisez.com/livre-grand-format/agriculteurs-les-raisons-dun-desespoir/9782259252522>

19. For a European law against food waste » (Arash Derambarsh – Le Figaro) : <https://www.lefigaro.fr/vox/politique/2016/06/03/31001-20160603ARTFIG00377-pour-une-loi-europeenne-contre-le-gaspillage-alimentaire.php>

20. For a rehabilitation of the French agri-food system » (Arash Derambarsh – Huffington Post) : https://www.huffingtonpost.fr/economie/article/pour-une-remise-en-etat-du-systeme-agroalimentaire-francais_95926.html

21. FRIEDMANN H., MCMICHAEL P., 1989, « Agriculture and the State System: The Rise and Decline of National Agricultures, 1870 to the Present », *Sociologia Ruralis*, 29, 2, p. 93–117.

22. GENTIL E.C., GALLO D., CHRISTENSEN T.H., 2011, « Environmental evaluation of municipal waste prevention », *Waste Management*, 31, 12, p. 2371-2379.

23. GENTILINI U., 2013, « Banking on Food: The State of Food Banks in High-income Countries », *IDS Working Papers*, 415, 18 p.

24. GEREFFI G., HUMPHREY J., STURGEON T., 2005, « The governance of global value chains », *Review of International Political Economy*, 12, 1, p. 78-104.

25. GEREFFI G., KORZENIEWICZ M., 1994, *Commodity Chains and Global Capitalism*, Praeger (Contributions in economics and economic history), 350 p.

26. GILLE Z., 2012, « From Risk to Waste: Global Food Waste Regimes », *The Sociological Review*, 60, p. 27–46.

27. GOODMAN D., DUPUIS E.M., GOODMAN M.K., 2013, *Alternative Food Networks: Knowledge, Practice, and Politics*, 1^{ère} édition, New York, Routledge, 320 p.

28. HALL K.D., GUO J., DORE M., CHOW C.C., 2009, « The Progressive Increase of Food Waste in America and Its Environmental Impact », *PLoS ONE*, 4, 11, p. e7940 (en ligne).

29. Law No. 2016-138 of 11th February 2016 relating to the fight against food waste in France

30. Law of January 2, 2023 relating to the fight against food waste in Spain

31. Manifesto against Food Waste » (Arash Derambarsh - Fayard) : <https://www.fayard.fr/livre/mani-feste-contre-le-gaspillage-9782213693866/>

32. MICHELETTI M., 2003, *Political Virtue and Shopping: Individuals, Consumerism, and Collective Action*, Palgrave Macmillan, 262 p.

33. MIDGLEY J.L., 2013, « The Logics of Surplus Food Redistribution », *Journal of Environmental Planning and Management*, 57, 12, p. 1872-1892.

34. MOURAD M., 2016, « Recycling, recovering and preventing "food waste": competing solutions for food systems sustainability in the United States and France », *Journal of Cleaner Production*, 126, p. 461-477.

35. NEFF R.A., SPIKER M.L., TRUANT P.L., 2015, « Wasted Food: U.S. Consumers' Reported Awareness, Attitudes, and Behaviors », *PLoS ONE*, 10,

6, p. e0127881 (en ligne).

36. PACKARD V., 1960, *The Waste Makers*, New York, Pocket Books, 340 p.

37. Proposed law aimed at combating food waste in France (17th January 2023)

38. QI D., ROE B.E., 2017, « Foodservice Composting Crowds out Consumer Food Waste Reduction Behavior in a Dining Experiment », *American Journal of Agricultural Economics*, 99, 5, p. 1159–1171.

39. REDLINGSHÖFER B., COUDURIER B., GEORGET M., 2017, « Quantifying food loss during primary production and processing in France », *Journal of Cleaner Production*, 164, p. 703-714.

40. Report of the debates in the Senate concerning the vote on the law against food waste (3rd February 2016)

41. SMIL V., 2004, « Improving Efficiency and Reducing Waste in Our Food System », *Environmental Sciences*, 1, 1, p. 17-26.

42. Supermarket food waste 'must be banned by EU and US » (Arash Derambarsh - The Independent) : <https://www.independent.co.uk/news/world/europe/supermarket-food-waste-must-be-banned-by-eu-and-us-demands-french-politician-arash-derambarsh-a6884191.html>

International legal acts

1. “Investigation of consumer attitudes, practices and food waste for three food items, to use as input in new packaging designs that aim to reduce food waste” (Helén Williams, Fredrik Wikström, Annika Lindström, Kristina Wickholm, Ann Lorentzon, 2017)

2. Fredrik Wikström, Helén Williams : “Packaging design that reduces food waste and increases recycling” (2023)

3. GARCIA-GARCIA G., WOOLLEY E., RAHIMIFARD S., 2015, « A Framework for a More Efficient Approach to Food Waste Management », *International Journal of Food*

4. Lisa Mattsson, Helén Williams : “Avoidance of Supermarket Food Waste—Employees’ Perspective on Causes and Measures to Reduce Fruit and Vegetables Waste” (2022)

5. Ng, M. et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*. May 29, 2014

Online sources

1. “Avoiding food becoming waste in households - The role of packaging in consumers’ practices across different food categories” (Helén Williams, Annika Lindström, Jakob Trischler, Fredrik Wikström, Zane Rowe, 2020) : <https://kau.diva-portal.org/smash/rec-ord.jsf?pid=diva2%3A1440471&dswid=-1009>

2. “Avoiding food becoming waste in households: The role of packaging in consumers’ practices across different food categories” (Helén Williams, Annika Lindström, Jakob Trischler, Fredrik Wikström) : <https://kau.diva-portal.org/smash/rec-ord.jsf?pid=diva2%3A1440471&dswid=-1009>

3. “COP26 as the convergence of the corporate

food-climate agendas” (Tomaso Ferrando) : <https://repository.uantwerpen.be/desktop/irua>

4. “Food Waste In America: One Big Issue, Many Possible Solutions” (Refed) : <https://refed.org/articles/guest-blog-food-waste-in-america-one-big-is-sue-many-possible-solutions/#:~:text=35%25%20of%20all%20food%20goes,the%20food%20and%20beverage%20industry.>

5. “Food Waste In America: One Big Issue, Many Possible Solutions” (Branch Food) : <https://www.branchfood.com/blog/food-waste-in-america-refed>

6. ADEME (2014). Source : <http://ecocitoyens.ademe.fr/mes-dechets/stop-au-gaspillage-alimentaire/a-savoir>

7. ALBAL. Source : http://www.albal.fr/save_food_abal_fr,2910.html

8. Buurman, R., Velghe, J. Les supermarchés et le gaspillage alimentaire. CRIOC. Edition 2013. Source : www.oivo-crioc.org

9. Buzby, Jean C., Hodan Farah Wells, Bruce Axtman, and Jana Mickey. Supermarket Loss Estimates for Fresh Fruit, Vegetables, Meat, Poultry, and Seafood and Their Use in the ERS Loss-Adjusted Food Availability Data. EIB-44, U.S. Dept. of Agriculture, Econ. Res. Serv. March 2009. Source : <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib44.aspx#.U6QmY1v1Q>

10. Combris, P. 2006. Le poids des contraintes économiques dans les choix alimentaires. *Cahiers de nutrition et de diététique*. 41 (5) : 279-284 in : Esnouf, C. Russel, M. Bricas, N. (Coord), 2011. *duALine - durabilité de l'alimentation face à de nouveaux enjeux. Questions à la recherche, Rapports Inra-Cirad (France)*, 236 p. Source : <http://www.cirad.fr/publications-res-sources/edition/etudes-et-documents/dualine>

11. de Sadeleer, Nicolas ; Poncelet, Charles. Contestation des actes des institutions de l'Union européenne à l'épreuve de la Convention d'Ahrus. In: *Revue Trimestrielle de Droit Européen*, no.1, p. 7-34 (janvier-mars 2013). <http://hdl.handle.net/2078.3/143196>

12. de Sadeleer, Nicolas. Climate Change Litigation in the EU. In: *ANU Center for European Studies Briefing paper*, (2021). <http://hdl.handle.net/2078.3/253340>

13. de Sadeleer, Nicolas. Droits fondamentaux et protection de l'environnement dans l'ordre juridique de l'UE et dans a CEDH. In: *Revue européenne du droit de la consommation*, no.1, p. 25-51 (2011). <http://hdl.handle.net/2078.3/143065>

14. de Sadeleer, Nicolas. Enforcing EUCHR Principles and Fundamental Rights in Environmental Cases. In: *Nordic Journal of International Law*, no.81, p. 39-74 (2012). <http://hdl.handle.net/2078.3/143136>

15. de Sadeleer, Nicolas. Les droits fondamentaux menacés par le changement climatique selon la Cour constitutionnelle allemande. In: *Justice en ligne*, (2021). <http://hdl.handle.net/2078.3/253366>

16. de Sadeleer, Nicolas. Les enjeux de l'harmonisation des règles de protection de l'environnement. In: *Revue du Droit de l'Union Européenne*, Vol. 2021, no.3, p. 149-163 (2021). <http://hdl.handle.net/2078.3/253355>

17. de Sadeleer, Nicolas. Les pouvoirs publics

belges responsables pour une politique climatique déficiente. In: Justice en ligne, (2021). <http://hdl.handle.net/2078.3/253361>

18. Decree relating to the Walloon Agricultural Code (27th March 2014)

19. Esnouf, C., Jean, S., Redlingshöfer, B. Les nouveaux enjeux liés à la durabilité des systèmes alimentaires. *Innovations Agronomiques*. 24 (2012), 121-132. Source : <http://www6.inra.fr/ciag/Revue/Volume-24-Novembre-2012>

20. EUFIC. Food Today. How to minimise food waste. 05/2012.

21. Eurostat 2010 in : Pertes et gaspillages alimentaires : causes, impacts et propositions. Barilla Center for Food & Nutrition (BCFN). 2012. Source : http://www.barillacfn.com/wp-content/uploads/2012/11/WEB_FRA.pdf

22. FAO 2011. Food Loss Reduction Strategy. Source : http://www.fao.org/fileadmin/user_upload/ags/publications/brochure_phl_low.pdf

23. FAO 2011. Gustavsson, J., Cederberg, C., Sonesson, U. 2011. Source : <http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>

24. FAO 2011. Produire plus avec moins. Guide à l'intention des décideurs sur l'intensification durable de l'agriculture paysanne. Rome. 2011. Source : <http://www.fao.org/docrep/014/i2215f/i2215f.pdf>

25. FAO 2013. Food wastage footprint. Impacts on natural resources. Summary report. 2013. Source : <http://www.fao.org/docrep/018/i3347e/i3347e.pdf>

26. FAO 2014. Save food: global initiative on food loss and waste production. Source : <http://www.fao.org/save-food/principaux-resultats/fr/> Angl. <http://www.fao.org/save-food/key-findings/en/>

27. FINE F., LUCAS J.-L., CHARDIGNY J.-M., REDLINGSHÖFER B., RENARD M., 2015a, « Food losses and waste in the French oilcrops sector », OCL, 22, 3, p. A302 (en ligne)

28. Fondation Louis Bonduelle. Les 7èmes Rencontres de la Comportements alimentaires et gaspillage : pertes alimentaires, déni et contradictions. 20 mai 2014. Source : <http://www.fondation-louisbonduelle.org/france/fr/tout-sur-la-fondation/les-rencontres-de-la-fondation-louis-bonduelle.html>

29. Food in the lives of Paris and Chicago residents" (Thesis Coline Ferrant – 17th december 2020) : <https://www.theses.fr/2020IEPP0006>

30. Food supply procurement : the influence of politics on food supply chains and the governance of local public food services" (Thesis Yoan Robin – 22nd december 2017) : <https://www.theses.fr/2017PA01E055>

31. Foresight. The Future of Food and Farming: Challenges and choices for global sustainability (2011). Final Project Report. The Government Office for Science, London. Source : https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288329/11-546-future-of-food-and-farming-report.pdf

32. France Nature Environnement. Du gaspillage alimentaire à tous les étages. Dossier thématique. Décembre 2013. Source :

<http://www.fne.asso.fr/fr/nos-dossiers/dechets/gaspillage-alimentaire/agir.html>

33. Gooch, M., Marenick, N., Laplain, D. Dent, B. Cut Waste, GROW PROFIT. Reducing food waste by addressing the disconnect between the attitude and behaviour of producers and managers of businesses situated along the value chain. Value Chain Management International. May 30, 2013.

34. Guardian: <https://www.theguardian.com/world/2015/may/25/french-supermarkets-donate-food-waste-global-law-campaign>

35. Gunders, D. Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill. Natural Resources Defense Council. August 2012. IP:12-06-B2012. Source : <http://www.nrdc.org/food/files/wasted-food-ip.pdf>

36. History Food Banks. Source : <http://www.banquealimentaire.org/>

37. Independent : <https://www.independent.co.uk/life-style/food-and-drink/news/man-behind-campaign-for-french-supermarkets-to-donate-waste-food-wants-to-take-law-global-10276028.html>

38. La lutte contre le gaspillage alimentaire en France et aux Etats-Unis : mise en cause, mise en politique et mise en marché des excédents alimentaires" (Thesis Marie Mourad – 2nd october 2018) : <https://www.theses.fr/2018IEPP0014>

39. Laisney, C., Soyeux, A., Redlingshöfer, B. (Juillet 2013) Source : http://agriculture.gouv.fr/IMG/pdf/CEP_Document_de_travail_no7_Gaspillages_alimentaires_cle0a419d.pdf

40. L'autorégulation en tant que stratégie hors marché. Une étude exploratoire sur les mécanismes transformant l'environnement hors marché des entreprises" (Thesis Agnieszka Majewska – 14th february 2023) : <https://www.theses.fr/2023UPSLD012>

41. Lundqvist, J., C. de Fraiture and D. Molden. Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain. SIWI Policy Brief. Stockholm International Water Institute (SIWI), 2008. Source : http://www.siw.org/documents/Resources/Policy_Briefs/PB_From_Filed_to_Fork_2008.pdf

42. Luxemburger Wort : <https://www.wort.lu/de/international/gaspillage-alimentaire-appel-a-junker-57504feeac730ff4e7f615c3>

43. McWhirter JP, Pennington CR. Incidence and recognition of malnutrition in hospital. *BMJ*. 1994; 308(6934): 945–948. Source : <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2539799/pdf/bmj00435-0025.pdf>

44. Ministère de l'Écologie, du Développement durable, des Transports et du Logement (2011). Rapport intermédiaire de l'étude relative au gaspillage alimentaire. Juillet 2011. Source : http://www.developpement-durable.gouv.fr/IMG/Rapport%20interm%C3%A9diaire_VF-1.pdf

45. Misonne, Delphine. Droit du climat et de l'environnement - Chronique 2022. In: *Journal de droit européen*, Vol. 290, no.290, p. 310-318 (2022). <http://hdl.handle.net/2078.3/265290>

46. Misonne, Delphine. L'actualité des communs à la croisée des enjeux de l'environnement et de la culture. In: *Revue interdisciplinaire d'études juridiques*,

Vol. 81, no. 81, p. 59-82. <http://hdl.handle.net/2078.3/207747>

47. Misonne, Delphine. L'ambition de l'Accord de Paris sur le changement climatique. Ou comment, par convention, réguler la température de l'atmosphère terrestre ? In: Aménagement - environnement : urbanisme et droit foncier, Vol. Double numéro spécial "Climat", no. 4, p. 8-26 (2018). <http://hdl.handle.net/2078.3/190896>

48. Misonne, Delphine. Lire le rapport du GIEC à la lumière de l'affaire Urgenda (et vice-versa). In: Plateforme wallonne pour le GIEC - Lettre d'information, Vol. 11, no. Octobre 2018, p. 11 (2018). <http://hdl.handle.net/2078.3/207759>

49. Nanocarbon from food waste : dispersions and applications" (Thesis Aikaterini Kampioti – 9th december 2016) : <https://www.theses.fr/2016BORD0364>

50. O'Brien, D., Aldeen, H.T. Hunger in America 2006. America's second harvest - the nation's food bank network fourth national hunger study. Source: www.hungerinamerica.org

51. Oxfam 2013. Cooper, N., Dumbleton, S. Walking the breadline. Oxfam, Church Action on Poverty. 2013. Source : http://historyof-socialwork.org/1967_food_banks/2013%20OXFAM%20Walking%20the%20Breadline.pdf

52. Pacte national de lutte contre le gaspillage alimentaire. Ministère de l'Agriculture, de l'Agroalimentaire et de la forêt. 2013. Dossier de presse. 14 juin 2013. Source : http://alimentation.gouv.fr/IMG/pdf/250913-Pacte-gapillageAlim_cle4da639.pdf

53. Poverty USA. 2014. Source : www.povertyusa.org

54. Preparatory study on food waste across EU 27. Bio Intelligence Service. European Commission (DG ENV). October 2010.

55. Réduction du gaspillage alimentaire - État des lieux et pistes d'action. Rapport final. Ministère de l'Écologie, du Développement durable, et de l'Énergie. Novembre 2012. Source : http://www.developpement-durable.gouv.fr/IMG/pdf/Rapport_final_gaspillage_alimentaire_nov2012.pdf

56. Résolution du Parlement européen du 19 janvier 2012 sur le thème « Éviter le gaspillage des denrées alimentaires : stratégies pour une chaîne alimentaire plus efficace dans l'Union européenne ». Parlement européen. Source : Europa (2011/2175(INI)).

57. Restaurants du cœur. Source : <http://www.restosducoeur.org/>

58. Sambon, Jacques. Les voies de recours en matière d'accès à l'information environnementale : diversité et complexité des régimes applicables. In: Aménagement - environnement, Vol. 2021, no.2, p. 73 (2021). <http://hdl.handle.net/2078.3/267609>

59. SMED (2011) in Food waste volumes in Sweden. 2012. Swedish Environment Protection Agency.

Source : <http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-8695-4.pdf?pid=11892>

60. Source : http://ec.europa.eu/environment/eussd/pdf/bio_foodwaste_report.pdf

61. Source : <http://www.eufic.org/article/en/article/How-to-minimise-food-waste/>

62. Source : www.cutwastegrowprofit.com

63. Soyeux, A. La lutte contre le gaspillage, une solution d'avenir ? Ministère de l'Agriculture et de la Pêche. Service de la statistique et de la prospective. Prospective et Evaluation. Analyse N° 5. Mars 2009. Source : http://agriculture.gouv.fr/IMG/pdf/Analyse_5_La_lutte_contre_le_gaspillage.pdf

64. Süddeutsche Zeitung : <https://www.sueddeutsche.de/wirtschaft/lebensmittel-verschwendungcontainern-1.4331886>

65. The "greening" of empire : the European Green Deal as the EU first agenda - Political geography - ISSN 0962-6298-105 (2023) p. 1-10 (Diana Vela Almeida, Vijay Krishnan Kolinjivadi, Tomaso Ferrando, Brototi Roy, Héctor Herrera, Marcela Vecchione Gonçalves, Gert Van Hecken) : <https://repository.uantwerpen.be/desktop/irua>

66. TNS SOFRES. Les Français et le gaspillage alimentaire. 2012. Source : <http://www.tns-sofres.com/etudes-et-points-de-vue/les-francais-et-le-gaspillage-alimentaire>

67. Tomaso Ferrando and Julie Mansuy : « The European Action against Food Loss and Waste : Co-Regulation and Collisions on the Way to the Sustainable Development Goals » (University of Warwick - November 2018) : <https://wrap.warwick.ac.uk/109189/>

68. University of Stuttgart. Too good for the bin. 2012. Source : <https://www.zugutfuerdietonne.de/uploads/media/TooGoodForTheBin.pdf>

69. USDA 2014. Source: <http://www.usda.gov/oce/foodwaste/>

70. Venkat, K. The Climate Change and Economic Impacts of Food Waste in the United States. Int. J. Food System Dynamics 2 (4), 2011, 431-446. Source : <http://www.cleanmetrics.com/pages/ClimateChangeImpactofUSFoodWaste.pdf>

71. WRAP 2012. Household Food and Drink Waste in the United Kingdom. Final report. 2012. Source : www.wrap.org.uk

Other sources

1. "D(i)ritto al cibo" (Andrea Segré - 2022) ;
2. "Lo spreco alimentare in Italia e nel mondo" (Andrea Segré, E. Risso - 2023).
3. L'insostenibile pesantezza dello spreco alimentare : dallo spreco zero alla dieta mediterranea (Andrea Segré - 2022) ;

LEGAL BASIS FOR ORGANIZING ELECTIONS TO LOCAL SELF-GOVERNMENT BODIES IN AZERBAIJAN AT THE BEGINNING OF THE XX CENTURY

Ismayilov Kh.

Baku State University, Department of Theory and History of State and Law, Prof. Dr.

<https://doi.org/10.5281/zenodo.14947181>

Abstract

Conducting elections is closely connected with the free expression of will of a specific person. In this sense, by expressing his will, a person makes a free choice from an objectively existing colossal variety of individual and special opportunities. Thus, he directly participates not only in the formation of general legal principles of functioning and development of the entire society to which he belongs, but also in the formation of structures of power and management adequate to his own interests and needs, through which norm-setting, law enforcement and other functions are carried out. From this point of view, it is of particular interest how this selective process occurs in different periods of historical development and in different structural formations. This article discusses the legal and organizational aspects of holding elections of city government in our country at the beginning of the last century. Being one of the forms of implementing democracy, local self-government covers not only the political and socio-economic spheres, but also the cultural and educational sphere. The article also covers issues related to the rules for holding elections to city and zemstvo self-government bodies during the functioning of the Special Transcaucasian Committee and the Transcaucasian Commissariat in 1917-1918.

Keywords: elections, local self-government, democracy, city дума, City Regulations, electoral rights, zemstvo, simplified city public self-government.

Peculiarities of normative regulation of elections to local self-government during the period of the Russian Empire's rule in Azerbaijan

The time of the adoption of the draft law on municipal self-government by the highest organs of state power coincided with the period of aggravation of domestic policy and the emerging turning point in the autocracy's views on self-government. In 1904, the Baku mayor A. Novikov wrote about this: "Municipal self-government appeared after the zemstvo. The time was relatively unfavorable. The reaction had not yet begun, but its breath was felt. Naturally, in relatively unfavorable conditions, a not very perfect organization appeared" [16, p.8]. Nevertheless, to a certain extent, the progressiveness of the City Regulations of 1870 consisted in the fact that the class-bureaucratic organs of municipal government were replaced by general-class (representing all classes) organs based on the principle of property qualification. The urban population, although within somewhat limited limits, was given the opportunity to be represented in government.

At the same time, the use of the three-class electoral system adopted from Prussia shaded this progressiveness. Thus, according to the principle of "proportionality" underlying the electoral system, the degree of participation in the work of city self-government was determined by the size of the quitrent and taxes paid to the city treasury. That is, all voters were included in the general list as the taxes paid were reduced, after which they were divided into three categories so that the money paid by voters of each category had to make up a third of all city taxes.

In general, according to the City Regulations of 1870, only males who had reached the age of 25, had a certain property qualification and participated in the payment of city taxes had the right to vote [12, p.211]. At the same time, persons convicted of committing crimes or misdemeanors for which the law provides for

the deprivation of rights of social status or the restriction of these rights, as well as those brought to investigative and judicial actions on charges of committing the said acts (except for those justified by a court sentence), removed from office during the last three years, persons declared bankrupt (except for persons who found themselves in such a situation as a result of an accident), deprived of their clerical rank and rank due to committing offenses in cases stipulated by law, were deprived of voting rights. Those occupying high administrative positions and local police officials, even if they had property qualifications, did not have the right to vote (Articles 18-19). In accordance with Article 20 of the Regulations, women, as well as young men under the age of 25, if they had a property qualification, could transfer the right to participate in voting by proxy to relatives, guardians or trustees [12, p.211]. However, in accordance with Article 23 of the law, no one from the city population could have more than two votes in the elections (one of their own, the other by proxy). Along with individuals, various institutions, structures, societies, companies, firms that took part in the payment of city taxes had the right to vote in the person of their representatives.

In the City Regulations, along with the establishment of privileges for the wealthy part of the population, national inequality was allowed. Thus, the representation of the main part of the local population - non-Christians (that is, Azerbaijanis) could not exceed half of the members of the Duma.

According to the Regulations, persons who received an absolute majority of votes were considered elected to the Duma. In the event of the election of a smaller number of deputies than was provided by law, the election of the missing members of the Duma was established by a relative majority of votes. The total number of members of the Duma, depending on the number of voters, could be from 30 to 72 people. In cities with no more than 300 voters, 30 people were elected as members of the Duma. In addition, for every

150 voters, 6 members of the Duma were allowed to be elected, with the condition that the total number of members of the Duma did not exceed 72 people [4, p.252-253; 12, p.212]. The members of the City Duma were free from any responsibility to the voters. As stated in Article 40 of the City Regulations, voters did not have the right to give the members any instructions (mandates, orders) [5, p.102].

At the same time, elections to city self-government bodies were an important link in the implementation of the city reform, since they directly formed the composition of the elected bodies, which, in turn, predetermined the direction and, in general, the content of municipal activity.

On June 11, 1892, a new City Regulation was approved [9, art. 8708]. The new Regulations further narrowed the composition of the representation in favor of the big bourgeoisie and the nobility and further limited the right of city public administration. The changes made to city government by the reform of 1892 concerned two main areas: 1) reduction of the contingent of voters by increasing the property qualification and 2) strengthening the control of government bodies and institutions over city public administration. The changes made to city government by the reform of 1892 concerned two main areas: 1) reducing the number of voters by increasing the property qualification and 2) strengthening the control of government bodies and institutions over city public administration. The concept of "city society" as a subject of law was excluded from the City Regulations and the concept of "city population" was retained only as an object of management.

True, the City Regulations of 1892, in comparison with the previous Regulations, in principle, slightly changed the powers and scope of activities of city government bodies, but legitimized the intervention of the governor in all matters of city public administration. Thus, Article 119 of the Regulations provided that if the governor did not approve the persons elected to the positions of the head of the municipality, members of the municipal government and the city secretary, or the elections were not held, then repeat elections should be held with the condition that persons not approved by the governor would not be put to the vote. If the elections failed for the second time, or the newly elected persons were again not approved by the governor, these positions were filled by persons appointed by the governor. The provincial administration had the right to apply disciplinary measures against officials of the city public administration, including their removal from office. According to Article 11 of the Regulations of 1892, the governor exercised control not only over the legality and correctness of the activities of city councils and administrations, but also over the appropriateness of these activities. The provincial court for city affairs had the right to discuss the legality and correctness of any decision and order of self-government bodies. Instructions for the executive bodies of city government, rules for managing city property and capital, decisions on the alienation of city real estate and other similar acts entered into legal force only after approval by the governor.

The City Regulations of 1892 abolished another of the previous rules, that is, the procedure for dividing

voters into categories, and provided for the organization of one election meeting for all voters. In the case of a large number of voters, the possibility of electing members of the Duma in precincts was established. In this case, members of the Duma could be elected by voters of each individual precinct, as a result of which passive electoral rights were significantly limited. The right to vote was granted only to those individuals and institutions (government agencies, charitable societies, schools and scientific institutions) in the city that, for at least one year, owned real estate worth between 300 and 3,000 rubles (established depending on the importance of the city and the size of its population. Thus, for the population of the city of Baku, it was envisaged to own property worth at least 1,500 rubles, and for the population of Ganja - at least 1,000 rubles), as well as companies, societies and individuals maintaining first or second-class commercial and industrial enterprises within the city [9, art. 8708; 12, p.217]). And this meant a departure from the principle of participation of the entire population in the representative body of the city established by the previous law and a maximum limitation of the circle of voters. In accordance with Article 22 of the Regulation and the Supplement to the Regulation (the "Rules on Simplified Urban Public Administration"), in cities where simplified public administration was envisaged, instead of the City Duma, which had dozens of members, a city assembly of authorized representatives consisting of 12-15 people was established. Authorized representatives were elected at meetings of local homeowners from among persons who owned real estate worth at least 100 rubles. Clause 2 of the Supplement to Article 22 of the Regulation did not provide for the general everyday understanding of the word "homeowner", that is, the head of the family, the manager of the family household, but for persons who had a property qualification in the form of a house within the city limits. The reduction of the property qualification from 300 to 100 rubles, in theory, should have increased the number of voters, but the use of restrictions on the use of the electoral right prevented this to a certain extent. In the "Instructions for the organization of simplified city public administrations", approved by the Ministry of Internal Affairs on May 30, 1893, issues related to the electoral process became even more specific. The assembly of authorized representatives elected the city headman (elder, kedkhuda, head, rais) and his assistant (if the governor considered it necessary - two assistants. No restrictions were introduced for Muslims to fill these positions; moreover, by the decree of the Governing Senate of April 24, 1901, in the event of the election of persons professing Islam as city elders, governors were recommended to approve them for this position [13, p.574].

In general, simplified public administration at first limited collegiality in the management of city affairs, reducing the size of the property qualification, increased the number of city voters, while at the same time depriving them of the right to make binding decisions and change city plans.

By the decision of the State Council of May 29, 1895, the City Regulations of 1892 extended to the cities of the South Caucasus, including Azerbaijan, in re-

spect of which the self-government reform was not applied by the previous law [13, p.10-11]. However, the creation of city dumas in Azerbaijan was planned only in Baku, Ganja (Yelizavetpol) and Shusha, in other district cities - Shamakhi, Lankaran, Guba, Nukha (Sheki), Nakhchivan, Ordubad, the creation of simplified public self-government bodies was envisaged. It should be noted that before the application of public self-government in all district cities of Azerbaijan and in the provincial city of Ganja, the city economy was handled by a special department for city affairs, which functioned in Ganja under the city police, and in other cities - under local district police departments. In their practical activities, they were guided by the "Regulations on the economy of cities, where the City Regulations were not applied" and the "Charter on the City Economy" [10, art. 809]. The main functions of these departments were to draw up annual budgets for city revenues and expenses, submitted for discussion to the provincial government.

However, simplified self-government bodies, even after the Regulations of 1892, were not used in all district centers of Azerbaijan. For example, in the centers of Javad and Goychay districts, district police departments continued to deal with urban management during that period; for this purpose, district departments for urban affairs were created under them, chaired by district chiefs and consisting of their assistants, city police officers and deputies elected from of the local population. The legislation of this period provided for certain differences for large and small cities on the issue of establishing city self-government, the procedure for its interaction with state authorities, the limits of authority of local self-government bodies, in general, which was regarded by a number of prominent lawyers of that time as a certain injustice in relation to small cities; in order to eliminate this injustice, some even proposed creating a special council for city and zemstvo affairs under the committee of ministers [6, p. 483].

According to the requirements of Article 56 of the City Regulations of 1892, the number of members of the Baku City Duma was to be up to 80, the Ganja City Duma - up to 60, and the Shusha City Duma - up to 40 people (according to the established general procedure, if the total number of city voters did not exceed 100 people, the number of members was set at 20 people, and for every 50 voters over 100 people, 3 members were included in the composition) [9, art. 8708]. In fact, the Baku and Ganja City Dumas were allocated fewer seats than stipulated by law (54 and 40, respectively).

In accordance with Article 47 of the City Regulations (as amended in 1906), elections to the Duma, conducted using balls, based on decisions of city Dumas were allowed to be replaced by voting using registration sheets (ballots), which, as envisaged, were subject to personal presentation by voters at a mass meeting to the chairmen of the election meetings [10, art. 942]. These voting sheets were filled out by voters either directly at election meetings, or in advance and in folded form they were dropped into a special ballot box. The sheets indicated the persons for whom the voter voted. The persons who received the greatest number of votes

were considered elected to the Duma. In the event of a tie, the voting results were determined by drawing lots.

The law "On the establishment of temporary rules related to the creation of city councils and meetings of authorized representatives in the cities of the Caucasus region" [1, art. 865; 13, pp. 152-153], adopted on May 15, 1899 specifically for the cities of the Caucasus, the rights of city self-government still more restricted. In this law, which included temporary measures until the legislative revision of decisions on the procedure for creating city councils and authorized meetings, the rights of administrative management were further expanded, in particular, the head of the civil part in the Caucasus was allowed, at his own discretion, to exclude any persons from the composition elected as members of the city council and authorized representatives.

The publication of such a special law for the cities of the Caucasus, the distrust of the city public administration and the establishment of strict control over it directed the election campaign in a completely different direction - the aggravation of relations between local clans and ethnic groups on this basis, as a result, "the feud connected with the "brotherly massacre in the city elections" was used by obsolete elements. Instead of the former young progressive representatives of the intelligentsia, city administrations were headed by people from a completely different "opera" [10, art. 35].

Article 44 of the City Regulations of 1892, prohibiting the number of non-Christian members of the Duma from exceeding 1/3 of the total composition [9, art. 8708], as an expression of unequal treatment of the population professing Islam (Azerbaijanis), included norms that caused the most intense disputes. The incorrectness of this article made itself known in practice. Thus, due to the violation of the electoral rights of the Muslim population, whose numbers in most cities of the South Caucasus (Baku, Ganja, Irevan, Shamakhi, Guba, Nukha, Lankaran, Nakhchivan, Yenibayazit, Shusha, etc.) were several times greater than the Christian population, petitions were constantly filed before higher authorities to go beyond the limits of the specified norm. As G.M. Tumanov noted, "in all these cities, the Muslim population had long since adopted Russian culture, and there was no serious reason to deprive it of equality with Christians in matters of self-government" [21, pp.185-186].

On December 14, 1900, a change was made to Article 44 of the City Regulations, and, according to the new edition, it was established that in the cities of the Caucasus region the number of non-Christian councilors cannot exceed half of the composition of the Duma members. In cities where the implementation of this order was unacceptable and difficult from the point of view of local conditions, the decision of the city and zemstvo local self-government or the local government for city affairs to go beyond this order was allowed with the consent of the Minister of Internal Affairs [13, p. 142].

In order to ensure equality and lift restrictions, on January 25, 1905, Azerbaijani deputies in the Baku City Duma proposed that the Duma adopt a resolution on filing a petition with the administrative leadership in connection with the equalization of rights of Muslims

of the South Caucasus with other residents of the empire in all bodies of city self-government, the release of city self-government from administrative guardianship, the granting of voting rights to tenants who pay housing taxes, the establishment of a minimum educational qualification, if not for voters, then at least for those elected, and recommended calling on all other city administrations of the South Caucasus to join this petition. The Duma adopted a decision on these proposals [7, f.50, inv.1, case 260, p.28-37]. By the decision adopted by the Baku City Duma and the provincial department for urban affairs on November 12, 1910, a petition was filed with the Caucasian administration to hold elections to the Duma without applying restrictions for Azerbaijanis. In response to this, the Viceroy of the Caucasus, in a letter dated January 28, 1911, addressed to the Baku City Administration, permitted elections of members to the City Duma for 1911-1915 "without observing the procedure established by Article 44 of the City Regulations of 1892 on limiting the number of members from non-Christians to half of the Duma" [8, f.13, inv.2, case 714, p.4]. However, on the eve of the elections, this permission was revoked by the vicegerency.

From numerous archival data it becomes known that the elections to the Dumas and simplified public self-government bodies held in other cities of Azerbaijan were also accompanied by various violations of the law, which were directed mainly against the interests of the local urban population, that against the background of the restrictions imposed by the authorities, voters showed complete indifference to this process, that, ultimately, the elections were held again several times, as they were declared invalid, and their results, being recognized as invalid, were canceled.

As a result of the analysis of this information, it becomes clear that after the application of the second provision, the wealthiest city residents-owners were allowed to participate in the elections to local self-government bodies, therefore the assertion about the representation of the interests of the urban population in the city self-government (with the exception of some progressively minded representatives of the Azerbaijani intelligentsia elected to the Duma at that time) seems unconvincing.

At the beginning of the 20th century, the issue of improving the local self-government system throughout the country was repeatedly raised in government circles, and a number of changes were even made to the current legislation on local self-government. However, during this period, that is, until the end of February 1917, the development and adoption, as envisaged, of new legislation related to city self-government did not occur.

Legal acts that changed the conduct of elections in the South Caucasus after the collapse of the autocratic empire

An important place among the laws developed by the meeting on the reform of local self-government was occupied by the Provisional Government on April 15, 1917, "Temporary Rules on the Election of Public City Dumas and on Precinct City Administrations" [8,

f.1818, inv. 1, case 303, pp.21-24]. In connection with the application of these rules, on May 3, the Ministry of Internal Affairs prepared and approved "Instructions for city public administrations" [8, f.1818, inv.1, case 303, pp.24a-28].

The temporary rules for the first time provided for the application of general, direct and equal suffrage during elections to city self-government bodies throughout the country as a whole. In accordance with Article 3 of the Rules, citizens of the country of both sexes, regardless of nationality and religious affiliation, who had reached the age of 20, residing in the relevant city at the time of application of the electoral lists or running a household in the given city or having official duties, as well as other employment related to the city, had the right to participate in the elections. Persons in military service participated in elections on a general basis. At the same time, persons convicted by the court for crimes in the area of electoral law and property crimes were deprived of their voting rights for a year after the end of their sentence, those sentenced to such types of punishment as deprivation of rights of social status or restriction of these rights - for three years after the end of their sentence, and brothel keepers were deprived of their voting rights altogether.

Unlike active voting rights, passive voting rights were enjoyed not only by persons who lived within the city limits, had official duties or other employment, but also by persons who had no connection with the city (in the event of compliance with other requirements provided for participation in elections). Voters were granted the right, no later than ten days before the elections, to submit to the mayor a list of candidates for members of the city who wished to be elected and who had been put to the vote. The number of candidates indicated in the list should not exceed the total number of councilors subject to election in a given city. Each voter had to sign only one of the lists of candidates for members of the city. To conduct elections of members, a city election commission was formed under the chairmanship of the city mayor. The commission, upon invitation of the mayor, included three people from among the voters. At the same time, the commission from each group of voters that submitted lists of candidates for the council included the person who first signed the list (if the persons who were part of the group of voters did not elect a special person among themselves).

When conducting elections by precincts, in addition to the city election commission, a precinct election commission was also provided for each polling station. The city mayor, at his own discretion, chaired one of these commissions. The chairmen of other election commissions were invited by the city mayor from among the voters. The composition of the precinct election commission included three people invited by its chairman from among the voters. In addition, the commission included a person elected among themselves by each group of voters who submitted lists of candidates for members.

The elections were conducted by means of a ballot sheet by secret ballot for only one of the lists of candidates for the vowels. Each ballot sheet had to indicate the number of the list of candidates for the vowels for which the voter had to cast his vote. The sheets were

placed by voters in opaque single-color envelopes made by the city administration and having no signs except for its seal, sealed and personally handed to its chairman at an open meeting of the commission. These envelopes were dropped by the chairman of the commission into a sealed ballot box in the presence of voters. The total number of votes to be elected in the electoral district was divided between the lists of candidates in proportion to the number of votes cast in the elections for each of these lists. In accordance with Article 25 of the provisional regulations, in order to establish the number of deputies allocated to each of the submitted lists of candidates, the total number of deputies to be elected was multiplied by the number of votes cast for the relevant list and divided by the number of votes cast for all lists in the electoral district as a whole. The quotient of this division determined the number of votes elected on each list. From each list, in the order in which candidates were included, persons were included in the composition of deputies in a quantity corresponding to the results of the above-mentioned division.

At the end of the elections, all documents, including voting sheets, were sent to a high-ranking representative of the local administrative authority within two days. He, in turn, could protest the election process and its results in the appropriate instance of the administrative court within seven days. In addition, complaints related to illegal actions committed by persons participating in the elections could be filed with the administrative court within three days. In accordance with the Resolution of the Provisional Government "On Administrative Courts" [7, f.389, inv.1, case 765, pp.82-83], seven days from the date of acceptance of the relevant documents were established for the consideration of protests and complaints by the administrative court. If, as a result of such a judicial review, a conclusion was made on the irregularity of the elections as a whole, the court made a decision to cancel the election results. The city administration, having received a court decision related to this issue, had to make a decision to hold new elections within a month. Although the decision made by the court, motivated by the irregularity of both the election results as a whole and the election of individual members, was sent for proceedings, nevertheless, the law (article 32) also provided for the right to appeal this decision within a month in the Governing Senate.

Despite the innovations introduced by the law "On City Public Administration" in the area of democratization of city dumas, these structures, nevertheless, were heavily dependent on the central government and its local commissioners. The city dumas failed to restructure their work. Only the composition of the dumas and boards was changed. Thus, even before the new official elections, political parties and non-party citizens included "social democratic elements" in their composition without prior agreement. A certain change has also occurred in the status of the Baku City Duma. There was a gradual democratization of this institution of power with its involvement in political struggle. As a result, 12 different parties and groups [18, 20.10.1917] were registered to participate in its new elections.

It should also be noted that although the programs of all the parties participating in the elections, in the part concerning the procedure for holding municipal

elections, along with holding elections to local self-government bodies by secret ballot, also approved direct elections, nevertheless, there were certain fundamental differences. Thus, if, due to the coincidence of the socialist bloc, consisting of the Socialist Revolutionaries and Mensheviks, and the programs of the Musavat party and the Committee of Muslim Public Organizations, which participated in the elections on a single list, planned to implement their municipal programs under the conditions of the existing system, then the Bolsheviks in their programs declared the transfer of political power into the hands of the proletariat as the most important goal.

Despite the fact that the laws "On the conduct of elections of city дума members" and "On amendments to the current Regulation on public administration of cities" reflected a number of progressive features, nevertheless, gross violations were allowed in the course of their application, and even deviations from the content of the law were encountered. Thus, the 120-thousand population of the industrial and factory districts of Baku, sailors and employees of railway lines were deprived of participation in the elections to the city дума. The compilation of the lists of voters was assigned to the city government - a body interested in delaying the elections. In this regard, although the law allocated two weeks from the moment of the announcement of the aforementioned law for the compilation of the lists of voters, nevertheless, the Baku city government announced the possibility of holding the elections to the city дума no earlier than 6 months later. As a result, the deadline established by law was not met, and the elections to the Duma were held on October 29, 1917. Although no party managed to achieve a decisive majority in the elections, nevertheless, for the first time, national democratic forces were able to obtain a sufficient number of seats in the Baku city self-government.

Unlike Russia, where the old pre-revolutionary institutions of governance were gradually abolished from the end of 1917, in the South Caucasus there was a tendency to resume work on the project of reforming zemstvo self-government. Despite the functioning of revolutionary committees and the system of councils in a number of regions at that time, in Azerbaijan, nevertheless, the consistent development of the principles of territorial self-government could be clearly seen in the example of district self-government, established by the "Temporary Regulation on Zemstvo Institutions in the South Caucasus" of the Transcaucasian Commissariat of January 25, 1918 [8, f.1818, inv.1, case 261, pp.101-165]. Thus, in accordance with Article 9 of the law, it was planned to create a separate zemstvo unit (with the rights of a district zemstvo) for the city of Baku (within the city's mayoralty), and a second district zemstvo unit for other territories of the Baku district, including industrial areas [7, f.389, inv.1, case 765, pp.53]. It was established to entrust the City Duma and the administration with the management of affairs within the city (in this case, the city дума exercised the powers of the district zemstvo assembly, and the city government exercised the powers of the district zemstvo administration) [8, f.1818, inv.1, case 261, pp.106-107]. On January 25, 1918, the Transcaucasian Commissariat also

adopted the "Instruction on holding volost, district and provincial elections in the South Caucasus."

The temporary regulations differed significantly from the regulations adopted earlier in connection with the zemstvos, relied more on democratic principles, and abolished the previous numerous qualifications. Thus, all citizens who had reached the age of 20, regardless of their nationality and religion, who lived or owned a house within the boundaries of the corresponding village or city on the eve of the compilation of the electoral lists and the introduction of amendments to them, or who were in a certain service in the given territory or had connections with this territory in connection with one or another employment, could participate in the elections of zemstvo councilors. Passive voting rights could also be used by persons who did not have the specified connection with the corresponding territory.

In general, the "Regulations on zemstvo institutions in the South Caucasus" can be divided into two parts: 1) the procedure for electing zemstvo councilors; 2) the scope and limits of powers of zemstvo institutions. The "General Provisions" reflected in the first section of the law basically included the contents of the relevant part of the laws on zemstvo institutions adopted by the Provisional Government (with the exception of amendments and additions to a number of articles in connection with the local characteristics of the Transcaucasian region).

As for the procedure for holding elections of zemstvo members, a number of distinctive features can be observed in this issue in comparison with Russian legislation. Thus, in Russian legislation, the formation of volost zemstvo institutions was regulated by one law, and the procedure for holding elections of provincial and district zemstvo members was regulated by another, as a result of which they provided for different electoral rules. Elections of provincial and district zemstvo members were held according to the proportional electoral system. The electoral lists submitted at the time indicated both the number of the list for which the vote was cast and the list of nominated candidates. Only in urban settlements, where less than three district councilors were elected, was it envisaged to vote for each candidate separately. The elections of volost councilors were conducted in accordance with the law of May 21, 1917 and the instruction of June 11, 1917 on the majoritarian electoral system. In this case, voting was conducted using voting sheets, which included the names, surnames and pseudonyms of the intended candidates, and the votes were counted using special cards created for each candidate separately. In accordance with the resolution of June 26 and the instruction of September 23, 1917, in a number of provinces of the country, the conduct of elections to volost zemstvos was based on a proportional system.

In the South Caucasus, the procedure for holding elections of volost, district and provincial zemstvo councillors was united in a single normative act, so many repetitive norms were excluded from the law and replaced with references to the relevant articles, which included the procedure for holding volost zemstvo elections. Thus, a decision was made to hold elections of councillors to volost, district and provincial zemstvo

assemblies in accordance with the procedure for holding elections to the Constituent Assembly (based on the proportional electoral system), that is, by the tested population, using a method familiar to it. In order to facilitate and speed up the compilation of voter lists, it was considered appropriate to use the voter lists compiled for the election of members to the Constituent Assembly (by making additions and amendments in connection with possible changes in the rights of voters from the day of elections to the Constituent Assembly until the elections of zemstvo councilors - to for example, the inclusion of new voters, the exclusion of a number of voters from the list as a result of their loss of voting rights, etc.) Also by a resolution of the Transcaucasian Commissariat of November 28 1917 provided for the immediate application of both volost and district and provincial zemstvos.

According to the specified normative acts, it was considered expedient, while preserving the proportional electoral system, allowing political minorities to obtain seats in lower zemstvos, to amend the procedure for its implementation, that is, to conduct voting not on the basis of electoral lists, but by means of balls for each candidate individually, since when voting by means of electoral lists, political parties had more opportunity to dictate their position to ordinary citizens. When voting with balls, elections take on an individual character, that is, candidates are elected not by belonging to a particular party, but by personal merits. In the course of such an individual electoral procedure, the voter does not fall under the influence of the lists of candidates dictated to him, on the contrary, he independently places a ball for each candidate, while the candidate's belonging to a particular list does not play a special role. This procedure was the most favorable, in particular, during the elections of the vowels of the volost zemstvos, when the polling stations were small, and the voter personally knew, if not all, then most of the candidates and had the opportunity to make an independent choice among them, without referring to the electoral lists. On the other hand, the procedure for holding elections by means of balls was also used during the previous city and zemstvo regulations, their experience showed that, unlike voting according to pre-prepared lists of candidates, in elections held according to the specified procedure, attempts by parties to put pressure on voters failed.

If the impossibility of applying the "Temporary Regulations on Zemstvo Institutions in the South Caucasus" [8, f.1818, inv.1, case 261, pp.101-165] in Baku and a number of territories included in the Baku province during that period was connected with the seizure of power by the Bolsheviks in these territories and the organization by the Bolshevik-Dashnak formations of mass slaughter of Azerbaijanis on national grounds to strengthen this power, then in other regions of Azerbaijan the implementation of this law was connected with completely different reasons. Thus, during the period of activity of the Transcaucasian Sejm, which was more concerned with issues of a political nature, negotiations conducted in connection with the regulation of national issues and territorial disputes, regulation of the activities of central government bodies, as well as the resolution of agrarian issues, no significant attention was paid

to the application of zemstvo self-government in these territories. The collapse of the Transcaucasian Sejm and the proclamation of independence by Azerbaijan determined the inevitability of the resumption, after a certain break, of normative-legal and practical activities related to the implementation of zemstvo self-government.

Conclusion

The changes reflected in the electoral system of city self-government institutions as a result of the second city reform once again demonstrated that in the course of "improving" the legislation, the government was guided no longer by proposals from the localities and data from law enforcement practice, but by its own considerations, the essence of which was the desire to prevent excessive activity of local society.

From a legal point of view, a serious shortcoming of the normative base of local self-government was the insufficiently consistent implementation of the principle of establishing the boundaries of executive and administrative powers, and this also applies to the electoral system in the sphere of local self-government. At the same time, the practical side of the existence and activity of self-government institutions at that time demonstrated their viability and, to a certain extent, universality in solving both state and, in particular, local problems.

The Provisional Government, as well as the Transcaucasian Commissariat, in their innovations attempted to act in the direction of pan-European standards of organizing local self-government and implement new reforms based on bourgeois principles. It is quite possible that the bourgeois-democratic government in its model took as a basis the "middle line", the most acceptable for the structure of local self-government throughout the country. Having assigned new state functions to local self-government bodies, the government simultaneously set the goal of creating guarantees for their independence and ensuring the formation of these bodies from local residents through elections.

Despite the preparation of local self-government reforms (both urban and zemstvo) without taking into account the socio-political situation in the country and the impossibility, in this context, of their successful completion, nevertheless, the legal framework created in this area can be assessed, in any case, as a historical and legal achievement. It is in this regard that the experience of developing in previous times by legislators and lawyers a new legal sphere for Azerbaijan - municipal law should not be left out of attention in the formation, improvement and development of the legal framework of the modern system of local self-government. It should also be noted that the legal force of the above-studied normative legal acts related to the conduct of elections to local self-government bodies was preserved in the early days of the Azerbaijan Democratic Republic during a certain period (transitional period). After some time, the founders of the Republic, using the accumulated scientific, theoretical and empirical materials in the field of local self-government in organizing and improving the system of governance of the state that had declared its independence, prepared a legal basis based on democratic and universal values to

ensure the effective operation of self-government institutions in accordance with their purpose.

References:

1. Collection of laws, June 2, 1899, No. 68, art. 865.
2. Collection of decrees and resolutions of the Provisional Government. Issue No. 2, part I, sections I - VIII. Petrograd, 1918, pp. 444-480.
3. Documents on the history of Baku, 1810-1917. Baku: Azerneshr, 1978, 484 p.
4. Ismayilov Kh.J. History of Law of Azerbaijan. Baku: "Science and Education", 2023 (2015), 588 p. (in Azerbaijani).
5. Ismayilov, Kh.J. Normative legal basis of local self-government in Azerbaijan (genesis and evolution). Baku: "Science and Education", 2011, 496 p.
6. Korkunov N.M. The Committee of Ministers as a body supervising zemstvo institutions // Legal Chronicle. 1890, No. 12, 542 p., pp. 449-540.
7. Laws and regulations. State Historical Archives of the Republic of Azerbaijan (SHARA). Funds: 50, 389.
8. Laws and regulations. The Central State Historical Archive of the Republic of Georgia (CSHARG). Funds: 13, 1818.
9. Laws and regulations. Complete Collection of Laws of the Russian Empire (CCLRE). 3rd Coll., v. XII, St. Petersburg, 1892, art. 8708.
10. Laws and regulations. Code of laws of the Russian Empire (CLRE). St. Petersburg, v. II, St. Petersburg, 1913, art. 35, 809, 942.
11. Leshkov V.N. On the right of independence as a basis for governance // Legal Bulletin. 1872, No. 1, section 1, 25 p., pp. 49-73.
12. Milman A.Sh. The political system of Azerbaijan in the XIX - early XX centuries, Baku: Azerneshr, 1966, 320 p.
13. Mysh M.I. City Regulations of June 11, 1892 with related laws and explanations. St. Petersburg, 1910, 1211 p.
14. Nemirovsky A.F. Reforms of city self-government. St. Petersburg, 1911, 172 p.
15. Novikov A.I. Notes on city self-government. St. Petersburg, 1904, 228 p.
16. Notovich O.K. Fundamentals of reforms of local and central government. St. Petersburg, 1882, 236 p.
17. Pajitnov K.A. City and zemstvo self-government. St. Petersburg: Type. M.I. Semenov, 1913, 114 p.
18. "People's Freedom", October 20, 1917
19. Postovoy N.V. Local self-government: history, theory and practice. Moscow: Advertising Publishing House "Fedorov", 1995, 188 p.
20. Semin O. Main issues of local self-government (zemstvo reform in the Caucasus and the oil-industrial region of Baku). Baku: Type. "Trud" S.G. Berladira, 1910, 112 p.
21. Tumanov G.M. Notes on city government in the Caucasus. Tbilisi, 1902, 214 p.
22. Tumanov G.M. Organization of zemstvo in Transcaucasia. Tiflis, 1918, 14 p.

MEDICAL SCIENCES

INDICATIONS FOR PULP REMOVAL BEFORE PROSTHETICS WITH METAL-CERAMIC CONSTRUCTIONS

Safaraliyev F.

Doctor of Philosophy in Medicine Associate Professor

Mammadova S.

Doctor of Philosophy in Medicine

Gurskaya N.

Doctor of Philosophy in Medicine Assistant

Department of Orthopedics Dentistry

Azerbaijan Medical University

Baku, Azerbaijan

<https://doi.org/10.5281/zenodo.14947183>

Abstract

In recent years, metal-ceramic constructions have become the primary choice for prosthetics in cases of partial tooth loss and crown defects, as they allow for the optimal reproduction of the anatomical shape of teeth, fully restore masticatory function, and meet the increasing aesthetic demands of patients, achieving a functional-aesthetic optimum.

Keywords: preparation for metal ceramics, depulping for orthopedic indications

Tooth preparation for metal-ceramic constructions involves grinding the tooth tissues to a thickness of 2 mm, which may adversely affect the condition of the tooth pulp. To avoid complications, it is essential to strictly follow preparation protocols for tooth hard tissues, understand safety zones, and be proficient in local anesthesia techniques. One of the key requirements is also taking measures to protect the prepared tooth from temperature and chemical impacts, as well as from infection penetrating through open dentinal tubules. All of this requires the dentist to have high qualifications, extra time, high-tech equipment, and modern materials.

In some cases, as part of the special therapeutic preparation of teeth, pulp removal may be necessary before prosthetics. The indications for this preparation have long been formulated and defined. According to various authors [1, 3, 5, 7], therapeutic preparation in the form of pulp removal is a last resort, and it should be considered in the following cases:

- If radiologically, a wide cavity in the tooth is determined, and during preparation, the tooth may be perforated, or after preparation, only a thin layer of dentin remains that cannot protect the pulp;
- In cases of tooth-alveolar elongation or protrusion >5 mm;
- In cases of tooth malposition, tilting >15°, rotations of upper central incisors >30° and lateral incisors >50°;
- In patients with periodontitis, when splinting of the anterior teeth is performed, and a decision is made to significantly shorten the crowns of the teeth;
- In cases of pathological wear of teeth of II and III degree;
- If persistent hypersensitivity occurs after preparation, which does not resolve after conservative treatment;
- In cases of significant destruction of the crowns of natural supporting teeth, when the decision

is made to restore them with post-and-core inlays [1, 3, 5, 7].

According to the literature [2, 4, 6] and our own observations, despite strict indications for pulp removal before metal-ceramic crown prosthetics, in orthopedic practice, most intact supporting teeth are depulped before prosthetics to reduce the risk of complications and to facilitate preparation. Unjustified pulp removal – the deprivation of organ vitality – cannot be considered justifiable either ethically or legally.

Aim of the study: To determine the prevalence and justification of pulp removal during therapeutic preparation before metal-ceramic crown prosthetics.

Material and Methods: A retrospective analysis of outpatient records from several dental clinics of various ownership forms was performed. A total of 873 outpatient records of patients who underwent prosthetics with metal-ceramic crowns and bridge prostheses were analyzed. The analysis protocol of medical histories included the following points:

1. Diagnosis.
2. Total number of teeth used as supports for metal-ceramic crowns and prostheses (previously depulped and intact).
3. Number of teeth subjected to endodontic revision (from previously depulped teeth), reasons for pulp removal.
4. Number of teeth with satisfactorily sealed root canals.
5. Number of intact teeth intended for prosthetics and pulp removal as directed by prosthodontists.
6. Justification for referral for pulp removal (presence of indications).
7. Number of teeth depulped by therapists upon referral from prosthodontists.

Results and Discussion

Analysis of the first point showed that out of 873 patients, the diagnosis of partial tooth loss was made in

267 (30.58%); the diagnosis of "crown defect" was recorded in 141 (16.15%) medical histories; the combination of both diagnoses was present in 465 (53.27%) medical histories.

According to the second point of the protocol, 3174 teeth were used as supports for metal-ceramic constructions, of which 1539 (48.53%) had been previously depulped and 1635 (51.47%) were intact.

Determining the number of teeth subjected to endodontic revision (from previously depulped teeth), we found that out of 1539 previously depulped teeth, 606 (39.38%) underwent endodontic revision; thus, the number of properly filled teeth amounted to 933 (60.62%). Repeated endodontic treatment was performed on 606 (39.38%) teeth, including due to inflammatory changes in the periapical tissues for 225 (14.62%) cases, and due to poor root canal filling for 381 (24.76%) cases.

The number of intact teeth subject to prosthetics and pulp removal as directed by prosthodontists was 1377 (84.22%) of the total number of intact teeth, 1635. In 1371 (83.85%) cases, the reason for referral for pulp removal in the outpatient records was listed as "for orthopedic indications." In 6 (0.37%) cases, the reason for referral for pulp removal was changes in the periapical tissues seen on X-rays.

When investigating the reasons for referral for pulp removal in cases where the outpatient card recorded "for orthopedic indications," no grounds for pulp removal were found either in the "objective examination" section or in the diagnosis. Of the 1635 teeth, 264 (15.78%) were prosthetically restored with metal-ceramic crowns while maintaining pulp vitality.

From the outpatient medical records, it was evident that dental therapists consistently depulped intact teeth in 100% of cases after referral from prosthodontists.

Analysis of 873 medical histories showed that out of 3174 teeth used as supports for metal-ceramic prostheses, 1635 (51.47%) originally had a vital pulp. Of these 1635 intact teeth, 1377 (84.22%) were referred

for pulp removal. The indications for pulp removal in outpatient records were changes in the periapical tissues detected on diagnostic X-rays in 0.37% of cases. The remaining 1371 (83.85%) teeth were depulped "for orthopedic indications." Metal-ceramic crowns were placed on 264 teeth (15.78%) out of 1635 originally intact teeth, preserving pulp vitality.

In none of the cases where teeth were referred for pulp removal "for orthopedic indications" was there any objective basis for such special preparation before prosthetics.

Thus, our study revealed a significant expansion of indications for pulp removal before metal-ceramic crown prosthetics, and in the overwhelming majority of cases, it was absolutely unjustified. From a legal standpoint, such a type of special preparation of teeth before prosthetics is, in most cases, unlawful.

References:

- 1 Abolmasov N.P., Abolmasov N.N., Bychkov V.A., Al-Hakim A. Orthopedic Dentistry: A Textbook for Universities. Moscow: MEDpress-inform, 2003; 182.
- 2 Borovsky E.V., et al. Therapeutic Dentistry. Moscow: MIA, 2004; 352.
- 3 Gavrilov E.I., Shcherbakov A.S., et al. Orthopedic Dentistry. St. Petersburg: Foliant, 1994; 156.
- 4 Evdokimov S.V. Endodontic Preparation of Teeth for Orthopedic Treatment: Author's abstract of the thesis ... Ph.D. Moscow, 2005; 15-17.
- 5 Kalamkarov K.A. Orthopedic Treatment Using Metal-Ceramic Prostheses. Moscow: MIA, 2003; 37-39.
- 6 Mokshin K.A. Features of Hemodynamic Disorders in the Tooth Pulp During Various Types of Odontopreparation for Metal-Ceramic Constructions: Author's abstract of the thesis ... Samara, 2004; 16.
- 7 Trezubov V.N. Preliminary Treatment of Patients Before Dental Prosthetics. Teaching aid. Moscow: MIA, 2009; 38-42.

**FORENSIC ANTHROPOLOGY IN THE MODERN SYSTEM OF SCIENTIFIC KNOWLEDGE –
SOLVING THE MAIN PROBLEMS AND NEW CHALLENGES****Huseynov V.***Associate Professor of the Department "Forensic medicine and pathological anatomy", Azerbaijan State Institute for Advanced Training of Medical Doctors named after A.Aliyev, Baku, Azerbaijan;***Musayev Sh.***Professor, Head of the Department "Forensic medicine and pathological anatomy", Azerbaijan State Institute for Advanced Training of Medical Doctors named after A.Aliyev, Baku, Azerbaijan;*

ORCID ID: 0000-0001-8598-1597

Ibragimov A.*Associate Professor of the Department of Life Sciences, Khazar University, Baku;*

ORCID ID: 0000-0001-6426-3246

**СУДЕБНО-МЕДИЦИНСКАЯ АНТРОПОЛОГИЯ В СОВРЕМЕННОЙ СИСТЕМЕ НАУЧНЫХ
ЗНАНИЙ – РЕШЕНИЕ ОСНОВНЫХ ЗАДАЧИ И НОВЫЕ ВЫЗОВЫ****Гусейнов В.К.***Доцент кафедры «Судебная медицина и патологическая анатомия», Азербайджанский Государственный Институт усовершенствования врачей им. А.Алиева, Баку, Азербайджан***Мусаев Ш.М.***Профессор, заведующий кафедрой «Судебная медицина и патологическая анатомия», Азербайджанский Государственный Институт усовершенствования врачей им. А.Алиева, Баку, Азербайджан;*

ORCID ID: 0000-0001-8598-1597

Ибрагимов А.Ш.*Доцент кафедры естественных наук, Университет Хазар, Баку;*

ORCID ID: 0000-0001-6426-3246

<https://doi.org/10.5281/zenodo.14947185>**Abstract**

In this study, the authors provide a brief overview of the literature on the current state of forensic anthropology. They mainly consider various aspects of new challenges that arise when solving problems of personal identification. In addition, they analyze scientific approaches that have good prospects as future methodologies in this field of scientific knowledge. Along with this, the authors' own statistical and mathematical calculations are also provided regarding the capabilities of personal identification methods of previous years, which are already considered ineffective. It is concluded that in the context of mathematics and cybernetics, personal identification methods based on older diagnostic methods are not inferior to the results of DNA analysis if several different methods used in previous years are used simultaneously. The authors conclude that in this context, reasonable application of scientific innovations will further expand the still inexhaustible capabilities of personal identification technologies of the previous generation.

Аннотация

В настоящей работе авторы приводят краткий обзор литературных данных, касающихся современного состояния дел в судебно-медицинской антропологии. В основном рассматриваются различные аспекты новых вызовов, которые возникают при решении задач идентификации личности. Кроме того, анализируются научные подходы, которые имеют хорошие перспективы в качестве будущих методологий в этой отрасли научного знания. Наряду с этим также приводятся собственные статистические и математические расчёты авторов, относительно возможностей методов идентификации личности предыдущих лет, которые считаются уже малоэффективными. Делается вывод о том, что в контексте математики и кибернетики методы идентификации личности, основанные на более старых диагностических методах, не уступают результатам ДНК-анализа при одновременном использовании нескольких различных методов, применявшихся в предыдущие годы. Авторы делают вывод о том, что в данном контексте разумное применение научных инноваций ещё больше расширят неисчерпанные возможности технологий идентификации личности предыдущего поколения.

Настоящая статья представляет краткий обзор литературных сведений, которые отражают состояние современной судебно-медицинской антропологии. Анализ этих данных позволяет сделать выводы о вызовах текущего момента и очертить прогнозы, касающиеся перспектив этой отрасли научных знаний. Суть работы метаанализ данных различных исследователей, а также собственные статистические и математические рассуждения.

Прежде всего, отметим, что судебно-медицинская антропология это научная дисциплина, которая представляет систему знаний о человеке и его следах, и имеет целью идентификацию личности и действий субъекта применительно к решению задач, определяемых законом и правовыми актами [1]. Разумеется, что эта дисциплина одно из направлений общей антропологии, которая является интегративной наукой, объединяющей круг пограничных проблем биологии, археологии, этнографии,

медицины, истории и других отраслей науки (вплоть до физики и химии). Как мы уже отметили, основные вопросы, которые решаются судебно-медицинской антропологией, сводятся к идентификации человека и отражений, которые он оставляет в окружающей среде (следы, выделения и т.д.). В данном контексте используются две совокупности методов – методы получения научной информации и методы анализа (оценки имеющихся результатов). В целом же базовые положения методологии следующие: однозначное разграничение объектов на идентифицируемые и идентифицирующие, изменяемые и неизменяемые (разумеется, относительно какого-либо интервала времени), последовательная объективная оценка признаков в отдельности и в совокупности с целью выявления сходства (либо различия), оценка веса отдельных признаков (характерность, специфичность и т.д.). С учётом указанных положений проводят идентификацию личности человека, классическая схема которой обязательно включает три этапа: 1) раздельное исследование признаков искомого человека с одной стороны, и признаков (либо следов) неизвестного трупа или костных останков человека с другой стороны; 2) сопоставление полученных данных и сравнение двух потоков информации; 3) оценка (математическая, логическая и т.д.) результатов сравнения и формулировка выводов (тождество либо её отрицание). Важным аспектом в данной работе являются признаки личности, которые как мы сказали, образуют два потока сравниваемой информации. Эти признаки делят на медико-биологические и биолого-криминалистические. К медико-биологическим признакам относятся общие (пол, раса, возраст, рост, масса и т.д.) и индивидуальные признаки. Индивидуальные признаки бывают врождённые (аномалии, особенности скелета, цвет глаз, родимые пятна и т.д.) и приобретённые (последствия патологий, стоматологический статус, последствия профессиональной деятельности, татуировки и т.д.). Генетическая индивидуальность человека также относится к врождённым признакам. К биолого-криминалистическим признакам относят отпечатки пальцев, почерк, особенности голоса, походки и некоторые другие признаки (мимика, жестикация, стереотипы в одежде и т.д.).

Таким образом, мы видим, что процедура идентификации личности сводится к накоплению двух массивов информации, затем их сопоставлению и формулированию выводов. Однако, в настоящее время это наукоёмкая сложная и многоступенчатая экспертиза с появлением технологии генотипоскопии сильно упростилась и редко сопряжена со сложностями. Вместе с тем, определённая часть вопросов осталась нерешённой. Экспертизы, мотив которых сопоставление ДНК найденных где-то останков человека с ДНК предполагаемого лица (пропавший без вести человек или группа людей), имеют смысл, когда есть подозреваемый, который пропал какое-то время назад. Трудности начинаются, когда нет кого-либо, кто потенциально подходит на роль «хозяина» обнаруженных останков – то есть не с чем сравнивать образцы ДНК от останков. Отсюда становится ясным насколько тяжёлыми могут быть последствия этой ситуации, если вдруг придётся идентифицировать огромный мас-

сив неопознанных останков, ДНК материал которых окажется недоступным (речь идёт о ДНК, которую предоставляют обычно близкие родственники человека пропавшего без вести). В принципе, пока ещё довольно часты и ситуации, когда не удаётся извлечь ДНК из останков идентифицируемого субъекта – то есть, просто нет образцов для сравнения. Особенно это касается случаев когда приходится извлекать ДНК из костей, пролежавших в земле долгие годы (затруднения возникают уже при работе с костями 10-ти летней давности и увеличиваются с каждым десятилетием чуть ли не с геометрической прогрессией). Ещё одной трудностью становится уменьшение количества специалистов, хорошо владеющих различными методиками идентификации предшествующего периода (во всяком случае, это характерно для Азербайджана). Связано это во многом с широким внедрением технологии генотипоскопии, которая можно сказать укоренилась, а также с почти полным отсутствием описанных выше ситуаций в практике наших экспертов. Тем не менее обозначенная проблема существует и необходимость методической базы её решения более чем очевидна.

Собственно одна из главных целей настоящей статьи представить возможности судебно-медицинской науки (на нынешнем этапе её развития) в контексте проблемы идентификации личности, показать пути преодоления потенциальных затруднений в обозначенном формате. Прежде всего, здесь надо видимо показать границы возможностей технологий генотипоскопии в математическом отношении. Как известно геном человека это комбинация нуклеотидов, которая вкупе с набором различных белков образует 23 пары хромосом в которых сосредоточена основная часть наследственной информации (часть информации содержится в митохондриях). То есть это своего рода код каждого субъекта, который уникален, но не исключительный и, разумеется, теоретически может иметь повторы. Поэтому генетикам предписано, в заключениях не писать об абсолютной идентификации, а отмечать пределы доверительной вероятности в интервале, которого ошибка исключена. Так в одной из недавних работ [2] индийские судебные эксперты приводят расчёты вероятности материнства, которые проводились при экспертизе по факту обнаружения останков одной женщины. Значения $P=0,998102706$ и $P=0,999714959$ они считают достаточно надёжными для положительной идентификации в пределах штата Раджастан с населением примерно 70-80 миллионов человек. То есть приближённо речь идёт о допустимости одной ошибки на 500 аналогичных случаев совпадения ДНК, и трёх на 10000 случаев. Как видим, методика генотипоскопии хоть и считается золотым стандартом для идентификации личности, но не является безоговорочной. Группа итальянских исследователей из Триеста [3] приводят два случая из своей практики, когда применение ДНК-технологий не решало вопросов следствия по причине поздно обнаруженного ложного отцовства (так называемые случаи «куколд-отцов» или «отцов-рогоносцев»). Авторы считают целесообразным учёт всех факторов, идентифицирующих пропавшего без вести человека (так называемая «антемортем-база») и тщательную проверку эталонных образцов, ибо

ошибки на этих этапах являются одной из главных причин ложной ДНК-идентификации. Хотя валидация и расчёт степени соответствия реальности выводов, которые получаются при использовании ДНК-технологий заранее прописаны [4], но как показывает практика все возможные казусы просчитать заранее не получается и поэтому ещё рано говорить об отказе от традиционных методов предыдущего поколения. Однако, отметим, что в принципе всевозможные нюансы неоднозначного характера, возникающие при процессе идентификации личности и вероятность отмеченных нами проблем ранее подробно описывались [5] и в данной статье мы, по большому счёту, хотим заострить внимание на ещё неисчерпанных возможностях использования в судебно-медицинской антропологии более ранних методов, которые широко практиковались до появления ДНК-генотипоскопии.

Рассмотрим возможности и эффективность применения традиционных методов идентификации личности. В первую очередь отметим, что общие медико-биологические признаки служат скорее для выделения из большого массива максимально маленькой группы останков, с которыми надо работать дальше (то есть для отсева лишнего материала). Для персональной идентификации незаменимую роль играют частные медико-биологические признаки. Часто несколько (или даже один) частных признаков способствуют положительной идентификации на таком же уровне достоверности, что и генотипоскопия. Так Владимирский Б.М. и соавторы [6] сообщают о случае идентификации по рентгенограммам грудной клетки. Случай был сопряжён с изучением комплекса приобретенных (травма или болезнь, в тексте не уточняется) рентгеноанатомических особенностей грудной клетки одного индивида. Экспертная комиссия установила, что вероятность встречи ещё одного человека с аналогичным морфокомплексом возможна только в выборке людей количеством $3,7 \times 10^{19}$ человек (население планеты на данный момент около 8×10^9). Разумеется, такой случай исключение, а не правило, но, тем не менее, наглядно раскрывает возможности традиционных прежде способов отождествления личности. В целом каждый из частных медико-биологических и биолого-криминалистических признаков имеет определённый относительный вес в контексте достоверной вероятности результатов идентификации. Например, Зинин А.М., Кирсанова Л.З. [7] считают, что при совпадении групповых медико-биологических признаков и одного биолого-криминалистического (строение лица) шанс ошибиться с идентификацией один на 5×10^6 . Понятно, что с увеличением количества совпадений индивидуализирующих личность признаков вероятность ошибки будет падать. Исходя из математических расчётов Keiser-Nielsen S. [8] пришёл к выводу, что для безоговорочной идентификации достаточно 12-13 частных признаков. Однако, эти выводы были сделаны почти 50 лет назад, когда ещё не было разработанных впоследствии высокотехнологичных способов (краниофациальной, стоматологической и других) идентификации. В настоящее время, например, применяются методы 3Д компьютерной реконструкции (и совмещения) по черепу, совмещённой пластической и компьютерной реконструкции, реконструкция (и

совмещение) с помощью компьютерной томографии [9], и разработчики указывают, что вероятность ошибки для этих методик чрезвычайно низкая ($P < 0,01$). Тем самым, становится ясным, что для высокой достоверности выводов экспертного исследования порой достаточно будет и нескольких индивидуализирующих признаков.

Покажем это на примере с использованием Байесовских процедур вычисления вероятности для совместных независимых событий [10]. Вероятность того, что произойдёт хотя бы одно из взаимно независимых событий, вычисляется путём вычитания из единицы произведения вероятностей противоположных (рассматриваемых) событий: $P(A) = 1 - P(A_1) \times P(A_2) \times \dots \times P(A_n)$. Допустим для идентификации личности применялись 3 разные методики достоверность по каждой из которых равна $P = 0,95$, то есть допускается вероятность одной ошибки на 20 случаев диагностики. Если по всем трём применяемым методикам получена однозначно положительная идентификация, то вероятность их совместной ошибки будет, разумеется, не так высока, что и показывают расчёты ниже. Вначале найдём вероятности противоположных событий, то есть вероятность того, что при диагностике по каждой из методик произойдёт ошибка: $P(A_1) = 1 - 0,95 = 0,05$; $P(A_2) = 1 - 0,95 = 0,05$; $P(A_3) = 1 - 0,95 = 0,05$. Теперь подставим эти значения в приведённую выше формулу: $P(A) = 1 - P(A_1) \times P(A_2) \times P(A_3) = 1 - 0,05 \times 0,05 \times 0,05 = 1 - 0,000125 = 0,999875$. Конечно же значение $P = 0,999875$ может считаться достаточно надёжным для однозначного вывода о результатах идентификации. Отметим, что многие разработчики методик идентификации личности по костям приводят ещё более высокие значения уровня доверительной вероятности. Например, для способа диагностики, разработанного нашим отечественным учёным [11] почти 30 лет назад и учитывающего популяционные особенности населения Кавказа, указывается надёжность $P > 0,97$. В то же время для идентификации личности по комплексному стоматологическому статусу приводятся аналогичные цифры (вероятность ошибки $P < 0,03$), касающиеся уровня доверительной вероятности. Нетрудно заметить, что при диагностике даже только по этим двум методикам вероятность общего успеха идентификации (то есть шанс, что хотя бы одно из двух взаимно независимых событий состоится) составит: $P(A) = 1 - P(A_1) \times P(A_2) = 1 - 0,03 \times 0,03 = 1 - 0,0009 = 0,9991$. То есть вероятность ошибки будет меньше единицы на 1000 случаев диагностики. Аналогичные выводы о том, что вероятностный подход позволяет интегрировать несколько источников остеологической информации и получить единый коэффициент достоверности (который будет более убедительным для вынесения решения об итоге идентификации) были получены и другими исследователями. Например, согласно расчётам Д.В. Стедмана и соавторов [12], если будут найдены соответствующие референтные данные групповых признаков по популяции, то даже совпадение двух признаков может обеспечить убедительную позитивную идентификацию. В качестве примера они приводят совпадение стоматологического статуса и прижизненного перелома с аналогичными признаками на скелетированных останках. Особенности зубочелюстного

аппарата и паттерны переломов (тип, локализация и особенности заживления) согласно их вычислениям являются наиболее изменчивыми компонентами биологического профиля и их совпадения вполне достаточно для идентификации. В последние годы поворот в сторону традиционных методов сделали и некоторые крупные ассоциации судебных антропологов, которые дают рекомендации по прикладной реализации комплекса более простых методик морфологического характера при недоступности высокотехнологичных [13]. При этом в качестве доводов также приводятся ссылки на исследования с математическими выкладками, подтверждающие легитимность указанных рекомендаций.

Таким образом, можно сделать выводы о том, что традиционные методы идентификации личности, которые использовались до появления ДНК-технологий, далеко не исчерпали своего практического значения. Наш анализ показывает, что и в перспективе роль этих методик не будет ослабевать. Некоторым авторитетным учёным будущее развитие видится в свете интеграции и междисциплинарного сотрудничества, а также распространения командного подхода, способствующего решению более сложных задач [14]. Немаловажное значение будет иметь применение искусственного интеллекта в решениях задач по судебно-медицинской антропологии [15, 16], а также другие инновации в компьютерном программировании и прикладной математике. В заключение также отметим, что методы, используемые для положительной идентификации людей, не ограничиваются рамками судебно-медицинских исследований, которые сопряжены с расследованием смертельных случаев в контексте криминальных кейсов. Они продолжают быть весьма полезны и в других юридических контекстах, а также могут дать много интересной информации археологам, этнографам и историкам [17].

Список литературы:

1. Попов В.Л. Теоретические основы судебной антропологии. Актуальные вопросы идентификации личности. Санкт-Петербург, 1999, с. 31-38.
2. Singh R., Kumawat R.K., Singh G., Sharma A. A skeletal remains unveiled the murder mystery of missing lady through DNA technology. *GSC Biological and Pharmaceutical Sciences*, 2022, 19(02), p. 160-164.
3. Consoloni L., Gobbo C., Sorçaburu C.S. et al. Pitfalls in the Genetic Identification of Human Remains. *Peer Reviewed Journal of Forensic and Genetic Sciences*, 2018, 1(2), p. 23-25. DOI: 10.32474/PRJFGS.2018.01.000108
4. Coble M.D., Buckleton J., Butler J.M. et al. DNA Commission of the International Society for Forensic Genetics: Recommendations on the validation of software programs performing biostatistical calculations for forensic genetics applications. *Forensic Science International: Genetics*, 2016, 25(1), p. 191-197. DOI: 10.1016/J.Fsigen.2016.09.002
5. Blau S., Ubelaker D.H. (editors). *Handbook of Forensic Anthropology and Archaeology (WAC Research Handbooks in Archaeology)*. 2016, Routledge, 738 p.
6. Владимирский Б.М., Иванов Н.И., Ковалёв А.В., Самарин А.И., Щербаков В.В. Математический анализ при идентификации личности. Актуальные вопросы идентификации личности. Санкт-Петербург, 1999, с. 31-38.
7. Зинин А.М., Кирсанова Л.З. Криминалистическая фотопортретная экспертиза (учебное пособие). Москва, 1991, 88 с.
8. Keiser-Nielsen S. Dental identification: Certainty V Probability. *Forensic Science*, vol.9, 1977, p. 87-97.
9. Wilkinson C. Facial reconstruction – anatomical art or artistic anatomy? *Journal of Anatomy*, 2010, vol.216(2), p. 235-250.
10. <https://byjus.com/jee/probability-of-independent-events/>.
11. Мусаев Ш.М. Медико-криминалистическая краниологическая идентификация жителей Кавказа. Баку, 1999, 130 с.
12. Steadman D.W., Adams B.J., Konigsberg L.W. Statistical basis for positive identification in forensic anthropology. *American journal of physical anthropology*, 2006, vol.131(1), p. 15-26. <https://doi.org/10.1002/ajpa.20393>
13. De Boer H.H., Obertova Z., Cunha E. et al. Strengthening the role of forensic anthropology in personal identification: Position statement by the Board of the Forensic Anthropology Society of Europe (FASE). *Forensic Science International*, 2006, vol.315, p. 1-7. DOI: 10.1016/j.forsciint.2020.110456
14. Ubelaker D.H., Shamlou A., Kunkle A. Contributions of forensic anthropology to positive scientific identification: a critical Review, *Forensic Sciences Research*, 2019, vol.4(1), p. 45-50. DOI: 10.1080/20961790.2018.1523704
15. Mesejo P., Martos R., Ibanez O. et al. A survey on artificial intelligence techniques for biomedical image analysis in skeleton-based forensic human identification. *Applied Sciences*, 2020, vol.10(14), p. 1-37. DOI: 10.3390/app10144703
16. Gupta S., Sharma V., Johri P. *International Research Journal of Engineering and Technology*, 2020, vol.7(5), p. 181-184.
17. Ибрагимов А.Ш., Евсеев П.В., Алиев А.А. Восстановление внешнего облика мужчины из шахинского могильника периода раннего средневековья. *Вестник Московского университета (Серия 23, Антропология)*, 2023, №1, с. 129-137.

COMBINED DAMAGE TO THE NERVOUS SYSTEM AND LIVER AS A RESULT OF ARSENIC POISONING AND CHANGES IN BIOCHEMICAL PARAMETERS IN THE BLOOD OF EXPERIMENTAL ANIMALS**Polukhova Sh.***Azerbaijan Medical University, Department of Pharmacology, Doctor of Philosophy in Biology, Asst.Senior Lecturer, Baku, Azerbaijan***Dr. Mehtiyeva Sh.***Azerbaijan Medical University, Department of Neurology, Doctor of Philosophy in Medicine, Doctor Neurologist, Baku, Azerbaijan*ORCID: <https://orcid.org/0009-0009-7540-4054>**Dr. Karimova R.***Azerbaijan Medical University, Doctor Neonatologist, Senior Researcher, Doctor of Philosophy in Medicine, Baku, Azerbaijan*ORCID: <https://orcid.org/0009-0004-4323-9625>**Prof. Abiyev H.***Azerbaijan Medical University, Department of Medical and Biological Physics, Doctor of Biological Sciences, Professor, Baku, Azerbaijan*ORCID: : <https://orcid.org/0009-0004-9319-5317>**Dr. Heybatova M.***Azerbaijan Medical University, Department of Pharmacology, Assistant, Baku, Azerbaijan***Aslanova A.***Azerbaijan Medical University, Department of Medical and Biological Physics, Chief Laboratory Assistant, Baku, Azerbaijan*<https://doi.org/10.5281/zenodo.14947187>**Abstract**

Arsenic is regarded as a group I carcinogen for humans. The major cause of human arsenic toxicity is from contamination of drinking water from natural geological sources rather than from mining, smelting and agricultural sources (pesticides or fertilizers). Arsenic contamination in the ground water has been reported worldwide. Studies on populations from different parts of the world exposed to comparable levels of arsenic in drinking water show varying degrees of individual susceptibility to arsenic-induced genetic damage, metabolism, methylation capacity and other health effects. Also, within the same population exposed to arsenic only a minor percentage actually develop arsenic-induced skin lesions that are considered to be the hallmark of arsenicosis. Research We conducted experiments on 15 white rats weighing 140-260 g, kept in the vivarium under normal conditions at the Scientific Research Center of the Azerbaijan Medical University, and divided them into 3 groups. The concentrations of the enzymes alanine amino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase (ALP), gamma-glutamyl transferase (GGT), lactate dehydrogenase (LDH), and creatine phosphokinase (CPK) were determined in the blood of experimental animals.

Keywords: arsenic poisoning, experimental animals, nervous system, liver**Introduction**

Consequently, it is of utmost importance to understand the underlying molecular mechanisms that render a person susceptible to arsenic toxicity. Substantial scientific progress has been made recently in the area of arsenic metabolism, pharmacokinetics, modes of carcinogenic action and in different model systems including human cell line [1].

Single doses of inorganic arsenic may be highly toxic by ingestion and inhalation. Ingestion of large doses of arsenic can rapidly lead to GI disturbance, encephalopathy, and potentially peripheral neuropathies. In severe poisonings, multi-organ features will develop within hours, these include rhabdomyolysis, renal failure, respiratory failure, failure of vital cardiovascular and brain functions and death. The fatal dose for inorganic arsenic ingestion in humans is often quoted as 1 to 3mg/kg, though survival at higher doses has been observed. Chronic exposure to inorganic arsenic has been extensively studied in areas of the world with naturally high levels. Chronic arsenic exposure may result in a wide range of signs and symptoms, many non-specific

[2,3,4]. Skin lesions including palmoplantar hyperkeratosis, hyperkeratinized warts or corns and hyperpigmentation (interspersed with areas of depigmentation) are thought to be the most sensitive indicator of chronic exposure to high levels [5,6].

Among the various internal organs affected by chronic exposure to arsenic in humans, liver is one of the important targets. Epidemiological studies have shown association between chronic arsenic exposure and liver disease including hepatomegaly, hepatoportal sclerosis, liver fibrosis and cirrhosis of liver. Abnormal liver functions as manifested by severe gastrointestinal problems and clinical elevations of liver enzymes in plasma including alanine amino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase (ALP) also are associated with chronic arsenic exposure. Exposure of mice to arsenic in drinking water causes elevation of liver enzymes in plasma and capillarization of liver sinusoidal endothelium. Infact, liver is the major site of arsenic metabolism and hence arsenic exposure causes liver disease in exposed humans [7,8,9].

Antinuclear antibodies (ANA) are a diverse group of autoantibodies that are found in autoimmune disorders like systemic lupus erythematosus, Rheumatoid arthritis, Sjorgen's syndrome, systemic sclerosis and inflammatory myositis. Arsenic exposure increases the incidence of auto-immune diseases like diabetes mellitus. ANA are present in lower titers in liver diseases, leprosy, multiple sclerosis and juvenile rheumatoid arthritis. The association of chronic arsenic exposure and autoimmune disorders has received only minimal attention [10,11,12].

Material and methods

Research We conducted experiments on 15 white rats weighing 140-260 g, kept in the vivarium under normal conditions at the Scientific Research Center of the Azerbaijan Medical University, and divided them into 3 groups.

While conducting experiments, the rules of behavior with experimental animals of the European Bioethical Commission (Strasbourg 1986) and the local bioethical commission of the Azerbaijan Medical University were strictly followed. In all cases, the experiments were performed under anesthesia conditions, and at the end of the experiment, anesthesia was created by injecting 0.5 ml of calypsol solution into their abdominal cavity. The white rats selected for the experiment were divided into 3 groups with 5 heads in each.

Group 1 included intact rats.

Creation of a pathological model in rats as a result of poisoning with arsenic-contaminated water in group 2.

Changes in biochemical indicators of liver enzymes in the blood of white rats in group 3 were studied 10 days after the cessation of poisoning.

The concentrations of the enzymes alanine amino transferase (ALT), aspartate amino transferase (AST), alkaline phosphatase (ALP), gamma-glutamyl transferase (GGT), lactate dehydrogenase (LDH), and creatine phosphokinase (CPK) were determined in the blood of experimental animals [13,14,15].

Results and discussion.

The concentration of AST enzyme in the blood of experimental animals included in group 1 varied between 25-33 u/l, ALT enzyme concentration 30-40 u/l, glutamine transferase enzyme concentration 28-58 u/l, lactate dehydrogenase (LDH) enzyme concentration 270-440 u/l, creatine phosphokinase (CPK) enzyme concentration 243-275 u/l, and alkaline phosphatase (ALP) enzyme concentration 150-300 u/l.

Based on the results obtained from experimental animals, it was determined that the average concentration of the AST enzyme in the blood of intact white rats was $29,4 \pm 1,50$ u/l ($\sigma=3,36$), the average concentration of the ALT enzyme was $35,2 \pm 1,85$ u/l ($\sigma=4,15$), the average concentration of the glutamine transferase enzyme was $43,2 \pm 5,43$ u/l ($\sigma=12,13$), the average concentration of the LDH enzyme was $368 \pm 28,53$ u/l ($\sigma=63,80$), the average concentration of the CPK enzyme was $260,4 \pm 6,00$ u/l ($\sigma=13,41$), and the average concentration of the alkaline phosphatase enzyme was $234 \pm 27,13$ u/l ($\sigma=60,66$).

In group 2, the average concentration of glutamine transferase enzyme increased by 26% compared to the intact state, and the average concentration of LDH

enzyme increased by 21%, reaching $54,6 \pm 3,01$ ($\sigma=6,73$) and $386 \pm 9,27$ u/l ($\sigma=20,74$), respectively.

The average concentration of CPK enzyme increased by 6% compared to the intact state, reaching $277 \pm 13,73$ u/l ($\sigma=30,70$), and the average amount of alkaline phosphatase enzyme increased by 18%, reaching $276,4 \pm 21,32$ u/l ($\sigma=47,67$).

In the blood taken from the hepatic vein of the experimental animals in group 3, the concentration of the AST enzyme was recorded between 30-62 u/l, the concentration of the ALT enzyme was 42-55 u/l, the concentration of the glutamine transferase enzyme was 42-65 u/l, the concentration of the LDH enzyme was 360-400 u/l, the concentration of the CPK enzyme was 266-346 u/l, and the concentration of the alkaline phosphatase enzyme was 230-360 u/l. Their average concentration was also significantly reduced compared to group 2.

In the blood taken from animals of group 3, the average concentration of ALT and AST enzymes decreased by 5%, to $36,2 \pm 2,13$ u/l ($\sigma=4,76$) and $47,2 \pm 2,35$ u/l ($\sigma=5,26$), respectively. The average concentration of glutamine transferase enzyme decreased by 6%, to $51,4 \pm 4,01$ u/l ($\sigma=8,96$), the average concentration of LDH enzyme decreased by 2%, to $379 \pm 7,48$ u/l ($\sigma=16,73$), the average concentration of CPK enzyme decreased by $295,2 \pm 13,61$ u/l ($\sigma=30,43$), and the average concentration of alkaline phosphatase enzyme decreased by 2%, to $271,2 \pm 23,74$ u/l.

The average concentration of AST, ALT, and glutamine transferase enzymes decreased significantly by two times compared to group 2, while the concentration of other enzymes decreased slightly. However, despite this positive change, the average concentrations of the remaining enzymes, except for the LDH enzyme, were significantly higher compared to the intact state. The average concentration of the AST enzyme increased by 23% ($p<0.05$), the average concentration of the ALT enzyme by 34% ($p<0.01$), the average concentration of the glutamine transferase enzyme by 19%, the average concentration of the LDH enzyme by 3%, the average concentration of the CPK enzyme by 13% ($p<0.05$), and the average concentration of the alkaline phosphatase enzyme by 16%. The accuracy of the difference according to intact indicators was inaccurate for the enzymes glutamine transferase, LDH, and alkaline phosphatase [16,17,18].

Conclusions

The results of our experiments show that as a result of arsenic poisoning, the concentration of enzymes synthesized in the liver, including aspartate and alanine transferase, glutamyl transferase, lactate dehydrogenase, creatine phosphokinase, and alkaline phosphatase, increases in blood taken from the portal vein of the liver [19,20].

References:

1. Riaz MA, Nisa ZU, Anjum MS, et al. Assessment of metals induced histopathological and gene expression changes in different organs of non-diabetic and diabetic rats. *Sci Rep* 2020; 10: 1–11. doi: 10.1038/s41598-019-56847-4.

2. Carmean CM, Yokoi N, Takahashi H, et al. Arsenic modifies serotonin metabolism through glucuronidation in pancreatic β -cells. *Am J Physiol Endocrinol Metab.* 2019; 316(3): E464–E474. doi: 10.1152/ajpendo.00302.2018.
3. Wang M, Hossain F, Sulaiman R, et al. Exposure to inorganic arsenic and lead and autism spectrum disorder in children: a systematic review and meta-analysis. *Chem Res Toxicol* 2019; 32(10): 1904–1919. doi: 10.1021/acs.chemrestox.9b00134.
4. Bozack AK, Saxena R, Gamble M V. Nutritional influences on one-carbon metabolism: effects on arsenic methylation and toxicity. *Annu Rev Nutr* 2018; 38: 401–429. doi: 10.1146/annurev-nutr-082117-051757.
5. Jain N, Chandramani S. Arsenic poisoning-an overview. *Indian J Med Spec* 2018; 9: 143–145.
6. Goel A, Ramakrishna B, Zachariah U, et al. What makes non-cirrhotic portal hypertension a common disease in India? analysis for environmental factors. *Indian J Med Res.* 2019; 149(4): 468–478. doi: 10.4103/ijmr.IJMR_1405_17.
7. Hsu LI, Wang YH, Hsieh FI, et al. Effects of arsenic in drinking water on risk of hepatitis or cirrhosis in persons with and without chronic viral hepatitis. *Clin Gastroenterol Hepatol* 2016; 14: 1347–1355. doi: 10.1016/j.cgh.2016.03.043.
8. Li X, Sun D, Zhao T, et al. Long non-coding RNA ROR confers arsenic trioxide resistance to HepG2 cells by inhibiting p53 expression. *Eur J Pharmacol* 2020; 872: 172982. doi: 10.1016/j.ejphar.2020.172982.
9. Dugo EB, Yedjou CG, Stevens JJ, et al. Therapeutic potential of arsenic trioxide (ATO) in treatment of hepatocellular carcinoma: role of oxidative stress in ATO-induced apoptosis. *Ann Clin Pathol.* 2017; 5(1). 2017;5(1):1101. Epub 2017 Jan 4.
10. Sadaf N, Kumar N, Ali M, et al. Arsenic trioxide induces apoptosis and inhibits the growth of human liver cancer cells. *Life Sci* 2018; 205: 9–17. doi: 10.1016/j.lfs.2018.05.006
11. Grau-Pérez M, Kuo CC, Spratlen M, et al. The association of arsenic exposure and metabolism with type 1 and type 2 diabetes in youth: the search case-control study. *Diabetes Care* 2017; 40: 46–53. doi: 10.2337/dc16-0810.
12. Rehman K, Fatima F, Akash MSH. Biochemical investigation of association of arsenic exposure with risk factors of diabetes mellitus in Pakistani population and its validation in animal model. *Environ Monit Assess* 2019; 191(8): 511. doi: 10.1007/s10661-019-7670-2.
13. Manthari RK, Tikka C, Ommati MM, et al. Arsenic induces autophagy in developmental mouse cerebral cortex and hippocampus by inhibiting PI3K/Akt/mTOR signaling pathway: involvement of blood–brain barrier's tight junction proteins. *Arch Toxicol* 2018; 92(11): 3255–3275. doi: 10.1007/s00204-018-2304-y.
14. Cardenas A, Smit E, Welch BM, et al. Cross sectional association of arsenic and seroprevalence of hepatitis B infection in the United States (NHANES 2003–2014). *Environ Res* 2018; 166: 570–576. doi: 10.1016/j.envres.2018.06.023.
15. Alex AA, Ganesan S, Palani HK, et al. Arsenic trioxide enhances the NK cell cytotoxicity against acute promyelocytic leukemia while simultaneously inhibiting its bio-genesis. *Front Immunol* 2018; 9: 1–13. doi: 10.3389/fimmu.2018.00001.
16. Suntararuks S, Worasuttayangkurn L, Akani-manee J, et al. Sodium arsenite exposure impairs B cell proliferation and enhances vascular inflammation in plasmodium berghei mouse model. *Environ Toxicol Pharmacol* 2019; 66: 7–13. doi: 10.1016/j.etap.2018.12.010.
17. Veenema R, Casin KM, Sinha P, et al. Inorganic arsenic exposure induces sex-disparate effects and exacerbates ischemia-reperfusion injury in the female heart. *Am J Physiol Hear Circ Physiol* 2019; 316(5): H1053–H1064. doi: 10.1152/ajpheart.00364.2018.
18. Seow WJ, Pan WC, Kile ML, et al. Arsenic reduction in drinking water and improvement in skin lesions: a follow-up study in Bangladesh. *Environ Health Perspect* 2012; 120(12): 1733–1738. doi: 10.1289/ehp.1205381
19. Al-Eryani L, Jenkins SF, States VA, et al. MiRNA expression profiles of premalignant and malignant arsenic-induced skin lesions. *PLoS One* 2018; 13(8): e0202579. doi: 10.1371/journal.pone.0202579.
20. Weinmuellner R, Kryeziu K, Zbiral B, et al. Long-term exposure of immortalized keratinocytes to arsenic induces EMT, impairs differentiation in organotypic skin models and mimics aspects of human skin derangements. *Arch Toxicol* 2018; 92: 181–194. doi: 10.1007/s00204-017-2034-6.

CADMIUM, WHICH PLAYS AN IMPORTANT ROLE IN THE DEVELOPMENT OF LUNG DISEASES, IS MOST COMMONLY ACCUMULATED IN THE LIVER

Dr. Karimova R.

Azerbaijan Medical University, Doctor Neonatologist, Senior Researcher, Doctor of Philosophy in Medicine, Baku, Azerbaijan

ORCID: <https://orcid.org/0009-0004-4323-9625>

Zulfugarova M.

Azerbaijan Medical University, Department of Pharmacognosy, Doctor of Philosophy in Biology, Senior Lecturer, Baku, Azerbaijan

ORCID: <https://orcid.org/0000-0003-1106-378X>

Dr. Heybatova M.

Azerbaijan Medical University, Department of Pharmacology, Assistant, Baku, Azerbaijan

Abaszade Z.

Azerbaijan Medical University, Department of Normal Physiology, Asst. Teacher, Baku, Azerbaijan

Dr. Sadygova G.

Azerbaijan Medical University, Department of Emergency Medicine, Assistant, Baku, Azerbaijan

Dr. Irzayeva A.

Azerbaijan Medical University, Department of Emergency Medicine, Assistant, Baku, Azerbaijan

Dr. Valiyeva Sh.

Azerbaijan Medical University, Department of Emergency Medicine, Assistant, Baku, Azerbaijan

<https://doi.org/10.5281/zenodo.14947189>

Abstract

Cadmium (Cd) is a ductile metal in the form of a blueish or silvery-white powder. It is naturally found in soil (about 0.2 mg/kg), minerals, and water. Cd belongs to the group of toxic, carcinogenic, and stimulating elements. Some lung diseases (such as emphysema, asthma, and bronchitis) and high blood pressure are thought to be related to slow poisoning. The symptoms of cadmium poisoning may vary depending on the time of exposure, the type of diet, and the age and health status of the exposed people. For non-smokers and non-occupational exposures, the only source of exposure is diet. Its biological half-life in the human body ranges from 16 to even 30 years on average. We conducted experiments on 15 white rats weighing 140–260 g, kept in the vivarium under normal conditions at the Scientific Research Center of the Azerbaijan Medical University, and divided them into 3 groups. The concentration of lactate dehydrogenase (LDH), alkaline phosphatase (ALP), peroxidase, and catalase in the blood of white rats was determined. The results of our experiments show that cadmium poisoning increases the levels of liver enzymes and antioxidant products in blood taken from the portal vein of the liver.

Keywords: lungs, diseases, cadmium, liver

Introduction

The FAO/WHO recommends that the tolerable cadmium intake for an adult is approximately 0.4–0.5 mg/week (60–70 µg per day) [1]. Cadmium is primarily absorbed through the respiratory system (about 13–19% of Cd from the air), but it can also enter through the digestive system (about 10–44%), when dust is mixed and swallowed with saliva [2,3]. The amount of accumulated Cd ranges from 0.14 to 3.2 ppm in muscles, 1.8 ppm in bones, and 0.0052 ppm in the blood. People who are most frequently exposed to heavy metals should be continuously monitored in order to maintain a healthy lifestyle, as well as to implement effective preventive measures and improve public health [4,5].

Cadmium is mainly absorbed during inhalation, partly through the digestive system when particles of dust are swallowed with saliva. This element accumulates most often in the lungs, liver, kidneys, pancreas, testicles, muscles, adipose tissue, and skin, inhibiting the activity of sulfur-containing enzymes illustrates some of the most common sources of Cd and how Cd exposure leads to the development of lung diseases [5,7,8]. It also demonstrates the health effects associated with the long-term accumulation of Cd in the

lungs. It is estimated that about 13–19% of Cd is absorbed into the lungs from the air, and about 10–44% through the digestive tract, mainly into the small intestine. Cadmium binds to red blood cells in complexes with large-molecule proteins (albumin) and accumulates in the liver, while when complexed with small-molecule proteins (metallothionein—MT) it is reabsorbed in the renal tubules [9].

The mitochondrial respiratory chain plays an essential role in maintaining energy homeostasis through oxidative phosphorylation (OXPHOS), generating energy in the form of adenosine triphosphate (ATP), which is the energy necessary for life. Additionally, mitochondria are implicated in the synthesis of amino acids, lipids and phospholipids, ion homeostasis, motility, and apoptosis [10,11]. The number and functions of mitochondria differ in animal tissues and cells relative to energetic needs and in response to physiological or environmental alterations. Malfunctioning mitochondria are related to aging and many diseases, including cancer [12].

Cadmium may alter many mitochondrial proteins' activity (enzymes and transporter systems across the outer and inner membranes) by inhibiting respiratory chain enzymes, collapsing mitochondrial membrane

potential, and swelling mitochondria, causing the inhibition of respiration. Cadmium could directly increase permeability and decrease mitochondrial membrane potential, a condition that causes cytochrome C release with activation of the caspase pathway. Additionally, cadmium inhibits ATPase, lactate dehydrogenase (LDH), superoxide dismutase (SOD), and glutathione peroxidase (GPx) activities, enhancing the levels of ROS and lipid peroxidation. Cadmium seems to be involved in Fenton reactions. Even though it does not act as a catalyst in the Fenton reaction, it can produce ROS by indirectly displacing an endogenous Fenton metal (e.g., Fe^{2+}) from proteins, thus increasing the amount of free redox-active metals. Cadmium may alter the cellular redox status by reacting with exogenous and endogenous antioxidants, such as glutathione GSH. Cadmium may damage mitochondria and not only interferes with Ca^{2+} signaling but also increases mitochondrial ROS formation [4,7].

Chronic obstructive pulmonary disease (COPD) is a respiratory system disease characterized by continuous respiratory symptoms and progressive decline in lung function. There are >400 million patients with COPD worldwide, which is the third major death causes in humans. Chronic airway inflammation with massive macrophages and lymphocyte infiltration is closely associated with the progression of COPD. A great deal of studies have demonstrated that cigarette smoking is the major risk factor for the incidence of COPD. Recently, numerous studies indicate that inhalation of polluted air and atmospheric fine particles promotes the occurrence and progress of COPD. Until now, it is not clear which substances play a key role in COPD caused by polluted air and atmospheric fine particles [13,14]. Cadmium (Cd) is a significant occupational and environmental pollutant. Occupational population are generally exposed to Cd by inhaling the polluted air in workshops. On the other side, Cd is one of the important toxic substances in atmospheric fine particles and air pollutants. The majority of people were exposed to Cd through inhaling atmospheric fine particles and air pollutants. Epidemiological research results indicated that there was an inverse correlation between occupational and environmental Cd exposure levels and lung function of the exposed population. Several hospital-based cohort studies showed that serum Cd level was affirmatively correlated with pulmonary inflammation and epithelial-mesenchymal transition (EMT) in patients with COPD [15].

The liver's main job is to filter the blood coming from the digestive tract before it circulates to the rest of the body, metabolizing and detoxifying potentially harmful chemicals and drugs. Approximately 60% of absorbed Cd is deposited in the liver (30%) and kidney (30%), while the rest is distributed throughout the other parts of the body. Approximately 0.007% to 0.009% of the Cd body burden per day is excreted through urine and feces. There are two main ways for the ionic form of Cd^{2+} to get through the hepatocyte cell membrane: (1) binding with Fe^{2+} and Zn^{2+} transporters, or (2) through voltage-gated Ca^{2+} channels. Protein-bound Cd usually binds to liver-produced metallothionein (MT) protein to form Cd metallothionein (Cd-MT) complex, which enters cells through receptor-mediated

endocytosis and is then released from the Cd-MT as a Cd ion through the digestion of lysosome. Chronic Cd ion is stored in various tissues such as the liver, kidney, prostate, and bone [16]. Acute Cd poisoning causes increased levels of liver damage markers such as alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) in the blood and also increases the incidence of nonalcoholic hepatitis and fatty liver. Histopathology shows that Cd can induce acute liver injury leading to tissue necrosis, apoptosis, hyperplasia, and enlarged liver sinus and hilum. Severe necrosis is accompanied by neutrophil infiltration and chemotaxis to the lesion, which can worsen liver damage. The mechanisms of Cd-induced acute hepatic injury mainly involve two pathways. Firstly, Cd directly binds to sulfhydryl groups on key molecules including glutathione (GSH) and sulfhydryl groups of proteins to cause oxidative damage. Secondly, although Cd is not a redox-reactive metal, it can cause inflammatory injury, an event associated with oxidative stress [17].

Material and methods

Research We conducted experiments on 15 white rats weighing 140-260 g, kept in the vivarium under normal conditions at the Scientific Research Center of the Azerbaijan Medical University, and divided them into 3 groups.

While conducting experiments, the rules of behavior with experimental animals of the European Bioethical Commission (Strasbourg 1986) and the local bioethical commission of the Azerbaijan Medical University were strictly followed. In all cases, the experiments were performed under anesthesia conditions, and at the end of the experiment, anesthesia was created by injecting 0.5 ml of calypsol solution into their abdominal cavity. The white rats selected for the experiment were divided into 3 groups with 5 heads in each.

Group 1 included intact rats.

Creation of a pathological model in rats as a result of cadmium poisoning in group 2.

10 days after the cessation of poisoning, liver enzymes and a representative of the antioxidant defense system were determined in the blood of white rats in group 3.

The concentration of lactate dehydrogenase (LDH), alkaline phosphatase (ALP), peroxidase, and catalase in the blood of white rats was determined.

Results and discussion.

The results of the analyses determined that the average concentration of the LDH enzyme in the blood of intact white rats as a result of cadmium poisoning was 368 ± 28.53 u/l ($\sigma=63.80$), and the average concentration of the alkaline phosphatase enzyme was 234 ± 27.13 u/l ($\sigma=60.66$).

In group 2, the average concentration of LDH increased by 2% to 379 ± 7.48 u/l ($\sigma=16.73$), and the average concentration of alkaline phosphatase increased by 2% to 271.2 ± 23.74 u/l. The average concentration of peroxidase was $(11.7 \pm 0.48$ nmol/mg; $\sigma=1.08$), and the increase in its concentration compared to the intact state was 4%.

Unlike peroxidase, the concentration of catalase increased very slightly. Its average concentration was

250.6±9.27 mkat/l ($\sigma=20.72$). This was only 1% increase, much less than the level in the intact state.

Compared to group 3, the average concentration of the LDH enzyme increased by 22.5% ($p<0.05$), and the average concentration of the alkaline phosphatase enzyme increased by 9% ($p>0.05$). Thus, compared to group 2, the average concentration of peroxidase in the liver tissue of white rats included in group 3 increased by 2% and the average concentration of catalase increased by 4%. Thus, among the markers we studied, the largest increase was recorded in catalase.

The concentration of catalase in the liver tissue of white rats included in group 3 varied between 130-275 Mkat/l. Its average concentration increased sharply and reached 172±18.61 Mkat/l. The reason for this was that the concentration of catalase in the liver tissue of the white rats (10%) taken into the experiment increased to a higher level than normal.

In this regard, the average concentration of catalase in the liver homogenate was 18% ($P<0.05$) higher than the level in group 2 animals and 12% higher than the level in intact experimental animals.

Conclusions

The results of our experiments show that cadmium poisoning increases the levels of liver enzymes and antioxidant products in blood taken from the portal vein of the liver.

References:

21. Schaefer H.R., Dennis S., Fitzpatrick S. Cadmium: Mitigation strategies to reduce dietary exposure. *J. Food. Sci.* 2020; 85: 260–267. doi:10.1111/1750-3841.14997.
22. Ruczaj A., Brzóska M.M. Environmental exposure of the general population to cadmium as a risk factor of the damage to the nervous system: A critical review of current data. *J. Appl. Toxicol.* 2023; 43: 66–88. doi: 10.1002/jat.4322.
23. Balali-Mood M., Naseri K., Tahergorabi Z., Khazdair M.R., Sadeghi M. Toxic Mechanisms of Five Heavy Metals: Mercury, Lead, Chromium, Cadmium, and Arsenic. *Front. Pharmacol.* 2021; 12: 643972. doi:10.3389/fphar.2021.643972
24. Kayiranga A., Li Z., Isabwe A., Ke X., Simbi C.H., Ifon B.E., Yao H., Wang B., Sun X. The Effects of Heavy Metal Pollution on Collembola in Urban Soils and Associated Recovery Using Biochar Remediation: A Review. *Int. J. Environ. Res. Public Health.* 2023; 20: 3077. doi: 10.3390/ijerph20043077
25. Genchi G., Sinicropi M.S., Lauria G., Carocci A., Catalano A. The Effects of Cadmium Toxicity. *Int. J. Environ. Res. Public Health.* 2020; 17: 3782. doi: 10.3390/ijerph17113782.
26. Syeda T., Cannon J.R. Environmental exposures and the etiopathogenesis of Alzheimer's disease: The potential role of BACE1 as a critical neurotoxic target. *J. Biochem. Mol. Toxicol.* 2021; 35: e22694. doi: 10.1002/jbt.22694.
27. Nordberg M., Nordberg G.F. Metallothionein and Cadmium Toxicology—Historical/Review, and Commentary. *Biomolecules.* 2022; 12: 360. doi:10.3390/biom12030360.
28. Tarhonska K., Lesicka M., Janasik B., Roszak J., Reszka E., Braun M., Kołacińska-Wow A., Jabłońska E. Cadmium and breast cancer—Current state and research gaps in the underlying mechanisms. *Toxicol. Lett.* 2022; 361: 29–42. doi: 10.1016/j.toxlet.2022.03.003.
29. Anyanwu BO, Ezeji for AN, Igweze ZN, Orisakwe OE. Heavy metal mixture exposure and effects in developing nations: an update. *Toxics.* 2018; 6: 65. doi:10.3390/toxics6040065
30. Fatima G, Raza AM, Hadi N, Nigam N, Mahdi AA. Cadmium in human diseases: It's more than just a mere metal. *Indian J Clin Biochem.* 2019; 34: 371–378. doi:10.1007/s12291-019-00839-8
31. Niture S, Lin M, Qi Q, et al. Role of autophagy in cadmium-induced hepatotoxicity and liver diseases. *J. Toxicol.* 2021; 95: 64297. doi:10.1155/2021/9564297
32. Barsouk A, Thandra KC, Saginala K, Rawla P, Barsouk A. Chemical risk factors of primary liver cancer: an update. *Hepat. Med.* 2020; 12: 179–188. doi:10.2147/HMER.S278070
33. Sanjeev S, Bidanchi RM, Murthy MK, Gurusubramanian G, Roy VK. Influence of ferulic acid consumption in ameliorating the cadmium-induced liver and renal oxidative damage in rats. *Environ Sci Pollut Res Int.* 2019; 26: 20631–20653. doi:10.1007/s11356-019-05420-7
34. Genchi G, Sinicropi MS, Lauria G, Carocci A, Catalano A. The effects of cadmium toxicity. *Int J Environ Res Public Health.* 2020; 17: 3782. doi:10.3390/ijerph17113782
35. Cheng CH, Ma HL, Deng YQ, Feng J, Jie YK, Guo ZX. Oxidative stress, cell cycle arrest, DNA damage and apoptosis in the mud crab (*Scylla paramamosain*)-induced by cadmium exposure. *Chemosphere.* 2021; 263: 128277. doi:10.1016/j.chemosphere.2020.128277
36. Demir E, Qin T, Li Y, et al. Cytotoxicity and genotoxicity of cadmium oxide nanoparticles evaluated using in vitro assays. *Mutat Res.* 2020; 850: 851: 503149. doi:10.1016/j.mrgentox.2020.503149
37. Ghosh K, Chatterjee B, Behera P, Kanade SR. The carcinogen cadmium elevates CpG-demethylation and enrichment of NFYA and E2F1 in the promoter of oncogenic PRMT5 and EZH2 methyltransferases resulting in their elevated expression, in vitro. *Chemosphere.* 2020; 242: 125186. doi:10.1016/j.chemosphere.2019.125186

STATE OF CENTRAL HEMODYNAMICS AND ENDOTHELIAL FUNCTION IN PATIENTS WITH ISCHEMIC HEART DISEASE AND TYPE 2 DIABETES MELLITUS

**Tulyaganova D.
Radjabova D.
Yakubov M.
Nazarova G.
Khan T.**

State Institution "Republican Specialized Scientific and Practical Medical Center of Therapy and Medical Rehabilitation", Uzbekistan

<https://doi.org/10.5281/zenodo.14947191>

Abstract

There was investigated the state of central hemodynamics and endothelial dysfunction in coronary heart disease (CHD) patients depending on the presence of type 2 diabetes mellitus (DM). Eighty-three patients with stable angina pectoris of FC II-IV were examined. It was found that biomarkers of endothelial dysfunction were significantly higher in patients with CHD associated with DM2. The presence of DM2 was associated with greater degree and area of ischemia, significantly greater dilatation of left heart chambers, decreased total contractility and higher score of left ventricle regional contractility impairment.

Keywords: ischemic heart disease, diabetes mellitus, systolic function, diastolic function, left ventricle, endothelin, vascular endothelial growth factor, interleukin 6.

Relevance. Cardiovascular diseases (CVDs), including coronary heart disease (CHD), remain one of the leading causes of mortality in the world according to the World Health Organization (WHO). They have a significant impact on people's health and quality of life, as well as a major economic burden on the health care system [1,2].

WHO reports that CVDs are the leading cause of death in the world, taking more than 17 million lives annually. Of these, approximately 7.4 million deaths are attributed to CHD, making it the most common type of cardiovascular disease. (WHO, 2019) [3].

The effectiveness of treatment of patients with ischemic heart disease largely depends on the degree of endothelial dysfunction and the functional state of central hemodynamics. In such cases, it is advisable to carry out a number of diagnostic measures to assess endothelial function and indicators of central hemodynamics in the treatment of patients with ischemic heart disease against the background of type 2 diabetes mellitus. Assessment of central hemodynamic parameters and endothelial activity in patients with CHD against the background of diabetes mellitus is important not only to determine the treatment tactics, but also to prevent possible complications and is one of the urgent problems of modern cardiology.

The role of endothelial dysfunction and functional state of central hemodynamics in the development of complications and worsening of its course and prognosis is undoubted, as there is a large number of studies concerning this issue [4]. But the studies aimed at a comprehensive study of clinical manifestations, endothelial dysfunction, functional state of central hemodynamics in patients with coronary heart disease against the background of diabetes mellitus are not numerous in the available literature.

In CHD against the background of type 2 diabetes mellitus there is a persistent endothelial dysfunction [5]. Assessment of endothelial activity using inflammatory biomarkers and central hemodynamic parameters

in patients with coronary heart disease against the background of type 2 diabetes mellitus is of great importance in determining treatment tactics, which is reflected in the improvement of prognosis and quality of life of the patient.

According to the conducted scientific studies and analysis of the available literature, it can be concluded that it is necessary to conduct studies aimed at optimizing diagnosis by determining the severity of the disease and endothelial dysfunction using laboratory and instrumental tests in patients with CHD against the background of type 2 diabetes mellitus. In this regard, it is relevant to study the significance of inflammatory factors and biomarkers in the severity of the disease, optimization of treatment tactics and prediction of complications.

Purpose of the study. To study the state of central hemodynamics and to reveal endothelial dysfunction in CHD patients depending on the presence of type 2 DM.

Materials and methods. There were examined 83 patients (mean age 63.4 ± 3.8 years) with CHD (stable angina pectoris FC II, III) who had undergone myocardial revascularization in anamnesis.

All patients were divided into two groups depending on the presence of type 2 DM. The first group consisted of 41 patients with type 2 DM. The second group consisted of 42 patients without DM.

The control group consisted of 20 patients (mean age 53.2 ± 3.5 years) without cardiovascular pathology and severe chronic diseases.

All patients underwent a comprehensive study including: anthropometric parameters (body weight, kg; height, cm; body mass index - BMI, kg/m^2), BP measurement and laboratory tests (fasting glycemia, mmol/L ; blood lipids, mmol/L).

Endothelial dysfunction was studied by determining the blood levels of endothelin-1 (ET-1), interleukin 6 (IL-6), vascular endothelial growth factor (VEGF) by enzyme-linked immunosorbent assay on a solid-phase analyzer "Humareader Single" (Germany). ELISA

method is based on the use of antibodies or antigens labeled with enzymes, which allows to register the process of formation of antigen-antibody complex by enzymatic activity. ELISA is characterized by high specificity, its sensitivity in many cases exceeds the sensitivity of other immunological methods.

From instrumental methods all patients underwent ECG in 12 leads, echocardiography, tissue Dopplerography. Electrocardiography was performed on the first day of the patient's admission to the hospital. A stationary electrocardiograph "Bioset" (Germany) was used.

Echocardiography with tissue Doppler was performed on a Samsung medison ultrasound device "Acucuvix.V20" (Korea) using a sector transducer with color mode and pulse-wave, continuous-wave mode with a frequency of 2-4 MHz in standard echocardiographic positions in M- and B-modes according to the recommendations of the American Society of Echocardiography (ASE) (Schiller N.B. et al., 1989).

As structural parameters of remodeling were recorded:

- LV end-diastolic volume (Simpson method) indexed to body surface area (EDV index);
- left atrial end-systolic volume (Simpson method) indexed to the body surface area (LA index);
- right ventricular end-diastolic area (planimetric method in the apical 4-chamber position), indexed to the body surface area (RV index);
- right atrial end-systolic area (planimetric method in the apical 4-chamber position), indexed to body surface area (RA index);
- diastolic thickness of the interventricular septum (parasternal position along the long axis of the left ventricle, IVS);
- diastolic thickness of LV posterior wall (parasternal position along the long axis of the left ventricle, LVAD);
- LV myocardial mass (shell method, apical position) indexed to the body surface area (MMLV index);
- sphericity index - the ratio of LV short diameter to cavity length (SI).

Functional characteristics of myocardial state:

- LV ejection fraction (LVEF) - the ratio of LV stroke volume (difference between LV EVC and LV end-systolic volume determined by Simpson's method) to LV EVC;
- index of regional LV contractility impairment (LV contractility index) - average values of the regional

contractility score using the 17-segment scheme. Assessment of segment contractility is five-point (0 - hyperkinesis - systolic thickening more than 100%, 1 - normokinesis - systolic thickening 50-100%, 2 - hypokinesis - systolic thickening less than 50%, 3 - akinesis - absence of systolic thickening, 4 - dyskinesis - systolic bulging of myocardial segment);

- shortening fraction of RV area (SFA) - ratio of the difference of end diastolic and end systolic area of LV measured by planimetric methods in apical 4-chamber position to end diastolic area of LV;

- stroke index (SI) - LV stroke volume indexed to the body surface area;

- minute index (MI) - product of MI by heart rate;

- type of myocardial diastolic filling (Dopplerography of transmitral and transtricuspidal blood flow, classification of diastolic filling types according to the Canadian classification of diastolic dysfunction, DD);

- integral index of myocardial function (Tei) - ratio of the duration of closed valve periods to the period of ejection (Doppler blood flow);

- mean pulmonary artery pressure (MPAP) - determined by the ratio of the duration of the period of acceleration of ejection flow to the total duration of the ejection period on the pulmonary artery valve.

Statistical processing of the obtained results was carried out using methods of variation statistics recommended for biomedical research on IBM PC AT Pentium IV. The results were processed using Microsoft Excel 2002 and Statistica 6.0 programs under Windows XP. The indicators are presented as the arithmetic mean of the variation series and its standard error ($M \pm m$). The reliability of differences in mean values was assessed using Student's t-criterion. The level of statistical reliability was taken as $p < 0.05$.

Results of the study. According to the inclusion criteria, 83 people were selected for the study. The first group consisted of 42 (50.6%) patients without the presence of type 2 DM. The second group consisted of 41 (49.4%) patients with type 2 DM. All patients had previously undergone myocardial revascularization.

Also, all patients included in the study signed informed voluntary consent. The conduct of the study was approved by the local ethical committee of the Republican specialized scientific practical medical centre of therapy and medical rehabilitation. The study participants were thoroughly informed about all goals and objectives of the study and its methods.

Table 1. Clinical characteristics of patients participating in the study.

Patient Characteristics	1 st group (without DM2)	2 nd group (with DM2)
Number of patients	42 (50,6%)	41 (49,4%)
Age, years	66,3± 1,42	61,5± 2,03
Sex composition (men; women)	26 16	27 14
BMI (kg/m ²)	29,48±0,63	32,43±1,56
History of myocardial infarction (number of patients)	14	18

Both groups of patients were completely comparable in terms of the leading clinical and demographic

parameters: sex, age, and BMI, but patients in the comparison group had a slightly higher body weight. Pa-

tients of both groups were also comparable in such clinical characteristics as the frequency of complaints of dyspnea, heart pain and the presence of other (except for CHD) cardiac pathology and comorbidities, except for myocardial infarction in the history, which was significantly more frequent in the group of patients with CHD + type 2 DM ($p = 0.024$).

Since there are currently no generally accepted normal values of endothelin-1 content, we determined normal and borderline reference values of these parameters using the data obtained in the control and comparison groups. Determination of the normal reference value seems to be necessary for further comparison of the values of the studied parameters in different groups of patients.

In the control group, including relatively healthy people without established diseases, normal levels of circulating markers of endothelial dysfunction were calculated, which amounted to 26.8 pg/ml for endothelin. The obtained results were taken as optimal threshold values characterizing normal endothelial status in practically healthy individuals.

We conducted a comparative study of endothelin-1 levels in CHD patients with and without concomitant

type 2 DM. The results of the study are presented in Table 2. Analysis of the obtained data showed that the content of endothelin-1 in CHD patients with type 2 DM is significantly higher than in the group of CHD patients without DM and the control group. The increase of ET-1 level was more determined in 83% of patients in the group of CHD patients with type 2 DM, whereas in the group of CHD patients without DM the level of ET-1 was elevated in 54,7% of cases. In the control group, only 2 participants (10%) demonstrated an increase in ET - 1 concentration.

Endothelin-1 is known to be the main form of endothelin, which is formed only in vascular endothelial cells and plays the most important role in the regulation of vascular tone, cardiac output and vascular channel permeability. ET-1 significantly increases myocardial contractility, causes vasoconstriction of coronary vessels, which leads to increasing ischemia and arrhythmia [7].

Thus, it was found that ET-1 concentration tends to increase slightly, whereas in patients with CHD associated with type 2 DM this indicator reaches a high level.

Table 2. Indices of endothelial dysfunction (VEGF, ET-1) and inflammatory factor (IL 6)

Indicators	CHD with DM2 (n=41)	CHD without DM2 (n=42)	p
IL-6, pg/mL	67,68±3,27	47,73±2,82	0,04
Endothelin-1, pg/mL	286,54±53,62	158,45±14,27	0,14
Vascular endothelial growth factor (VEGF), pg/mL	1138,24±65,71	684,49±58,63	0,05*

Note - * difference with the comparison group $p < 0.05$

When analyzing such parameters as VEGF and IL-6, a slight increase in their concentration in blood is noted in the group of CHD patients, and in the group of patients with CHD associated with type 2 DM there are higher unreliable figures compared to the main group.

Analysis of ECHOCG parameters in CHD patients showed some changes in cardiac geometry within ischemic remodeling: increase of chamber volumes (increase of LA volume index, EDV index, LV ICDO, RV diameter $p < 0,05$ in comparison with control group), spherical deformation of LV cavity (increase of MMLV index, $p < 0,05$). At the same time, comparison of indices of patients with CHD + type 2 DM showed that the size of left heart chambers and MMLV index were significantly larger than in CHD patients without DM. The right ventricular (RV) size was comparable regardless of the presence of DM.

Disturbances of ventricular systolic and diastolic function were also revealed: LV EF in CHD patients on average remained within normal values, but was significantly lower than in control group ($p < 0.05$). A more detailed analysis showed that overall 51% of patients had heart failure (LV EF < 55%). At the same time, reduced LV EF in CHD patients was associated with the presence of DM.

Another index of LV myocardial systolic function, the index of regional contractility impairment, was assessed using the 17-segment LV model. More than half of the patients (53.6%) were found to have impaired regional contractility. At that, regional dyskinesia, as well

as reduced total contractility, was associated with the presence of background DM ($p < 0.05$).

Integral systolic LV remodeling index - an index combining parameters of LV structural and functional systolic remodeling, representing the ratio of LV EF to sphericity index, in patients included in the study was significantly lower than in the control group ($p < 0,05$).

This is associated with both a decrease in LVEF and an increase in the sphericity index and changes in LV cavity geometry. Spherical remodeling of LV cavity itself disturbs the funnel-shape of ejection flow, reducing its efficiency and making an additional contribution to the impairment of total LV contractility. The lowest index was found in CHD patients with DM (compared to the CHD group without DM).

The analysis of LV diastolic function revealed a reliable tendency to impairment of processes of active diastolic relaxation of LV myocardium, which was manifested by a decrease of E/A ratio determined in the process of tissue Dopplerography of the lateral edge of mitral annulus ($p < 0,05$, compared to control). Comparison of CHD patients with and without DM revealed a greater degree of diastolic dysfunction in patients with background DM. The analysis confirms the described regularities: the highest incidence of diastolic dysfunction is observed in the group of patients with CHD associated with type 2 DM.

Integral index of myocardial functional state Tei, reflecting the ratio of the sum of "closed valve" periods (isometric tension and isometric relaxation periods) to

ejection time, in patients included in the study was significantly higher than the control index ($p < 0.05$). The highest value was observed in patients with background DM ($p < 0.05$ in comparison with patients without DM). The consequence of LV functional state impairment, especially its diastolic dysfunction, is an increase in

pulmonary artery occlusion pressure (PAOP), reflecting postcapillary pulmonary hypertension. In our study, in patients with CHD, especially with the presence of DM, PAOP was higher than in the control group, although on average for the groups remained within normal values ($p < 0.05$, comparison of CHD patients with and without DM and control group).

Table 3: Indices of systolic and diastolic cardiac function

Indicators	CHD with DM2 (n=41)	CHD without DM2 (n=42)	Control group (n=20)
EDV index, ml/m ²	123,19±7,62	97,72±5,63	78,60 ± 10,58
LA index, ml/m ²	26,38±12,13	22,63±0,58*	19,4 ± 4,75*
MMLV index	134,73±22,31	125,64±19,04*	97,61±10,45*
SI	0,77±0,16	0,62±0,13	0,57 ± 0,14
LV EF, %	55,13±6,37	52,32±5,92*	64,85 ± 4,91
LV contractility index, points	1,33±0,12	1,31±0,11	1,00 ± 0,00
Integral systolic remodeling index, points	63,45±24,36	68,41±25,82	121,74±31,65
LV E/A	0,72±0,31	0,83±0,33	1,53±0,15
RV E/A	0,80±0,39	0,85±0,41	1,56±0,17
LV Tei	0,43±0,11	0,39±0,11	0,28 ± 0,06
RV Tei	0,37±0,11	0,35±0,10	0,23 ± 0,04
PAOP, mmHg	19,24±4,75	17,83±5,25	10,50±1,8
MPAP, mmHg	30,57 ± 4,62	29,73±4,78	22,64±3,49

Note - difference with the comparison group $p < 0.05$

The level of systolic pressure in the pulmonary artery was also determined in combination with PAOP. It was found that in patients with CHD there is an unreliable increase in pressure in the small circle of circulation ($p < 0.05$ compared to control group) with maximum effect in patients with CHD + DM2.

The integral index of myocardial functional state of LV (Thei LV), as well as the total integral functional index demonstrated the violation of ventricular functional state in CHD patients ($p < 0.05$ with CGcontrol group), and more pronounced violations were associated with the presence of background DM in general in all patients included in the study ($p < 0.05$).

Formation of myocardial dys- and asynergy zone, its extent significantly affect the course of the disease and prognosis for the patient's life. Assessment of myocardial structural and functional reorganization dynamics in CHD patients allows to verify more effectively the severity of the disease and possible complications, and also determines a rational approach to treatment tactics.

In patients with angina pectoris with the most severe functional classes against the background of myocardial mass growth and LV hypertrophy, some LV cavity expansion and decreased ejection fraction are revealed. Along with this, diastolic dysfunction by type 1 is noted. Progression of the disorder occurs with aggravation of functional class of stable angina pectoris and presence of complications. Thus, in patients with III-IV FC, complicated by CHF, development of diastolic dysfunction of both type 1 and type 2 (pseudonormalization), as well as predominance of eccentric LV hypertrophy was found. Early sensitive indicators of myocardial remodeling include an increase in end-systolic size and volume [6,7,8].

The severity of ischemic myocardial remodeling directly correlates with the incidence of adverse cardiovascular events. Echocardiographic parameters preceding the development of systolic, diastolic dysfunction and CHF, such as increased end-systolic size and end-systolic volume, myocardial stress, decreased diastolic peak filling and relaxation ratios are considered to be early predictors of LV remodeling [9,10,11,12].

Conclusion.

In conclusion, biomarkers of endothelial dysfunction such as endothelin-1, IL-6 and IL-6 and VEGF were significantly higher in patients with DM2-associated CHD. This indicates a high level of inflammation and vascular wall damage in this population. In addition, we observed a trend toward a progressive increase in disease severity compared with healthy subjects and CHD patients without type 2 DM.

In patients with CHD, angina pectoris with the most severe FC, complicated by CHF we revealed a tendency to insignificant structural and functional remodeling of not only left, but also right heart sections with increase not only in volumes of heart cavities, but also in myocardial mass, as well as impaired myocardial functional state, systolic and diastolic functions of both ventricles.

Background DM was associated with more pronounced abnormalities, i.e. greater degree and area of ischemia, and characterized in particular by significantly greater dilatation of left heart chambers, decreased total contractility and higher score of regional LV contractility impairment, higher values of pulmonary artery pressure, which can be explained by more widespread coronary lesions and greater degree and area of ischemia.

Thus, the study of functional state of cardiac hemodynamics and endothelial dysfunction in mechanisms of CHD development, determination of the role of proinflammatory markers for risk assessment of development and prediction of pathology course, as well as introduction of modern innovative technologies of diagnostics and prediction of cardiovascular complications in patients with CHD associated with type 2 diabetes mellitus, allow to identify groups of increased risk of development and determine effective tactics of prevention and treatment of this pathology, which, in the final analysis, will allow to identify groups of increased risk of development and determine effective tactics of prevention and treatment of this pathology.

References:

1. Kronenberg, H.M., et al. (2010) Williams Tratado de endocrinología. 11th Edition, Elsevier, Rio de Janeiro, Lorber D. Importance of cardiovascular disease risk management in patients with type 2 diabetes mellitus. *Diabetes Metab Syndr Obes.* 2014 May 23;7:169-83. doi: 10.2147/DMSO.S61438. PMID: 24920930; PMCID: PMC4043722.
2. Ferrucci L., Fabbri E. Inflammageing: chronic inflammation in ageing, cardiovascular disease, and frailty. *Nat Rev Cardiol* 2018;15(9):505–22. DOI: 10.1038/S41569-018-0064-2.
3. Chung H.Y., Kim D.H., Lee E.K. et al. Redefining chronic inflammation in aging and age-related diseases: proposal of the senoinflammation concept. *Aging Dis* 2019;10(2):367–82. DOI: 10.14336/AD.2018.0324.
4. Fulop T., Witkowski J.M., Olivieri F., Larbi A. The integration of inflammaging in age-related diseases. *Semin Immunol* 2018;40:17–35. DOI: 10.1016/j.smim.2018.09.003
5. Visseren F.L.J., Mach F., Smulders Y.M., Carballo D., Koskinas K.C., Böck M., 2021. 2021 ESC guidelines on cardiovascular disease prevention in clinical practice. *Eur. Heart J.* **42**(34): 3227–3337.
6. Schinzari F., Cardillo C. 2020. Intricacies of the endothelin system in human obesity: role in the development of complications and potential as a therapeutic target. *Can. J. Physiol. Pharmacol.* 98(9): 563–569.
7. Broch K., Anstensrud A. K., Woxholt S., Sharma K., Tøllefsen I. M., Bendz B., et al. (2021). Randomized Trial of Interleukin-6 Receptor Inhibition in Patients with Acute ST-Segment Elevation Myocardial Infarction. *J. Am. Coll. Cardiol.* 77 (15), 1845–1855. 10.1016/j.jacc.2021.02.049
8. Chung H.Y., Kim D.H., Lee E.K. et al. Redefining chronic inflammation in aging and age-related diseases: proposal of the senoinflammation concept. *Aging Dis* 2019;10(2):367–82. DOI: 10.14336/AD.2018.0324.
9. Fulop T., Witkowski J.M., Olivieri F., Larbi A. The integration of inflammaging in age-related diseases. *Semin Immunol* 2018;40:17–35. DOI: 10.1016/j.smim.2018.09.003
10. Schinzari F., Cardillo C. Intricacies of the endothelin system in human obesity: role in the development of complications and potential as a therapeutic target. *Can. J. Physiol. Pharmacol.* 2020.98(9): 563–569.
11. Ultrasound-based imaging methods of the kidney—recent developments / J.M. Correias [et al.] // *Kidney international.* – 2016. – Vol. 90, N 6. – P. 1199–1210.
12. Koc, A.S. Renal cortical stiffness obtained by shear wave elastography imaging is increased in patients with type 2 diabetes mellitus without diabetic nephropathy / A.S. Koc, H.E. Sumbul // *J. Ultrasound.* – 2018, N 21. – P. 279 – 285.

PEDAGOGICAL SCIENCES

FORMATION OF THE CONCEPT OF BANDONEON ART DEVELOPMENT IN UKRAINE

Kolomiets V.

Doctor of Economics, Docent

Melitopol Bohdan Khmelnytsky State Pedagogical University, Ukraine

<https://doi.org/10.5281/zenodo.14947193>

Abstract

Musical culture is always an integral part of human life. But there are such sectors of musical art as mastering and communicating authentic musical instruments in other countries. The victory path of bandoneon from local instrument to the widespread executor of Argentine tango is indicative in the development of world musical art. Unfortunately, despite the unusual sound, the compactness of the bandoneon, it has not become the subject of deep research. Most of the studies are observed in regions where bandoneon is widespread. This is Germany, Argentina, Uruguay.

The small-sized tool, its unusual piercing-shirty sound, the original layout of the button panel should contribute to its promotion and teaching the game on it. This purpose will make a significant contribution to Ukrainian musical art, in particular will expand the range of tools used in Ukraine. Along with the button accordion, the accordion, the harmonic of the Bandoneon will enter the study at the music school, institutions of higher education. Bandoneon has the opportunity to expand the composition of the orchestras, not excluding solo performance.

The purpose of the study is to determine the concept of development of bandoneon art in Ukraine, to select the basic categories of the concept, the areas of construction of academic bandoneon art.

The methodology of defining the concept is based on the application of methods of theoretical and practical research.

Ukraine has been taking care of the creation of a new cultural – building project since independence. But if button Accordion-Accordion art has developed in the twentieth century, Bandoneon was not destined to become the subject of deep research. The purpose of the concept is to recognize Bandoneon as a full – fledged academic tool in Ukraine.

The scientific novelty of the study was the «Concept of Development of Bandoneon Art in Ukraine», which involves the construction of academic bandoneon art. The directions of construction of academic bandoneon art are proposed. The development of bandoneon art in Ukraine will be the positive results of the concept implementation.

Keywords: Bandoneon, Bandoneon Art, Concept of development of Bandoneon Art, Musical Culture, creativity of Bandonenists

Introduction. Musical culture has become an integral part of human life. The evolution of musical art from ancient times to modern innovations has focused the attention of M. Nadirova, N. Aliyeva [1].

L. Shuchang wrote about the influence and role of music as an effective instrument for emotional involvement of a person in the knowledge of national values. He noted that music is a universal language that is able to convey emotions, ideas and values without the need to use words [2].

Z. Junkai noted the role of music as a key means of forming cultural values and aesthetic outlook of China's students [3].

The competence of musicians has been investigated by a number of scientists such as H. Vrubel [4], A. Mitieva [4], T. Bagrii [5; 6], H. Vrubel, [7], O. Nakhlova [7]. In their writings, the essence of the phenomenon of professional competence of musicians is substantiated, the problem of preparation of the future music teacher is updated. Particular emphasis is placed on the ability of musical art to stimulate creative self-expression, improve your well-being and promote psychological recovery.

The quality of training of musicians was paid considerable attention to S. Tereshchenko [8], O. Sopin

[8], A. Mitieva [4; 8], L. Kotova [8; 9], L. Sopina [8], N. Segeda [10], H. Panchenko [11].

Music therapy as a factor in reducing the physical and emotional tension of a person was considered by N. Levchuk [12], S. Boychenko [13], V. Draganchuk [14; 15], L. Slyvka [16], L. Nesterenko [17], L. Rakityanska [18], O. Rudnytska [19], T. Tkachenko [20], other authors [21]. These researchers raise the impact of music therapy on the formation of humane relationships and emphasize the active application of music therapy in the educational process of a comprehensive school. It is indicative that it can have a positive effect on the human body, improve its well-being, improve mood, increase performance. The authors prove the positive influence of classical music on the subconscious, emphasize the need for musical education of man [13; 19; 20].

The topical problem of improving the development of personality in the process of obtaining higher music education, the formation of a high level of musical culture can be considered one of the prerequisites for effective professional training of the musician. This focused on G. Nagorna [22], Y. Smakovsky [23].

But there are such sectors of musical art as mastering and communicating authentic musical instruments in other countries.

The victory path of bandoneon from local instrument to the widespread executor of Argentine tango is indicative in the development of world musical art.

Unfortunately, despite the unusual sound, the compactness of the bandoneon, it has not become the subject of deep research. Most of the studies are observed in regions where bandoneon is widespread. This is Germany, Argentina, Uruguay.

At the same time, the evolutionary path of bandoneon in musical art, the methodology of teaching the game, methodological and musical provision of performing arts at the moment remains chaotically covered in separate world research, which requires systematization and deepening. In Ukrainian science, there is a small number of works on bandoneon, which is associated with the slight distribution of the tool, the specifics of the game. Deeply worked on issues related to V. Koliemets [24; 25].

The small-sized tool, its unusual piercing-shirty sound, the original layout of the button panel should contribute to its promotion and teaching the game on it. This will make a significant contribution to Ukrainian musical art, in particular will expand the range of instruments used in Ukraine; Along with the button accordion, harmonics will enter the study at the music school, higher education institutions; It has the ability to expand the composition of the orchestras, not excluding solo performance.

Unfortunately, there is little information on bandoneon art, especially in Ukraine. The study of each issue is a problem because of the limited information and specialists in this area.

For a deep study of the problem, it is necessary to define the concept of development of bandoneon art, to distinguish basic categories of concept, directions of construction of academic bandoneon art. In solving the problem, complexity can be caused by the use of primary sources of foreign language (such as Argentina, Uruguay), accessibility to actual sources (for example, to museums of bandoneon abroad, bandoneon festivals abroad).

The problem of research is multifaceted and is currently inexhaustible.

The solution of the broken study is interesting and relevant in terms of the decline of musical art in Ukraine. There are also a number of studies of little-known world instruments that attract specialists and lovers of music, which has an impact on human spiritual development, and has the creative potential of Ukraine.

Each such study is authorial, specific, using a kind of set of methods, techniques, approaches.

Paying the proper scientific and practical significance of scientists, it is worth noting that the issues of substantiation of theoretical and methodological foundations, the development of conceptual approaches and practical recommendations on genesis, creative achievements and prospects of development of bandoneon art remain unresolved. Currently, the number of tools in Ukraine, the number of Bandoneon schools, the availability of educational and methodological support of virtuosos and students remains unknown.

The number of keys is incomprehensible, and

therefore tones on tools that exist specialized and hybrid varieties of tools. Each tool has its own set of tones.

Thus, the urgency of the outlined problems led to the choice of the topic of research, its purpose and objectives.

The purpose of the study is to determine the concept of development of bandoneon art, the selection of basic categories of the concept, directions of construction of academic bandoneon art.

Objective of the study:

- define the concept of development of bandoneon art;
- highlight the basic categories of the concept;
- to determine the directions of construction of academic bandoneon art.

Research methods. The research methodology is based on the application of theoretical and practical methods. The purpose of using theoretical and practical research methods is to achieve the goal and solve certain tasks, in particular methodological assistance in the conducted research.

The sections of work require the use of different methods: historical-chronological analysis for the study of the development of aerophones, methods of generalization and systematization, which in the complex made it possible to investigate the formation and creative-performing role of bandoneon art. The method of analyzing the tool as its belonging to the aerophones. The last section of the study focuses on the formation of the concept of development of bandoneon art in Ukraine. In accordance with the goals of the section, induction and deduction, decomposition, synthesis and synergetics were applied to substantiate the directions of formation of the concept of development of bandoneon art in Ukraine. Scientific abstraction, logical generalization, systematic approach and classical categorization – for providing recommendations for the construction of academic bandoneon art in Ukraine.

Throughout the study, methods of structural and logical analysis and generalization were used-for the logical structural construction of the study.

Results

The development of aerophones in Ukraine

From the time of independence, Ukraine cares for the creation of a new cultural formation project, which could be recognized as an alternative to "Kulishivtsi", which determines the actualization of folk art and a specific role of folklore close to folklore (in the broad sense) of performance, popularized in the activities of folk collectives.

But if button accordion - accordion art has developed in the twentieth century, then Bandoneon was not destined to become the subject of research.

Traditional schools of folk-instrumental art of the twentieth century in the context of domestic musical and instrumental art are marked by the generalization of the previous epochs of cultural work. The practice of instrumental performance is actively included in the new phase of its functioning - from the empirical canons of traditional music and the first steps in the development of academic arts on the side, to a powerful, consolidated state program of the educational system.

We consider it necessary to start the formation, de-

velopment and popularization of folk-instrumental performance on the bandoneon in the aspect of its powerful professionalization and academicization. This requires solving a number of tasks. Of these, the discovery of classes in the teaching of the game on the bandoneon becomes important.

In the early twentieth century, aerial phones were intensively developing, resulting in significant changes in their structures.

Serious research in the field of bandoneon-based performance and the publication of scientific and methodological developments are required. We consider it advisable to focus not only on the practice of household music and amateur music on bandoneon, but also on training that requires vocational education and relies on foreign accumulated experience of bandoneon music.

The performing arts of the Bandoneon game are closely related to composer work, and it is known to be different and multifunctionality.

We consider the urgent creation of bandorchestra in Ukraine. From the beginning of the creation, this can be a small mobile ensemble of bandoneon, violin, cello, guitars, electronic piano. With the development of bandoneon art it is possible to attach more bandoneons. Some world ensembles include up to three bandoneons. This is the problem of educating bandonists-professional.

It is important that and how the tool is performed and for whom it. That is, the role of the public, the addressee of the creation and performance of a musical work.

With the advent of bandoneon, the birth of unique musical instruments that replace, including even the orchestra (more precisely the ensemble) in the context of folk art, which is inseparably related to the sensuality of everyday life is marked.

The process of constructing and optimizing the training of bandoneon performance is important in the context of transformations related to reviewing educational standards in Ukraine.

In educational institutions where the departments of folk instruments are actively functioning, there is a need to study the history of development of bandoneon instrumental creativity, to determine its present and forecasting the future.

Construction of academic bandoneon art in Ukraine

The construction of academic bandoneon art in Ukraine in the author's interpretation is presented below. It includes the following:

- creation of schools for the study of bandoneon art and opening the relevant bandoneon classes;
- formation of professional performing schools in the bandoneon;

Particularly important role is played by the introduction of the teaching of play at musicians in music schools, and later in music schools, at the pedagogical faculties of conservatories;

- study of curiosity of bandonists;
- teaching of teachers; training of pedagogical staff for higher music schools;
- stimulating the development of academic direction of bandoneon art and performance in Ukraine;

- development and publication of Ukrainian original literature for Bandoneon;

Creation of the first textbook for learning a bandoneon game will lay the foundation of academic bandoneon education on the basis of a musical record.

- development of repertoire policy for the bandoneon ensemble;

One of the most important tasks of ensembles is to promote folk instruments not only in professional circles, but also in the environment of a «mass» listener. Not the last role in this is played by the repertoire policy of teams, which is represented as folklore (processing, fantasy, paraphrases, variations, concert plays on folk theme composer works, as well as original compositions).

- drawing up textbooks;
- concert activity;
- formation of representation solo-concert function of the bandoneon, however, not applied, secondary, but the resemblance to the academic tools of the symphonic orchestra. Another path that flows from the involvement of bandoneon in the field of classical orchestral repertoire, in particular, symphonic.

Bandoneon art is proposed to use the concept of «academicization» of tools, as it was applied to Bayan and the accordion in the twentieth century. Its importance is closely linked to the processes of improving bandoneon art, professionalization, obtaining classical status, typological forms of functioning, involvement in educational and professional programs, educational practice. Academicism is known to be the highest form of manifestation of artistic and content qualities of scientific or artistic phenomena that have canonical forms and act as a «measure», a model for imitation. By definition of D. Varlamov, «the concept of academic musical art is denoted by the universal direction of art produced in the process of centuries-old artistic and creative activity, based on the unique human ability through specific artistic expressive intonation foundations to memorize and reproduce rational (in meaning conscious, meaningful) (sensual) anthroposocial relations». The processes of academicization in the context of the formation of contemporary bandoneon art, having completed their end, are transformed into the next stage, which can be marked as a classic, characterized by processes of stabilization;

- expanding the range of works for the bandoneon, ensemble or orchestra, accession to the classic European repertoire.

The purpose of establishing the concept of development of bandoneon art in Ukraine is to recognize the bandoneon as a full – fledged academic tool, as it happened with a button accordion, accordion.

Expanding the international artistic relations of Ukrainian musicians with their colleagues in Europe, Argentina, Uruguay at the level of festivals and competitions, concerts of famous performers and collectives, organization of scientific conferences, practical seminars and workshops-only one of the consequences of the entry of Ukraine. The Music School of Ukraine has the opportunity to reveal new artistic possibilities of modern bandoneon and to direct this type of art into a professional channel of world development.

It is important for Ukraine for the formation of

bandoneon art, first of all, the expansion of vocational training – the formation of the school of academic bandoneon performance; opening of bandoneon classes in music schools; Opening of Bandoneon departments in conservatories. This will significantly affect the further development of professional performance on the bandoneon. The formation of genres of concert performance should be carried out in parallel with the development of traditions of folk music.

Development of the concept of development of bandoneon art

The concept of development of bandoneon art in Ukraine involves the construction of academic bandoneon art. The key positions of the concept are considered in Fig. 1.

The purpose of the concept is to recognize Bandoneon as a full – fledged academic tool in Ukraine. The concept defines the baseline categories: Bandoneon, creativity of bandoneon players, Ukrainian bandoneon art history, professional bandoneon performance, bandoneon art, academic instrument, academization of the instrument.

The directions of building academic bandoneon art have become:

- starting the formation, development and popularization of folk-instrumental performance on Bandoneon;
- academization of bandoneon;
- opening classes on the teaching of the game on the bandoneon;
- research in the field of bandoneon – based technology;
- publication of scientific and methodological developments;
- training that requires vocational education and relies on a foreign accumulated experience of bandoneon music;
- composer creativity;
- creation of bandorchestra;
- updating the role of the public, the addressee of creation;
- study of the history of development of bandoneon – based instrumental creativity;
- study of curiosity of bandonists;
- teaching of teachers;

- training of pedagogical staff for higher music schools;

- development and publication of Ukrainian original literature for Bandoneon;

- development of repertoire policy for the bandoneon ensemble.

The authors considered the principles of development of bandoneon art.

The identity of bandoneon art is one of the most important principles. The vast majority of researchers do not consider bandoneon art as a distinctive phenomenon, but highlight certain aspects of purely bandoneon art only in the context of studying its performance.

Internationalization of cultural life contributes to the entry of Ukrainian bandoneon art into the world musical space.

The next principle of media development contributes to the spread of bandoneon art through the use of the media.

The democratization of world musical culture and its enrichment with new genres and styles contributes to the following principle.

The positioning of the instrument as an academic should be academization of performance.

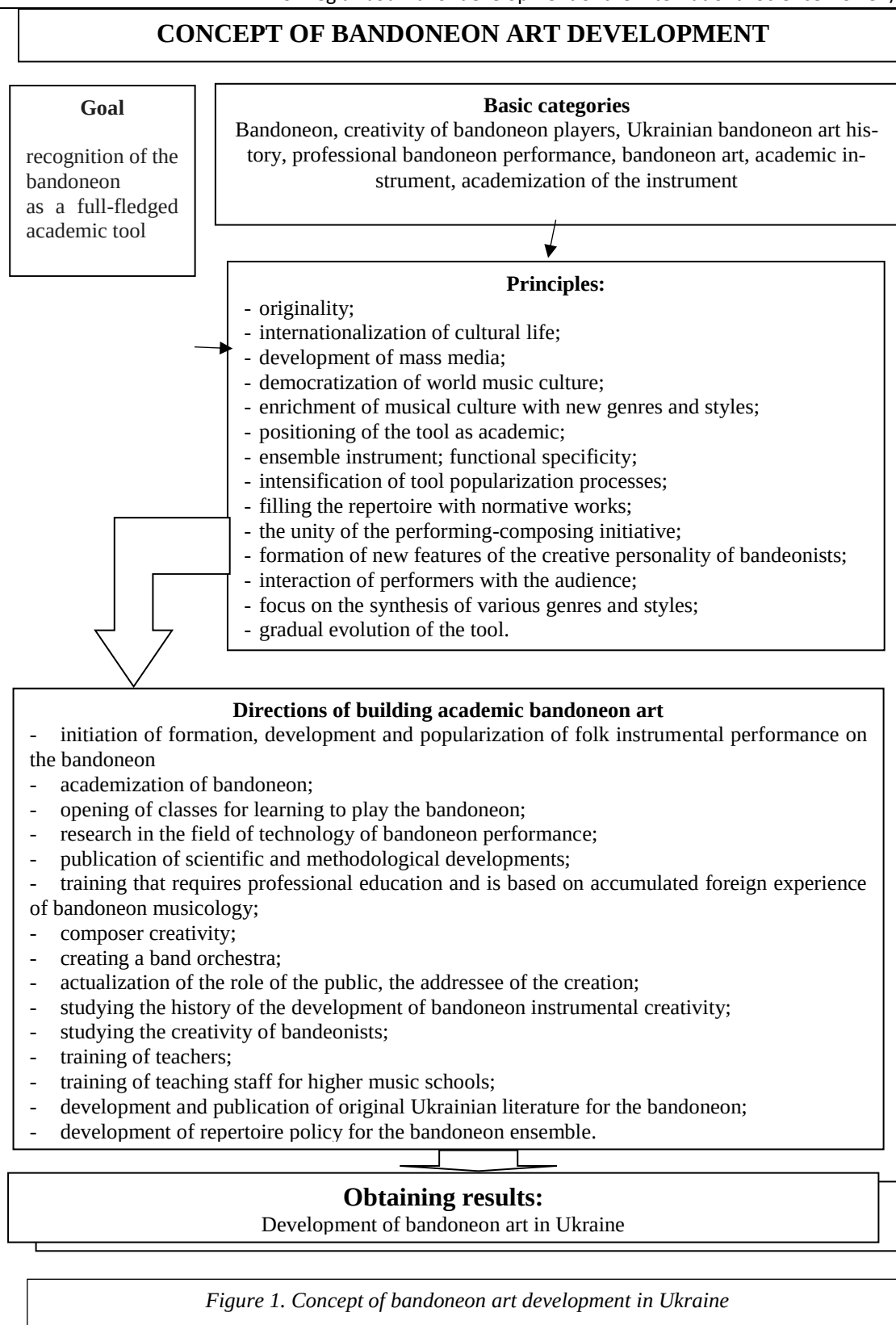
Bandoneon should be considered as an ensemble instrument when constructing academic bandoneon art. Due to the variability of performing compositions, the weight of small ensembles, a kind of «mobility» and mobility, the latest projects focused on a modern repertoire are embodied and a new palette of timbre connections is formed.

The principle of «functional specificity» is considered for bandoneon. After all, other aerial phones (button accordion, accordion) have become universal tools for the adaptation of classical works to the performance on Bandoneon.

Important intensification of tool promotion processes.

Also, the initial stage is relevant to fill the repertoire with normative works.

The development of bandoneon art in Ukraine will be the positive results of the concept implementation. Of course, it is difficult at the initial stage to predict how much the concept will last.



It is necessary to keep the unity of performing-composing initiative and the formation of new features of the creative personality of accordionists, in particular stylistic universalism, the focus on innovation and enrichment of composer-performing tandem, theatricalization of performances and other forms of creative expression.

At the same time there is a need for close interaction of performers with the audience.

Bandoneon art focuses on the synthesis of different genres and styles. But it is necessary to take into account the gradual evolution of the instrument.

Conclusions

Bandoneon was not destined to become the subject of research in Ukraine. Serious research in the field of bandoneon-based performance and the publication of scientific and methodological developments are required. The scientific novelty of the study was the

«Concept of Development of Bandoneon Art in Ukraine», which involves the construction of academic bandoneon art.

The purpose of the concept is to recognize Bandoneon as a full – fledged academic tool in Ukraine. The directions of construction of academic bandoneon art are proposed. The development of bandoneon art in Ukraine will be the positive results of the concept implementation.

References:

1. Nadirova M., Aliyeva H. (2024). EVOLUTION OF MUSICAL INSTRUMENTS: FROM ANCIENT TIMES TO MODERN INNOVATIONS. Norwegian Journal of development of the International Science. № 135/2024. 12–16. <https://doi.org/10.5281/zenodo.12578468>.
2. Shuchang L. (2024). Fostering Patriotism in music classes in Chinese secondary Schools: the Impact of Art on the Formation of national Consciousness. Norwegian Journal of development of the International Science № 139/2024. <https://doi.org/10.5281/zenodo.13619670>.
3. Junkai Z. (2024). The Specifics of Artistic and Aesthetic Education of High School Students in General Education Schools of the Prc Through Music. Norwegian Journal of development of the International Science. № 139/2024. <https://doi.org/10.5281/zenodo.13619684>.
4. Vruble H., Mitieva A. (2024). Formation of Professional Competences on the Basis of Health-Saving Technologies of Future Music Teachers. Norwegian Journal of development of the International Science. Pedagogical Sciences. № 144/2024. 53–57. <https://doi.org/10.5281/zenodo.14169123>.
5. Bagrii T. (2024). Professional competences of the future teacher-musician: essence, content, structure (conductor and choral aspect). Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. № 1 (32)'2024. 159–164. doi: 10.33842/22195203-2024-1-32-159-164.
6. Bagrii T. (2022). Concert performance as an indicator of the formation of creative abilities of the future music teacher. Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. № 1(28)'2022. 45–50. doi: 10.33842/22195203-2022-28-45-50/.
7. Vruble H., Nakhalova O. (2024). Formation of professional competences of future music teachers on the basis of health-saving technologies. Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. № 1 (32)'2024. 93–99. doi: 10.33842/22195203-2024-1-32-93-99.
8. Kotova L., Yunyk T. (2015). Preparation of instrumental musicians for stage activities as a psychological and pedagogical problem. Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. № 1. 39–43. http://nbuv.gov.ua/UJRN/Nvmdpu_2015_1_7. doi:10.7905/hj3het.v0i14.1039.
9. Tereshchenko S., Sopin O., Mitieva A., Kotova L., Sopina L. (2023). Methodological aspects of forming project competence in the process of professional training of music teachers. Revista de Tecnología de Información y Comunicación en Educación. Volumen 17, № 3. Julio-septiembre 2023. 71–80. DOI: [10.46502/issn.1856-7576/2023.17.03.6](https://doi.org/10.46502/issn.1856-7576/2023.17.03.6).
10. Segeda N. (2017). The Principles of Continuous Professional Development of Teachers in the Context of a Systemic Understanding of Education Throughout Life: materials of the IV International Scientific and Practical Conference (December 11-12, 2017, Sumi), 12–13.
11. Panchenko H. P. (2020). Creative abilities of the future music teacher: theory and practice: monograph. Melitopol: Publishing House of Bohdan Khmelnytskyi MDPU. 176 p.
12. Levchuk N. (2022). Humanistic education of universal human values in elementary school students by means of music therapy. Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. № 1 (28)'2022. 130-136. doi: 10.33842/22195203-2022-28-130-136.
13. Boychenko S. (2015). Reducing physical and emotional stress in children by means of music therapy. Music Director. № 5. 9–13. [in Ukrainian].
14. Draganchuk V. M. (2010). Music therapy: theory and history. Luts'k: VZV «Vezha» of the Volyn National University named after Lesya Ukrainka. 225 p. [in Ukrainian].
15. Draganchuk V. M. (2016). Music psychology and therapy. Luts'k: East European National University named after Lesya Ukrainka. 230 p. [in Ukrainian].
16. Slyvka L. V. (2015). Music therapy in the educational process: historical and theoretical background. Scientific Bulletin of the Uzhhorod National University. Series: Pedagogy. Socialwork. № 37. 164–166. [in Ukrainian].
17. Nesterenko L. P. (1978). Education of humane relations in younger schoolchildren under the conditions of a boarding school: Diss. Ph.D. ped. of science M., 1978. 212 p. [in Russian].
18. Rakityanska L. M., Ponomarenko T. V., Zhuravel O. V. (2009). Music therapy as a pedagogical technology [Electronic resource]. Pedagogy of higher and secondary schools. № 26. 294–299. [in Ukrainian].
19. Rudnytska O. P. (1999). Music and personality culture: problems of modern pedagogical education: study guide. K., 1999. [in Ukrainian].
20. Tkachenko T. (2012). Music therapy and its contribution to health, educational and moral function of youth. Youth and market. № 4. 17–20. [in Ukrainian].
21. Music therapy in childhood development. (2021). URL: <https://childdevelop.com.ua/artikles/develop/130/>.
22. Nagorna G. Formation of research skills as a condition for the development of professional thinking of a musician. V. 2 № 25 (2020): Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. 62–69. doi: 10.33842/22195203/2021/25/62/69.
23. Smakovsky Y. (2020). Model of formation of pedagogical culture of future music teachers. V. 1 № 24 (2020): Scientific bulletin of Melitopol State Pedagogical University. Series: Pedagogy. 19–24. DOI: <https://doi.org/10.33842/2219-5203-2020-1-24-19-24>.
24. Kolomiets V. (2023). Musical, Pedagogical

and Social Creativity of Bandoneonists. International Scientific Conference Ways to Develop Science in the Current Crisis Conditions: Conference Proceedings, December 22-23, 2023. Riga, Latvia: Baltija Publishing, 51–53. doi: [https://doi.org/10.30525/978-9934-26-](https://doi.org/10.30525/978-9934-26-379-8-14)

[379-8-14](https://doi.org/10.30525/978-9934-26-379-8-14).

25. Kolomiets V. (2024). The Evolutionary Path of the Bandoneon in Musical Art. Scientific-Discussion, 84, (2023). 13–17. doi: <https://doi.org/10.5281/zenodo.10480740>.

PHYSICAL SCIENCES

QUANTUM BIG DIMENSION THEORY

Abbasov V.

Experimental and theoretical physicist.

Baku State University,

Baku, Republic of Azerbaijan.

<https://bakustate.academia.edu/VAbbasov>

<https://doi.org/10.5281/zenodo.14947195>

Abstract

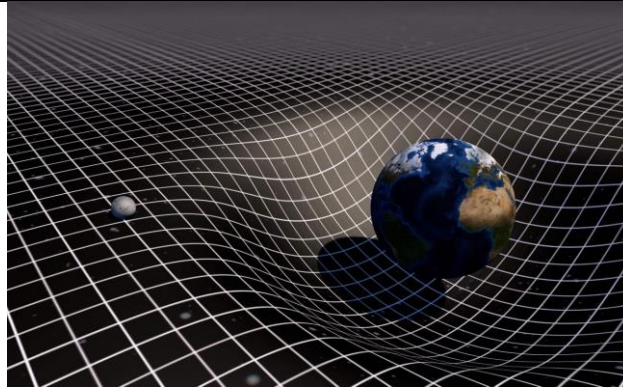
Until the middle of the 19th century, Newton's laws of classical mechanics dominated science. However, some phenomena that emerged towards the end of the 19th century could not be fully explained qualitatively by the laws of classical mechanics. These phenomena were considered micro-phenomena in terms of size. It was possible to fully explain these phenomena only as a result of the development of quantum mechanics. Therefore, the laws of motion of micro and macro systems are completely different from each other. The existence of this fact is a factor that makes it difficult to build a general theory. According to scientists, the construction of a general theory can eliminate the contradictions between these directions, and today the best position in this matter belongs to the M-theory. However, there is a big problem in determining how to approach the M-theory. It is obvious that one can be sure of the correctness of this approach only when it is possible to fully explain all the phenomena in the Universe, both qualitatively and quantitatively. What is needed now is a complete explanation of all physical phenomena occurring in 3-dimensional space. Quantum Large Scale Theory highlights the important facts that must be taken into account in order to fully explain all phenomena related to the 3-dimensional space part of M-theory. The presentation of this theory and its correct approach will lead to a more accurate understanding of the Universe. The field served by the theory is to complete the 3-dimensional space part of M-theory by taking into account the effects of high-dimensional spaces and using string theory.

Purpose: It consists of completing the part of M-theory related to 3-dimensional space by fully explaining all micro and macro phenomena quantitatively and qualitatively through string theory and taking into account the effects of high-dimensional spaces.

Keywords: M-theory, String theory, uncertainty principle, dark matter, spatial defect, cosmic tunneling, quantum entanglement, speed limit.

Introduction. It is known that one of the most interesting issues of people, perhaps the first, is the question of how the Universe was formed and how it works. One of the important issues that scientists are working on today is to discover a general law that can fully explain the cause of every process occurring in the Universe. Scientists' ideas on this issue are that the most important role in the formation of the Universe was played by the forces of interaction. In this regard, our goal is to find a general theory that contains the mechanism of all interaction forces. All events occurring in the universe can be divided into two parts, micro and macro events, based on their size. It is clear that all macro events that we observe in our daily lives are subject to the laws of classical mechanics of I. Newton. That is, the application of the laws of classical mechanics to macro events always results in success. Based on this fact, scientists were led to believe that the application of the laws of classical mechanics in the microworld would give positive results. However, the experiments conducted surprised scientists a lot. When trying to study the microworld with the laws of classical mechanics, a number of problems arose. The results showed that a new physics - quantum physics - should be created to study the events in the microworld. Thus,

when classical and quantum mechanics are studied separately, they give the desired results flawlessly. Since the final theory combines the explanation of micro and macro events within itself, a bridge must be built between classical and quantum mechanics. In addition, the final theory must also combine the explanation of additional phenomena. Currently, the greatest success in this direction belongs to "M-theory". The essence of M-theory is to build a final model of the Universe in high-level spaces by including the smallest indivisible particle in the Universe in the obvious problem. Here, the smallest, primary particle is considered to be a string. It is obvious that it is necessary to approach strings in different ways to explain the mechanism of matter and physical field forms of matter, from the smallest particles to the largest objects, and the various phenomena occurring between them. When we study the nature of physical fields, we see that the gravitational field is quite different from other fields. Based on his general theory of relativity, A. Einstein came to the conclusion that space and time are a single whole and are like a piece of material. All objects with mass bend this material, and a hole is formed around the bent material. As a result, objects with a smaller mass move around objects with a larger mass.



However, since every object in 3-dimensional space has mass, a hole will form around everything, and it is impossible to imagine these holes in 3-dimensional space. From this point of view, A. Einstein came to the conclusion that this piece of space-time exists in higher spaces (4-dimensional space). We will return to this phenomenon in detail.

Theory building. As can be seen, since the final theory contains the mechanism of all interactions, based on the fact that the space-time fragment exists in high-dimensional spaces, it is clear that the existence of multidimensional spaces will be used in this matter. Therefore, we need to clarify how many dimensions of space we can use in the final theory of the Universe. According to Michio Kaku, an American physicist of Japanese origin, when we reach 12-dimensional space from multidimensional spaces, strange results are obtained. Thus, in 12-dimensional space, the concept of two times for one object appears. In 13-dimensional space, things become almost meaningless. Therefore, 11-dimensional space is taken as the limit space boundary. It should be noted that the human brain can only fully perceive 3-dimensional space. That is, a person can only imagine and analyze any event that exists in 3-dimensional space. From this point of view, in order for his theory to be of high quality, it would be a more logical direction to complete the 3-dimensional space part of M-theory. The theory that embodies all the characteristics of the main direction here is the theory of "Quantum Large Scale". This theory is based on the fact that large-scale events can be fully explained by

connecting the laws of quantum physics, which fully explain the properties of the microworld, with string theory. For this, it is necessary to fully characterize 3-dimensional space with string theory. First, it is necessary to determine some properties of strings. It is noted that the 3-dimensional space we live in, as well as the entire Universe, was created as a result of the Big Bang. With the creation of the Universe, the concepts of time and space began to emerge at the same time, and matter expanded and formed from that point. Therefore, matter and the physical field, which are the manifestations of matter, have the same source. This source is clearly the smallest particle that exists. Therefore, this particle must combine the properties of both matter and the physical field. Strings also have this property. Matter as a whole is composed of strings. On the other hand, we know that energy is the most important quantity in the Universe. That is, we can say that matter is built entirely on a single energy. The single energy causes these strings to vibrate at a certain frequency. The various forms of energy that we observe in the Universe are actually different manifestations of the single energy. The existence of different forms of energy gives rise to the fact that strings vibrate in different ways. The vibration of strings in different ways creates different physical fields, and the combination of strings vibrating in different ways creates the corresponding particles. Different combinations produce different particles, different particles produce different atoms, different atoms produce different substances, and different substances produce the richness of the Universe.

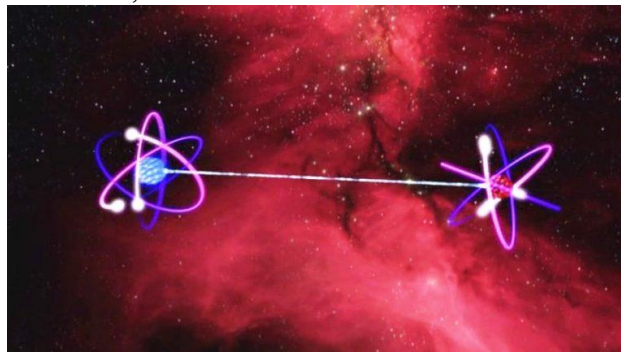


To understand why strings do not vibrate in the same way, we need to introduce the concept of "semi-strings". Since there is a concept of 3 directions of motion in 3-dimensional space, we can say that these semi-strings can move in different directions. As a result of the interaction of semi-strings with the same direction, energy exchange occurs, and vibrational forms of the corresponding frequency arise. Since less energy is re-

quired for the combination of strings with the same vibrational forms, only strings with the same shape can combine in a very short time. The combination and separation of strings by vibrating in different ways leads to changes in the properties of elementary particles. Strings have mass and their mass is $1,42 \cdot 10^{-84}$ kg. This much has been calculated. There are approximately $7.03 \cdot 10^{136}$ strings in the universe, and this number continues to increase. To form an elementary particle like

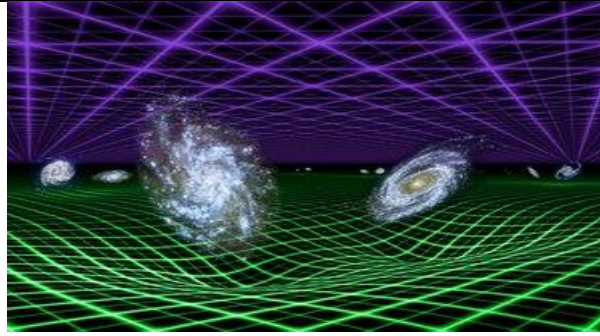
an electron, approximately $6.4 \cdot 10^{53}$ strings must be combined. It has been determined that quantum mechanical phenomena in the microworld can be fully explained qualitatively and quantitatively using these string parameters. Let us emphasize once again that the properties of the microworld are very strange. It becomes clear that the laws of classical mechanics become completely useless here. Therefore, the search for a final theory was considered by some scientists as a futile search. Starting from particles and moving towards larger objects, the laws of motion change from quantum mechanics to classical mechanics. So, at a certain point, a transition from quantum mechanics to classical mechanics occurs. The goal is to find what this converter is. The main difficulty in finding this converter is the strange processes in the microworld. Thus, microparticles, despite combining wave and particle properties in themselves, behave neither as waves nor as particles. Because, the wave and particle picture are compatible in some cases, and in some cases they are not. The properties of microparticles are so unique that we cannot find a suitable example for microparticles. In classical mechanics, the state of a material point is characterized by its position (coordinates) and momentum at each instant of time. Real microparticles are more complex objects in this respect. Thus, it is impossible to accurately determine its position and momentum at the same time to characterize the instantaneous state of a microparticle. The reason for this is that each particle has both corpuscular and wave properties. Therefore, we cannot say anything about where the particle will be after a certain time t . This is the uncertainty principle given by Heisenberg in 1927. In simple terms, if we consider a particle as a wave, the wave has a certain propagation speed. However, waves do not occupy a local place in space. Therefore, it is impossible to determine its coordinates. On the other hand, if we look at it

as a particle, it will have a specific location in space at any given time. However, it will be very difficult to determine the speed of the particle during this journey. Therefore, if the coordinates of the particle are known, the speed of movement is uncertain and vice versa ($\Delta x \cdot \Delta p = h$). The main reason for this picture is that we look at the particle as a particle-wave dualism. In fact, particles are not like anything we have seen before. That is, particles made of strings can sometimes exhibit wave properties and sometimes particle properties. However, it would not be correct to say that they are exactly like them. In short, if it were possible to accurately determine the material of the particle, this principle would not work. On the other hand, it can be said that we encounter this picture because we do not know the initial coordinates of the particle. Moreover, at the same time, we are trying to study a microworld through macrodevices. Of course, such a factor plays a major role in the creation of this picture. Although we do not take into account the importance of errors for large objects, this fact is of great importance for small-sized objects. In reality, in 3-dimensional space, each particle has each of these parameters at the same time. Another problem is the phenomenon of quantum entanglement that occurs between particles. Let's touch on the essence of this phenomenon, which was awarded the Nobel Prize in 2022. According to this theory, two substances or objects that are created at the same time or from the same source are in a state of continuous entanglement with each other. In the simplest definition, quantum entanglement is the inextricably linked nature of two objects and, when one is disturbed, the other is disturbed, regardless of the distance between them. Until now, the speed of light has been considered the limit speed in the Universe.



Note that here the interaction is transmitted through string theory. Since all strings vibrate at the expense of a single energy, as we have noted, they are all connected to each other. Then we prove that particles interact with each other regardless of distance. It was the discovery of the phenomenon of quantum entanglement that once again confirmed this fact. Therefore, the speed of energy transfer in a string network can be considered the maximum speed of the transmission of interaction, and this speed will be the limiting speed of the Universe. This speed can be determined according to the formula $V = S/t$ ($t = 232 \cdot 10^{-18}$ seconds, t -found

from experiment). As can be seen, the correct approach to string theory can fully explain micro-events. However, in order to complete the final theory, the Quantum Large Scale Theory supports the fact that it is necessary to apply this approximation to the explanation of phenomena in space. Let us turn to the explanation of these phenomena. We noted above that A. Einstein concluded that the gravitational field exists in 4-dimensional space. In fact, it can be noted that the bending of this material does not depend on the properties of objects, but only on their masses.



Celestial bodies were distributed in phase according to a certain law depending on their masses and the distance between them. Because, although all the bodies existing in the Universe have different properties in different places, they are a manifestation of a single energy. This fact requires that there be a certain law for their distribution in space for celestial bodies in particular. This distribution will depend on the masses of celestial bodies and the distance between them. The quantity that connects these two parameters is potential. In order for celestial bodies to be in equilibrium, their potentials should not differ in terms of energy.

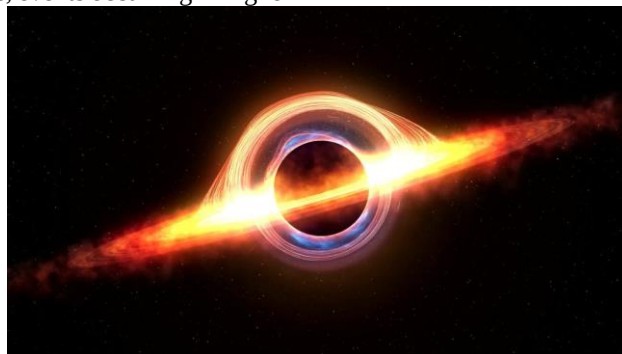
$$X = M_1/R_1 = M_2/R_2 = \dots = M_n/R_n \quad (1)$$

Here $X \sim 1.015 \cdot 10^{18} \text{ kg/m}$ is calculated. As we have mentioned, the result obtained from the general theory of relativity affects the effect of motion in space on time. Everything in the existing 3-dimensional space is human energy. The existing unit energy looks at the shape of 3-dimensional space. The combination of an infinite number of 3-dimensional spaces creates 4-dimensional space. Therefore, events occurring in higher-

level spaces have an effect on our space. In fact, all objects existing in the Universe have motion. Motion, in turn, causes the flow of time. This can be expressed mathematically as:

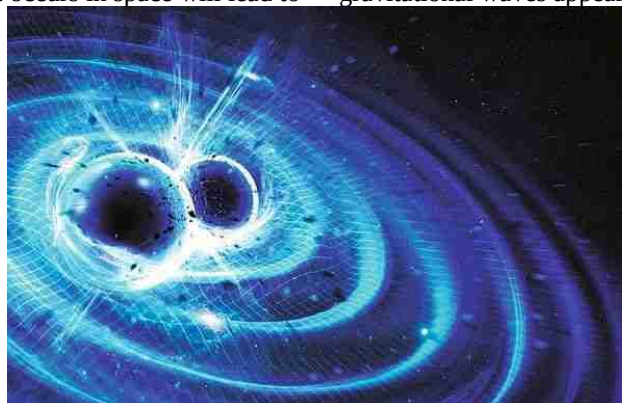
$$\text{Time} = \text{Space}/\text{Motion} \quad (2)$$

Since the goal is to explain the phenomena occurring in 3-dimensional space with string theory, we will use the concept of a string network instead of a single energy expression. In the section on quantum entanglement, we mentioned the method of calculating the speed limit of the Universe, that is, the speed of energy transfer between strings V^* . If the energy of any object, due to the additional energy provided from external spaces, is greater than the total energy of the strings that form it, that object can exceed 3-dimensional space. Knowing the relationship between energy and speed, the same approach can be said for the speed difference. During this transition, a defect will be created in the spatial network. Black holes are actually defects created in space.



Through them, interspatial matter flows. These defects mainly appear during "astronomical disasters". It is clear that any defect that occurs in space will lead to

a defect in time in that part. As a result of these defects, fluctuations occur in the space-time fragment, and thus gravitational waves appear.



Based on these facts, we can call black holes the pillars of the Universe. It can be said that the location of black holes in space in accordance with a certain law of the masses and distances between them plays a key

role in the stability of the Universe. Another result of the general theory of relativity is the existence of cosmic tunnels. Through cosmic tunnels, it is possible to travel to greater distances in the Universe in a short

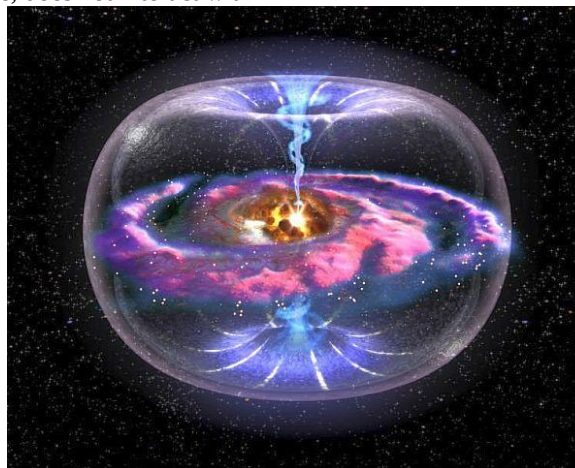
time. When the energy released during "astronomical disasters" cannot create defects, it is spent on twisting the space-time fabric. Some of these twists can be a

means of creating cosmic tunnels. The greater this energy, the greater the length of the tunnel.



If we could artificially create the necessary energy, we could create a space tunnel and travel long distances with it. The most accurate approach to obtaining this energy has already been found. Black holes are mainly located in the centers of galaxies. It is precisely due to the effect of this defect that anomalies are observed in the speed of movement of the galaxy. Calculations show that for such a movement to occur, there must be more mass in the galaxy than the sum of the masses of the stars. Since this substance cannot be observed, it was called dark matter. Dark matter is a substance that is invisible to the eye, does not interact with

electromagnetic waves, and whose existence is determined only by its effect on other substances. Dark matter is clearly manifested in the interaction of gravity. Then it can be said that dark matter exists in 4-dimensional space as a gravitational field. From this relationship, we can conclude that dark matter is the creator of the gravitational field. That is, it is the reason for its existence. Through a black hole, dark matter shows its effect in our space more clearly. Since these transitions are constant, it becomes clearer to understand why the Universe is expanding.



Results. As can be seen from the theory of quantum large-scale measurements, important conclusions are drawn. The universe is built on a single energy and the 3-dimensional space part of the universe is made up of a network of strings. The final energy of the universe is equal to the sum of the energies of all strings. In 3-dimensional space, each particle, as well as strings, has mass, shape and size, and at the same time, everything is in motion. Every particle in the universe is connected to each other. There is no instantaneous event, that is, for any event to occur, at least a very small amount of time must pass. Because, the space-time fragment exists in large-dimensional spaces and this fragment is connected to dark matter. The limiting speed of the universe is the speed of energy transmission in the strings, and this speed can be calculated approximately. It turns out that black holes are defects formed in space and they play the role of pillars of the universe. Due to these defects, the effect of dark matter on our space becomes

greater and the Universe expands by gaining additional mass. The presence of these defects leads to the presence of defects in time. That is, the Quantum Large Scale theory says that time travel can exist. This theory says that cosmic tunnels can be created by artificially creating a large energy level. The entire Quantum Large Scale theory, in which an infinite number of 3-dimensional spaces participate in the creation of 4-dimensional space, does not deny the possibility of parallel Universes. Again, the idea of splitting an object into a string wave with a high energy level and reuniting it at a very high speed to another place is no longer unusual. Thus, the Quantum Large Scale Theory states that Teleportation can exist. In order to realize such magnificent events, it will be necessary to establish the equation of the Universe between all the important quantities characterizing the 3-dimensional space and the unified energy of the Universe. The Quantum Large

Scale Theory is one of the theories that serves to establish this equation. Finally, let us note that it may be possible to complete the 3-dimensional space part of the M-theory by taking into account the important facts obtained from this theory. When this theory is completed, the secret of creation will already be clear.

References:

1. Abbasov V., Sarmasli V. "M THEORY". NJD-128. 2024.
2. Abbasov V. "Uncertainty principle". NJD-131. 2024.
3. Abbasov V., Bashirov M. "A new approximation to Dark matter". NJD-132. 2024.
4. Abbasov V., Bashirov M. "String theory: another approach to phenomena". NJD-141. 2024.
5. Abbasov V., Bashirov M. "Space defect: inter-space matter transitions". NJD-146. 2024.
6. Abbasov V., Bayramova T. "A shortcut to space travel: the space tunnel". NJD-146. 2024.
7. Abbasov V. "Quantum entanglement and String theory". NJD-150. 2025.

POLITICAL SCIENCES

THE USE OF INFORMATION TECHNOLOGIES IN SHAPING THE ELECTORAL BEHAVIOR OF CITIZENS

Antonyan A.

Russian-Armenian University. Postgraduate student of the second year of study, 23.00.02 "Political institutions, processes and technologies", Founder and CEO at Cratos Consult company, which specialises in Political PR and Communication

ИСПОЛЬЗОВАНИЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ В ФОРМИРОВАНИИ ЭЛЕКТОРАЛЬНОГО ПОВЕДЕНИЯ ГРАЖДАН

Антонян А.Р.

Российско-Армянский Университет. Аспирант второго года обучения по специальности 23.00.02 «Политические институты, процессы и технологии», Основатель и генеральный директор компании Cratos Consult, специализирующейся на политическом PR и коммуникации
<https://doi.org/10.5281/zenodo.14947197>

Abstract

This report examines various approaches to defining the concept of "electoral behavior" in order to comprehensive understand the problem raised. The analysis of specific examples of the use of information technologies in the formation of the electoral behavior of citizens. It is stated that the construction of electoral behavior via information technologies contradicts one of the principles of democracy: the freedom of choice. It is illustrated that the development of the information society will inevitably lead to the transformation of the institution of democracy, in particular, the logic of electoral processes will change.

Аннотация

В данном докладе рассматриваются различные подходы к определению понятия «электоральное поведение», с целью комплексного понимания поднятой проблемы. Произведен анализ конкретных примеров использования информационных технологий в формировании электорального поведения граждан. Констатируется, что конструирование электорального поведения с помощью информационных технологий противоречит одному из принципов демократии: принцип свободного выбора. Проиллюстрировано, что развитие информационного общества неизбежно приведет к трансформации института демократии, в частности изменится логика избирательных процессов.

Keywords: Electoral behavior, information technology, democratic elections.

Ключевые слова: Электоральное поведение, информационные технологии, демократические выборы.

Электоральное поведение — совокупность действий и поступков граждан, связанных с осуществлением местных или общенациональных выборов в органы власти, а также их участием в референдумах. Электоральное поведение — поведение людей, связанное с реализацией ими социальных функций избирателей. [1]

В политической науке и политической социологии сформировались три основных подхода, по-разному трактующих факторы, определяющие электоральное поведение.

1. Социологический подход, основан на признании преобладающего воздействия социальных факторов: социального статуса и социальной среды. Основателями этого подхода считаются А.Зигфрид, С.М.Липсет, С.Роккан, П.Лазерсфельд, Б.Берельсон.

2. Социально-психологический подход основанный на предположении о том, что основной фактор, влияющий на голосование — это партийная или идеологическая идентификация. [2]

3. Концепции рационального поведения избирателей, основанные на теории рационального выбора. Их основная идея заключалась в том, что

избиратели голосуют за ту политическую силу, которая, по их мнению, способна предоставить им выгод больше, чем любая другая. [3] Ни один из трех подходов не дает комплексного представления об электоральном поведении, поэтому в последние десятилетия исследователи предпринимают попытки создать интегративные модели этого процесса, которые включали бы разнообразные факторы.

Новые тенденции привели к появлению категории «нового избирателя», по результатам исследований составившего около 10-15% всего электората развитых демократий. Эта группа характеризуется, в первую очередь, нестабильностью **политических ориентаций** и предпочтений, несмотря на регулярное участие в голосовании. Но именно данная группа предопределяет исход электорального процесса. Знаменитый американский экономист, автор теории «Черного лебедя» Нассим Талеб убежден, что исход событий предопределяет меньшинство, 4% населения могут изменить мир. [4, с.197]

Французский философ-постмодернист Жан Бодрийяр в своей работе «В тени молчаливого

большинства или Конец социального» констатирует, что в современном мире исход всех политических и социальных процессов предопределяет именно меньшинство: «Не стоит ли задуматься над тем странным обстоятельством, что после многочисленных революций и сто- или даже двухсотлетнего обучения масс политике, несмотря на активность газет, профсоюзов, партий, интеллигенции — всех сил, призванных воспитывать и мобилизовывать население, всё ещё (а точно такой же ситуация будет и через десять, и через двадцать лет) только лишь тысяча человек готова к действию, тогда как двадцать миллионов остаются пассивными». [5, с.96]

Исходя из этого теоретического убеждения, современные политические технологии анализируют механизмы конструирования политического и электорального поведения именно «нового избирателя», который составляет около 10-15% всего электората развитых демократий. В качестве инструмента конструирования политического и электорального поведения особую роль играют информационные технологии. В научной литературе существует множество подходов, которые по-разному определяют понятие «информационные технологии». В рамках данной работы мы будем руководствоваться определением М. Кастельса, который рассматривает данную категорию следующим образом: «Информационная технология - система взаимосвязанных методов и способов сбора, хранения, накопления, поиска, обработки информации на основе применения средств вычислительной техники». [6, с.492 - 493]

В контексте конструирования электорального поведения, особое внимание следует уделить **обработке информации** с помощью информационных технологий. Обработка позволяет не просто составить представление о личностях электората, но и создать их полноценный профиль, в котором указаны убеждения, особенности характера, предпочтения, интересы и многое другое. Именно такой анализ дает возможность для эффективного **микротаргетирования электората**.

В этом контексте, следует рассмотреть достаточно известный скандал касательно анализа данных Cambridge Analytica. Анализируя большие данные, Cambridge Analytica выстраивала психологическую карту пользователей Facebook, выделяя какие мотивации могут повлиять на поведение отдельных пользователей. Исходя из этого, алгоритм доносил адресную политическую рекламу, которая эффективным образом влияет на электоральное поведение.

Согласно информации The Observer существуют вполне обоснованные данные, что такой же механизм был задействован входе Брексита, исход которого определил участие прежде бездействующего политического меньшинства. С помощью информационных технологий был осуществлен пси-

хографический маркетинг, за счет которого политически апатичное меньшинство был «замотивирован» на участие в электоральных процессах. Формирование информационного общества как нового типа социальной организации естественным образом предопределяет начинающуюся трансформацию социальных и политических коммуникаций и институтов. При переходе к информационному обществу происходит трансформация как социально-экономической, так и общественно-политической организации общества, а также структурное изменение властей, в результате которого информационный фактор становится существенно более значимым в социальном и политическом регулировании. [6, с.7]

Следовательно демократический институт под воздействием информационных технологий также трансформируется. В данном случае, под воздействием информационных технологий дискредитируется один из важнейших инструментов демократического правления – выборы. А. Х. Халитова отмечает, что выборы обретают тенденцию превращения в действенный институт народовластия, основную форму политического участия, в способ реализации субъективных политических прав граждан. [7] А. А. Бучин полагает, что выборы есть «**сознательная деятельность** определенного круга граждан по делегированию своих властных полномочий органам публичной власти либо должностным лицам, важнейшую форму участия их в управлении государством».³⁰ Конструирование электорального поведения через микротаргетирование граждан противоречит идее сознательного выбора. Вышеизложенный анализ конкретных примеров использования информационных технологий в формировании электорального поведения граждан, демонстрирует уязвимость института прямых выборов. Если крупные корпорации отслеживают миллионы или даже миллиарды людей, а собранная информация в форме электронных данных, может интерпретироваться машинами, можно предположить, что технологии позволяют предопределить исход любого политического процесса. Учитывая, что международные правозащитные организации и политологическое сообщество обоснованно указывают на технологические угрозы либеральной демократии, можем утверждать, что в обозримой перспективе, институт прямых выборов будет существенно изменен. Можем предположить, что будет введен институт выборщиков, представители которого будут соответствовать определенным требованиям, либо будут обладать «психологическим иммунитетом» к информационнотехнологическому воздействию.

Список литературы:

1. Терминологический словарь библиотекаря по социально-экономической тематике. — С.-Петербург: Российская национальная библиотека. 2011.

³⁰ Бучин А. А. Конституционные функции выборов в современной России: автореф. дис. ... канд. юрид. наук. Саратов, 2008. 25 с.

2. Lipset S., Rokkan M. *Cleavage Structures, Party Systems and Voter Alignments. An Introduction* // *Party Systems and Voter Alignments*. N.Y.: The Free Press, 1967.
3. *The American Voter* / Campbell A. et al. N.Y.: John Wiley and Sons, 1960.
4. Талей Н.Н. "Рискуя собственной шкурой. Скрытая асимметрия повседневной жизни". — 1-е изд. — М.: КоЛибри, 2018. 384 с.
5. Baudrillard J. *A L'ombre des Majontes Silencieuses, ou la Fin du Social*. — Paris: Editions DENOEL, 1982. — Перевод с французского Н. В. Сулова. // Электронная публикация: Центр гуманитарных технологий. — 27.08.2006. URL: <https://gtmarket.ru/library/articles/1256>
6. Кастельс М. *Информационная эпоха: экономика, общество и культура*. М. : ГУИ ВШЭ, 2000. С. 492—493.
7. Абдеев Р.Ф. *Философия информационной цивилизации: Диалектика прогрессивной линии развития как гуманная общечеловеческая философия XXI века*. М. : ВЛАДОС, 1994. С. 7.
8. Халитова А. Х. О политологическом понимании понятия «выборы» // *Вестник ТГГПУ*. 2006. № 5. С. 56–61

POLITICAL KNOWLEDGE AS AN ALTERNATIVE TO EDUCATION IN THE CONTEXT OF UNDERSTANDING CITIZENS' ELECTORAL BEHAVIOR

Mushchenko Ya.

*a Third-year Graduate Student,
at the Department of Political Science and International Relations
of Lviv Polytechnic National University
12, S. Bandery St., Lviv, Ukraine
ORCID ID: 0000-0001-7207-4533
<https://doi.org/10.5281/zenodo.14947199>*

Abstract

The theory of democratic governance envisages the active participation of citizens in the political life of the country through control, accountability, voting, protests, petitions, rallies, demonstrations, etc. The active involvement of citizens in politics, a basic understanding of the functioning of the state apparatus, the principles of domestic and foreign policy help the electorate to maneuver gracefully between political forces and, most importantly, to effectively link their own interests with the manifestos of political parties, party leaders and presidents, as well as to make a retrospective assessment of the government's achievements. From a sociological perspective, education is an important predictor of electoral participation, but the existing scientific discussion shows that it is rather a proxy factor that shapes other affiliated characteristics of an individual that actually directly affect the level of participation. Another thing is an individual's political knowledge (not to be confused with education), which is more of a political factor and is seen to have a greater explanatory power for electoral behavior, participation, and choice. Having accurate factual political beliefs reduces the number of resources citizens spend on processing the pre-election information flow, improves their ability to navigate the political spectrum and to position themselves in relation to different political forces and vice versa (political forces – in relation to themselves).

In a demanding political environment, a high level of political knowledge is a reliable predictor of turnout and electoral participation. Education, as a more formal sociological characteristic of the population, does not always yield positive results in the context of correlation with turnout, because despite the rapid spread of higher education, access to knowledge, the development of algorithms and AI, turnout continues to decline steadily, which is a paradox of participation. Moreover, in today's context of criticism of classical/formal education, traditional educational institutions, methods and forms, the spread of alternative forms of education, constant updating of information, financial instability and economic demands of the market, focus on quick results, etc. it is difficult to determine the level of classical education of even two different individuals.

Keywords: education, political knowledge, electoral participation, absenteeism, facts, resource model, limited awareness

We will begin our discussion with the interpretation of the concepts of demography, demographic factors and education. The term 'demographics' refers to the personal characteristics of a society that are commonly used in government reports and national population censuses. In particular, it refers to gender, age, marital status, level of education, economic status or income, language, race, religion, mobility, ethnicity, etc. For researchers, the attractiveness of these indicators lies in their accessibility and systematic correlation with turnout, voting participation, political preferences, and party identification/affiliation. While scholars may take different approaches to the above indicators, the operationalization of demographic concepts has been fairly uneventful. The relative stability of many demographic characteristics also adds to the concept of supporters, as reverse causality is often impossible or unlikely. For example, voting in the last election is unlikely to change a citizen's age, gender, education, or income. However, it is worth mentioning the problems that scientists face when uncritically exploiting sociological variables. First, it is the fact that scientists can rely on established factors and their confirmed and seemingly predictable results without rechecking the patterns/correlations (for a particular election, a specific state, a specific time period, etc.), which leads to

simplified or even false conclusions. Secondly, the interpretation and measurement of demographic factors is characterized by high variability. For example, if we talk about the level of education, what do we mean by 'one citizen is more educated than another'? Is higher education obtained at Ukrainian and U.S. universities comparable? Can a person who has completed a two-year degree at an Ivy League university have a higher level of knowledge and general competence than a full-fledged graduate of a leading technical university in Ukraine? Is it possible to compare a degree earned in 1970 with the same degree from a similar university in 2020? Third, differences in research quality can sometimes tip the scales in favor of the better measured concept, leading researchers to erroneously conclude that one variable is more important than another. Fourth, the volatility of certain demographic factors can mislead researchers in interpreting their effects. For example, a person classified as married, divorced, or single may have been in their current status for a month, a year, or a decade. Accordingly, the strength of the impact on behavior will be different, as will the behavior of two individuals with the same socio-demographic statuses. Moreover, instability lies in a person's self-identification (sexual, religious, ethnic) at different stages of life. The same respondent identifies as African-American

today and as a mixed-race person a year later, and such differences create problems for analysis, forecasting, and correlations. Fifth, society has changed dramatically since the pioneers of behavioral research began using demographic data to predict political behavior. First and foremost, the roles of men and women have changed, gender, ethnic, and socioeconomic gaps have widened, the line between white- and blue-collar workers has blurred, higher education has become more accessible, and race and ethnicity have become plural. These processes complicate attempts to measure, interpret, and evaluate the political implications of socio-demographic affiliations. Indeed, demographic classifications remain important variables in determining the political and electoral choices of citizens, but scholars must go beyond their uncritical use in the context of the complexity of social life [2; 4].

Apart from age, no other demographic variable attracts as much attention as education. For a long time, educational attainment has been identified as one of the most important predictors of voter turnout and political participation. The assumed cause-and-effect relationship has not been revised for four decades, despite the apparent paradox that voter turnout in Western countries has been declining even as education levels have been rapidly increasing. Since the 2000s, the first attempts to identify the causal effect of education on turnout using instrumental variable methods have yielded contradictory results. For example, scholars suggest talking about relative rather than absolute levels of education, or even better, the general level of competence, or referring to a generation cohort in the analysis. A study of Swedish voters showed that the influence of education is manifested even before graduation. Other American researchers have not found a casual relationship between education level and election participation. This suggests that formal education and the products of education (cognitive abilities or future income) have minimal or no impact on the decision to vote, while the preconditions of educational attainment (such as family of origin, early and subsequent personal socialization) have a higher explanatory power.

An interesting concept that can reveal and help understand the electoral behavior of the masses is the concept of political knowledge. Political knowledge is defined in different ways, most often as a range of factual information about politics stored in long-term memory or as a measure of a citizen's ability to give correct answers to a certain set of fact-based questions. In other words, it is familiarity with general political data and facts.

There are two schools or approaches to assessing citizens' political competence: traditional and revisionist. The main idea of the first school is that citizens should be politically knowledgeable in order to fulfill their democratic responsibilities (history, political facts, institutions, alternatives, consequences, party system, etc.), but the empirical results are disappointing, as researchers have exposed the so-called 'political ignorance' of the average citizen. For the traditional school, political knowledge matters because it helps shape preferences and behavior based on cognitive ra-

ther than emotional or affective engagement, and political information is considered the currency of citizenship.

For revisionists, political knowledge itself and its role are of lesser importance – scholars are less critical of the citizen. Indeed, they recognize that few citizens pay close attention to politics and have different interests and appetites for political information, but individuals can use heuristics or any other methods available to them to shape their political interests. People never have complete information and yet often manage to live a decent life with acceptable choices, so 'bounded rationality' works satisfactorily, which leads to the theory of low-information rationality. The uneven distribution of knowledge is compensated for by aggregated political opinion. Another type of political information is the concept of principal-agent, where voters as principals must trust representatives (agents) and the speaker, who takes on the task of monitoring and evaluating the agents' activities.

In fact, the very method of processing the available information is more important than the absolute level of knowledge possessed by voters. Such labels as ideology, political narratives, representative appearance, media framing, or other political markers allow average citizens to make their choice as well as those with greater information resources [1].

Contemporary researchers are revising methods of measuring citizens' political knowledge and providing critical remarks on the traditional approach to the scale of total knowledge that has become the standard for measurement. The question arises as to whether citizen surveys/tests based on facts, correct/incorrect answers, including the option of 'don't know', can measure the general competence of citizens regarding the principles and mechanisms of the political system? Critics argue that these surveys can measure basic personality traits: self-confidence, competitiveness, and risk-taking. For example, women are more likely than men to choose the 'don't know' option, even if they have partially or completely correct information. New experimental analysis also showed that removing the 'don't know' and 'not sure' options led to higher knowledge scores, both at the level of individual items and in aggregate for political knowledge. Furthermore, manipulating the context, lack of time to think, the way the question is phrased, personality variations, or perceived threats can all impair survey results. However, for example, simply adding visuals to equivalent test items increases the number of correct answers. Other studies show that incentivizing respondents to perform well, including financially, for correct answers and response time, resulted in an average increase in correct answers of 11 percent [6].

Thus, although research shows that citizens do not meet the standard of an 'informed citizen', recent academic research shows that citizens are more aware or have sufficient incentives, motivation, and means to become politically informed.

We would like to focus on the gender gap and differences in political knowledge between men and women. For example, a significant inequality in knowledge has been proven, with the largest share being possessed by wealthy older white men, who are

more likely to participate in politics, have a more meaningful, stable attitude towards politics, are better at choosing candidates who meet their interests, and are better at linking their own interests to ideologies [1]. The researchers demonstrate that these differences lie in the fact that women do not store as much political information in declarative memory as men, but they use their procedural memory better, and when focused on it, they perform better than men on average. In other words, women have less political knowledge of facts, but men are less likely to choose the 'I don't know' option and are more risk-averse, which increases the chances of a correct answer, thus widening the gap between men and women in these questions. It is important to understand the importance of specific knowledge, for example, when the questions designed to determine political competence are gender-related, i.e., they relate to women's lives and experiences. Analysts emphasize that the 'practical' type of knowledge about politics (public services, social welfare policy) compensates for or reverses the gender gap [8].

The binary distinction between politically informed (accurate factual convictions) and uninformed (no factual beliefs) was supplemented by the concept of 'mis-/disinformation' (false beliefs), thus creating a third type – the category of misinformed. The category of the misinformed with the strongest false beliefs are the most categorical party supporters. Corrections do not change the misconceptions of the most ideologically committed (i.e., strong partisans), and in some cases can reinforce the misconceptions. Resilience or 'backlash' has also been demonstrated for politically knowledgeable people. Rather than simply denying previous views and information, offering an alternative explanation – i.e., interacting with beliefs and showing another possible alternative – helps to reduce the impact of misconceptions.

A logical question that follows from the previous discussion is whether more informed voters vote more often than their fellow citizens, and whether political knowledge (again, not to be confused with education) can be considered a correlate or predictor of turnout.

Political knowledge is part of the resource-based model of voting, which argues that resources help citizens understand complex processes or unfamiliar choices. In terms of voting, citizens with better political knowledge are better and more easily able to choose among a range of politicians, parties or policies that best reflect their preferences, so the relative ease of voting choices increases their chances of turning out to vote.

Combining individual and institutional factors, analysts examine how the proportionality of the electoral system and the level of knowledge affect voter turnout [3]. They show that citizens with low levels of knowledge are less likely to participate in pluralistic elections; this is a robust finding that controls for a number of individual and macro-level variables.

Media can be an effective variable in modeling the relationship between knowledge and turnout. Various analysis shows how an increase in media choice increases gaps in both political knowledge and voter turnout – on the one hand, as media choice increases, citizens may become more selective in where they receive

news, and on the other hand, citizens who are less motivated may easily avoid political news in favor of entertainment content [7]. Citizens who have access to the Internet and prefer news are more informed and more likely to turn out to vote. But there is also evidence that with greater access to media, those who prefer entertainment over news are less informed and less likely to turn out to the polls. In other words, increasing diversity in the media environment is not a panacea for the problem of political ignorance, as citizens can easily select or reject political news [9].

V. Larcinese's analysis of the 1997 British general election distinguishes between general education and political knowledge and their impact on turnout and shows that the former is not a significant predictor of turnout [5].

Thus, although political knowledge has long been considered a prerequisite for healthy democratic politics, most empirical studies show that low levels of political knowledge have negative consequences for individual and collective political participation. Nevertheless, citizens, guided by a common heuristic, can make acceptable choices and decent decisions. This discussion proves that political knowledge is a more convincing correlate of electoral participation than the general phenomenon of formal education. However, we should be careful when choosing an instrument for assessing the level of political knowledge of citizens, considering the structure and content of the survey, as well as realizing the role of specific knowledge and lived experience (in the words of Fukuyama, 'Erfahrung' and 'Erlbnis') of different social groups. We aspire to continue this debate in future studies and to find more convincing evidence in favor of the dependence of turnout on citizens' political knowledge.

References:

1. Carpini Delli, Keeter Scott. What Americans Know About Politics and Why It Matters, New Haven, CT: Yale University Press, 1997. 416 p.
2. Coffey Amanda. Reconceptualizing Social Policy: Sociological Perspectives on Contemporary Social Policy. Open University Press, 2004. 192 p.
3. Fisher Stephen, Hobolt Sara, Lessard-Phillips Laurence and Curtice John. Disengaging Voters: Do Plurality Systems Discourage the Less Knowledgeable from Voting? *Electoral Studies*. 2008. V. 27, No. 1, Mar. P. 89–104.
4. Kenneth Patricia. Comparative Social Policy. Open University Press, 2001. 176 p.
5. Larcinese Valentino. Does Political Knowledge Increase Turnout? Evidence from the 1997 British General Election. *Public Choice*. 2007. V. 131, No. 3, Jun. P. 387–411.
6. Prior Markus, Lupia Arthur. Money, Time, and Political Knowledge: Distinguishing Quick Recall and Political Learning Skills. *American Journal of Political Science*. 2008. V. 52, No. 1, Jan. P. 169–183.
7. Prior Markus. News vs. Entertainment: How Increasing Media Choice Widens Gaps in Political Knowledge and Turnout. *American Journal of Political Science*. 2005. V. 49, No. 3, Jul. P. 577–592.

8. Stolle Dietlind and Gidengil Elisabeth. What Do Women Really Know? A Gendered Analysis of Varieties of Political Knowledge. *Perspectives on Politics*. 2010. V. 8, No. 1, Mar. P. 93–109.

9. Zaller John. The Myth of Massive Media Impact Revived: New Support for a Discredited Idea. In

Diana C. Mutz, Paul M. Sniderman, Richard A. Brody, (eds). *Political Persuasion and Attitude Change*. Ann Arbor: University of Michigan Press, 1996. P. 17–78

TECHNICAL SCIENCES

THE IMPACT OF MODIFICATION OF DIESEL FUELS BY BIOCOMPONENTS AND MAGNETIC FIELD ON THEIR ANTIWEAR AND OTHER PROPERTIES

Tsyhanenko V.

PhD candidate of education by specialty «Chemical technologies and engineering», State University «Kyiv Aviation Institute», Kyiv, Ukraine

Trofimov I.

PhD, associate professor of the Department of Chemistry and Chemical Technology, State University «Kyiv Aviation Institute», Kyiv, Ukraine

<https://doi.org/10.5281/zenodo.14947201>

Abstract

Biodiesel fuels derived from renewable resources show significant potential to improve the lubricating properties of diesel fuels, reduce wear and tear on fuel equipment, and reduce harmful emissions. The problem statement includes the study of the effect of biodiesel fuels and treatment of magnetic field on the antiwear properties and other characteristics of diesel fuels. Treatment of magnetic field is a promising approach that improves the molecular structure of fuel, increases its lubricating properties, and reduces friction and wear of engine parts. The combination of these technologies can help create new fuel systems with improved technical, economic and environmental performance.

Keywords: biodiesel, magnetic field, antiwear properties, diesel fuel, synergistic effect.

Introduction.

In the face of increasing environmental restrictions and the need to reduce harmful emissions, the use of alternative fuels such as biodiesel is attracting increasing attention. Anti-wear properties are one of the key reliability criteria. Biodiesel can reduce wear of parts. In addition, adding biodiesel to traditional fuel helps improve environmental performance. However, along with numerous advantages, the use of biodiesel is associated with a number of challenges. For example, biodiesel has worse low-temperature properties, which may limit its use in cold climates. In addition, the presence of oxygen-containing molecules in biodiesel may increase its corrosion activity. Another promising technology that complements the properties of biofuels is the treatment of diesel fuel with a magnetic field. It allows you to change the molecular structure of the fuel, improving the combustion process and helping to reduce wear of engine components. Research into the effects of biodiesel and magnetic field treatment on the anti-wear and other performance properties of diesel fuels is important for improving modern fuel systems.

Problem statement.

Traditional diesel fuels, although efficient in terms of energy density, are characterized by high levels of greenhouse gas emissions and dependence on fossil resources. The relevance of research into alternative approaches to improving diesel fuels is due to the need to solve environmental and technical problems. The use of biodiesel fuel is becoming an important tool in reducing harmful emissions and improving lubricating properties. However, biofuels have certain limitations, such as increased corrosion activity and low-temperature properties, which requires additional technological solutions to optimize its use. One of the promising areas is the magnetic field treatment of diesel fuel, which improves the physicochemical characteristics of the fuel. The study of the interaction of biodiesel fuels and magnetic field treatment to

improve the anti-wear properties of diesel fuels is an extremely important task. This allows not only to solve current technical problems, but also to lay the foundation for creating innovative solutions in the field of fuels and lubricants

Analysis of researches and publications.

The study of the effect of biofuels and magnetic field treatment on the anti-wear and other properties of diesel fuels is based on numerous scientific works and developments. Analysis of the available literature allows us to highlight key aspects and directions for the development of this topic.

- Study of fuel composition and its effect on operational properties.

One of the earliest approaches to the analysis of effect of fuel composition to the formation of deposits and wear of engine parts was carried out by Eltinge L., Gray D. and Taliaferro H. in the work "How Fuel Composition Affects Diesel Deposits and Wear" [1]. This study became the basis for further work focused on the relationship between fuel composition and its tribological properties. Modern approaches to improving the lubricating properties of fuels demonstrate the effectiveness of using nanomaterials. Hou X., Ma Y., Bhandari G., Yin Z., Dai L., Liao H., Wei Y in their work investigated the properties of graphene additives to low-sulfur fuels using plasma-assisted milling methods [2]. The results showed a 20% reduction in the friction coefficient, which confirms the promising nature of such solutions.

- The effect of biofuels on the tribological properties of diesel fuels.

Biofuels, due to the presence of fatty acid methyl esters, have significant potential for improving lubricating characteristics. Sruthi H., Dalimba U.K., Hegde P. investigated the effectiveness of methyl oleate-based lubricating additives for ultra-low-sulfur diesel fuels (ULSD) [3]. The results showed that the introduction of such additives provides a 15%

reduction in wear of fuel system components. Goodrum J.W., Geller D.P. [4], as well as Mei D., Luo Y., Shen X., Lu D., Yuan Y [5] analyzed the effect of various methyl esters on the lubricating properties of diesel fuels. The studies confirmed that the addition of methyl esters contributes to a 10–20% reduction in wear of plunger pairs.

- Effect of magnetic field treatment on the physicochemical properties of fuel.

Ramar K., Subbiah G. [16] investigated the effectiveness of magnetic field treatment of biodiesel on engine performance. It was noted that the magnetic field increases energy efficiency by 8% and reduces CO and HC emissions by 12% and 15%, respectively.

- Synergistic effect of biofuel use and magnetic field treatment.

The combination of biofuel and magnetic field treatment is considered a promising direction in the work of El-Fakharany M. K., Abdelrazek A. S., Baz F. B., Gad M. S. [12]. The authors investigated the effect of combining Nano-TiO₂ with biodiesel under magnetic field treatment.

Analysis of scientific articles demonstrates the versatility of approaches to solving the problems of wear and improving the operational properties of diesel fuels. The synergistic approach, which combines the use of biofuels and magnetic field treatment, shows significant potential for increasing the reliability and efficiency of engine operation. Despite numerous studies, the issue of optimizing the composition of biofuels and magnetic field treatment parameters to achieve maximum efficiency in reducing wear of fuel systems, improving engine stability and minimizing emissions of harmful substances remains open.

The aim of the article is to study the impact of the use of biodiesel fuels and magnetic field treatment on the anti-wear, physicochemical and environmental properties of diesel fuels in order to optimize their composition and treatment technology.

The antiwear properties of diesel fuel play a key role in ensuring reliable and long-lasting operation of diesel engines. Insufficient lubricity of the fuel can lead to increased wear of fuel system components such as fuel pumps and injectors, which in turn increases maintenance and repair costs.

According to a study published in the journal SAE International entitled “How Fuel Composition Affects Diesel Deposits and Wear” [1], 20,000 hours of testing were conducted on six automotive diesel engines, which showed how the sulfur content, aromatics, and average boiling point of the fuel affect deposits and wear. It was found that sulfur increases deposits and wear in these engines under various operating conditions. Higher aromatics and average boiling points increase deposits at certain points in the engines, but have little effect on wear.

A study published in the journal Processes under the title “Preparation and Tribological Properties of Graphene Lubricant Additives for Low-Sulfur Fuel by Dielectric Barrier Discharge Plasma-Assisted Ball Milling” [2] indicates that low sulfur content in fuel impairs its lubricating properties. To improve these properties, the authors propose the use of graphene

additives that reduce the coefficient of friction and the wear diameter.

A study by Goodrum J.W. and Geller D.P., presented in the paper “Influence of fatty acid methyl esters from hydroxylated vegetable oils on diesel fuel lubricity” [4], confirms that the addition of FAME to diesel fuel improves its lubricating properties. The authors found that biodiesel components form a lubricating film that significantly reduces wear of contacting surfaces, especially in injectors and fuel pumps.

Studies confirm that the use of biodiesel blends helps reduce wear of diesel engine components. In particular, the study by Mujtaba et al., described in the article “Effect of Additivized Biodiesel Blends on Diesel Engine Performance, Emission, Tribological Characteristics, and Lubricant Tribology”, indicates that a mixture of diesel fuel with biodiesel in the ratio of B30 reduces the friction coefficient by 6.72%. The use of biodiesel with the addition of TiO₂ nanoparticles improves lubricating properties and reduces wear of friction surfaces [6].

Geller D.A. and Goodrum J.W. in the article “Effects of specific fatty acid methyl esters on diesel fuel lubricity” [7] studied the influence of individual FAMES on the properties of diesel fuel. The authors found that long-chain esters demonstrate the highest efficiency in reducing the coefficient of friction and increasing the service life of fuel equipment. Studies confirm that the use of FAME is an effective means of reducing wear, especially in the case of ultra-low sulfur diesel fuel.

A study by Rao et al., presented in the article “Effect of Different Biodiesel Blends (80% Diesel + 20% Biodiesel) on Tribological Property of I.C. Engine Components”, shows that the use of B20 significantly reduces wear of piston rings and cylinder surfaces due to improved lubricating properties of the fuel. The study showed that the use of B20 reduces microwear by 15% compared to the use of conventional diesel fuel [8].

Another study by Kinoshita et al., published in the article “The Effect on Diesel Injector Wear, and Exhaust Emissions by Using Biodiesel Fuel”, shows that the addition of biodiesel to diesel fuel significantly reduces injector wear. The authors note that biodiesel provides stability of the lubricating film even within the limits of boundary lubrication [9]. Therefore, the use of biodiesel fuel blends significantly reduces the coefficient of friction and wear of engine components, which contributes to increasing their resource and efficiency.

The lubricating properties of esters are improved in the presence of monoglycerides and free fatty acids. With increasing unsaturation and molecular weight of esters, their lubricating properties increase [10].

Long-term use of biodiesel blends, such as B20, can have a positive effect on engine life. In particular, studies show that the use of biodiesel reduces wear on engine components such as pistons, piston rings and fuel injectors. The study “Impact of Biodiesel Blended Fuels on Combustion Engines in Long Term” states that the use of biodiesel blends leads to a reduction in

wear and deposits on critical engine parts, which can increase the overall engine life by 5-10% [11].

The study "Impact of Nano-TiO₂ Combination with Biodiesel on Diesel Engine Performance and Emissions Under Fuel Magnetism Conditioning" found that the use of biodiesel (B20) in combination with magnetic field treatment of the fuel provides a 30% reduction in wear of fuel system parts compared to pure diesel fuel. The study conducted experiments on a diesel engine under various operating conditions. For B20 biodiesel with magnetic field treatment, the friction coefficient decreased to 0.28 compared to 0.40 for untreated diesel fuel. In addition, the content of nitrogen oxides in exhaust gases decreased by 18%, and fuel economy was up to 10% [12].

The magnetic field contributes to a change in the electronic structure of oxygen-containing molecules, which reduces their reactivity and, as a result, an aggressive effect on metal engine components. The study presented in the article "Bio-Nanoparticles Mediated Transesterification of Algal Biomass for Biodiesel Production" confirms that the effect of a magnetic field on biodiesel obtained using nanocatalysts reduces the amount of peroxides and free fatty acids in its composition [13]. This contributes to the stabilization of oxygen-containing molecules, which are the main sources of the formation of corrosive compounds. As a result, the level of corrosion wear of metal surfaces is reduced by 15% compared to untreated biodiesel. In addition, according to the article "Effect of Biodiesel Ester Structure Optimization on Low Temperature Performance and Oxidation Stability", optimization of the structure of biodiesel esters in combination with magnetic field treatment significantly improves its oxidative stability [14]. After magnetic field treatment, such biodiesel demonstrates improved anti-corrosion properties, and stabilization of oxygen-containing molecules after magnetic exposure ensures the formation of a protective film on metal surfaces [15]. Therefore, the magnetic field plays an important role in increasing the stability of oxygen-containing molecules of biodiesel, which not only reduces the corrosive effect and improves the overall performance of the fuel.

Thus, the use of biodiesel provides improved economic and environmental performance of diesel engines. However, to achieve optimal results in different operating conditions, it may be advisable to consider additional fuel treatment methods. Biodiesel contributes to the reduction of harmful emissions. However, biodiesel has worse low-temperature properties compared to traditional diesel fuel, which may complicate its use in cold climates.

A study by Ramar K. and Subbiah G showed that the use of magnetic field treatment of biodiesel blends significantly improves the calorific value of the fuel. When using a B40 blend with magnetic field treatment, the brake heat efficiency increased by 8% compared to untreated fuels [16]. This indicates an increase in the energy efficiency of the engine, since the magnetic field orders the molecular structure of the fuel, which contributes to more complete combustion. Another study published in Materials Transactions (2015) indicates that a 15.89% reduction in smoke and a

12.85% increase in O₂ in exhaust gas reduces engine deposits [17]. A study "A study of magnetic field influence on performance and emission using biodiesel in DI diesel engine" found that CO emissions were reduced by 12% and HC emissions by 15%. This is due to the more complete combustion of the fuel provided by magnetic field treatment and the reduction in the sulfur content of biodiesel.

Marine biofuel trials conducted by the Singapore Decarbonization Center (2024) confirm the readiness of biofuels for use in shipping. The tests showed a 7% increase in engine efficiency due to improved combustion. The study "Magnetic Nanocatalysts for Biofuel Production" notes that the use of magnetic nanocatalysts can significantly improve the efficiency of the transesterification process for biofuel production. This technology provides a 25% increase in productivity compared to conventional methods, but its cost is still high for mass implementation [18]. In the study "The Effect of Biofuel Production on Greenhouse Gas Emission Reductions", the use of second-generation biofuels allows for a reduction in CO₂ emissions by 8–12% compared to traditional fossil fuels [19]. This efficiency is achieved due to the closed carbon cycle. Also, the study "Biofuels & Greenhouse Gas Emissions: Myths versus Facts" notes that biofuels can reduce emissions of other harmful gases, such as methane and nitrogen oxides, by 5–10%, which provides additional environmental benefits [20].

Conclusions.

It has been established that the modification of diesel fuels with biocomponents significantly improves the lubricating properties of diesel fuel due to the high content of oxygen-containing polar molecules, which allows to reduce the wear of fuel system parts by 10–15%. In addition, biodiesel contributes to the reduction of emissions of harmful substances, which is important for achieving environmental goals. Experimental data confirm that a magnetic field improves fuel combustion, increases the calorific value and stability of engine operation. The combination of biofuels and magnetic field treatment demonstrates a synergistic effect, which allows to reduce the wear of fuel system components by 30%, improve the combustion process and reduce nitrogen oxide emissions by 18%. Such a combined approach increases the economic efficiency of engine operation, reduces maintenance costs and reduces the frequency of maintenance.

Future research includes optimizing the composition of biodiesel fuels, developing new compositions, as well as the use of nanomaterials to stabilize oxygen-containing molecules in biofuels. An important direction is the scaling of magnetic field treatment technologies for industrial use. Additional experimental studies in real conditions will help to confirm the stability and effectiveness of the results obtained. Therefore, the results confirm the prospect of using biodiesel fuels and magnetic field treatment to increase the anti-wear properties of diesel fuels, reduce harmful emissions and improve the efficiency of diesel engines.

References:

1. Eltinge L., Gray D., Taliaferro H. How fuel composition affects diesel deposits and wear. SAE Technical Paper 540187, 1954. DOI: <https://doi.org/10.4271/540187>
2. Hou X., Ma Y., Bhandari G., Yin Z., Dai L., Liao H., Wei Y. Preparation and Tribological Properties of Graphene Lubricant Additives for Low-Sulfur Fuel by Dielectric Barrier Discharge Plasma-Assisted Ball Milling. *Processes*. 2021. №9. P.272. <https://doi.org/10.3390/pr9020272>
3. Sruthi H., Dalimba U.K., Hegde P. Efficient Lubricity Improvers Derived from Methyl Oleate for Ultra Low Sulphur Diesel (ULSD). *Pet. Chem.* 2022. №62. PP.1126–1136. DOI: <https://doi.org/10.1134/S0965544122090146>
4. Goodrum J.W., Geller D.P. Influence of fatty acid methyl esters from hydroxylated vegetable oils on diesel fuel lubricity. *Bioresource Technology*. 2005. Vol. 96. Issue 7. P. 851-855. DOI: <https://doi.org/10.1016/j.biortech.2004.07.006>
5. Mei D., Luo Y., Shen X., Lu D., Yuan Y. Lubrication properties of fatty acid methyl esters as low-sulfur diesel enhancers. *Transactions of the Chinese Society of Agricultural Engineering*. 2016. Vol. 32, Issue 9. P. 193-197. DOI: <https://doi.org/10.11975/j.issn.1002-6819.2016.09.027>
6. Mujtaba M. A., Liaquat A. M., Kalam M. A., Masjuki H. H., Varman M., Gulzar M., Shahir S. A. Effect of Additivized Biodiesel Blends on Diesel Engine Performance, Emission, Tribological Characteristics, and Lubricant Tribology. *Energies*. 2020. Vol. 13. Issue 13. DOI: <https://doi.org/10.3390/en13133375>
7. Geller D. A., Goodrum J. W. Effects of specific fatty acid methyl esters on diesel fuel lubricity. *Fuel*. 2004. Vol. 83. Issue 17-18. P. 2351-2356. <https://doi.org/10.1016/j.fuel.2004.06.004>
8. Dr. Venkata Sundar Rao K., Dr. Shreeprakash B., "Effect of Different Biodiesel blends (80% Diesel + 20% Biodiesel) on Tribological Property of I.C. Engine Components", *SSRG International Journal of Mechanical Engineering*, vol. 7, no. 10, pp. 7-10, 2020. Crossref, <https://doi.org/10.14445/23488360/IJME-V7I10P102>
9. Kinoshita E., Ito T., Nakatani N., Uchino M., Yamashita K. The Effect on Diesel Injector Wear, and Exhaust Emissions by Using Biodiesel Fuel. *Materials Transactions*. 2015. Vol. 56. Issue 5. P. 642–647. DOI: <https://doi.org/10.2320/matertrans.M2014410>
10. Makareviciene V., Janulis P. Environmental effect of rapeseed oil ethyl ester. *Renewable Energy*, 2003. Vol. 28, Issue 15. P. 2395–2403. DOI: [https://doi.org/10.1016/S0960-1481\(03\)00142-3](https://doi.org/10.1016/S0960-1481(03)00142-3)
11. Singh, P., Sharma, S., Kumar, S. (2022). Impact of Biodiesel Blended Fuels on Combustion Engines in Long Term. In: Kumar, V., Agarwal, A.K., Jena, A., Upadhyay, R.K. (eds) *Advances in Engine Tribology. Energy, Environment, and Sustainability*. Springer, Singapore. https://doi.org/10.1007/978-981-16-8337-4_3
12. El-Fakharany M. K., Abdelrazek A. S., Baz F. B., Gad M. S. Impact of Nano-TiO₂ Combination with Biodiesel on Diesel Engine Performance and Emissions Under Fuel Magnetism Conditioning. *Arab Journal of Science and Engineering*, 2024. PP.1-16. DOI: <https://doi.org/10.1007/s13369-024-09643-w>
13. Verma ML, Dhanya BS, Wang B, Thakur M, Rani V, Kushwaha R. Bio-Nanoparticles Mediated Transesterification of Algal Biomass for Biodiesel Production. *Sustainability*, 2024. Vol. 16(1):295. DOI: <https://doi.org/10.3390/su16010295>
14. Wenchao W., Fashe L., Ying L. Effect of Biodiesel Ester Structure Optimization on Low Temperature Performance and Oxidation Stability. *Journal of Materials Research and Materials*. 2020. Vol. 9. Issue 3. P. 2727-2736. DOI: <https://doi.org/10.1016/j.jmrt.2020.01.005>
15. Mythili, R., Venkatachalam, P., Subramanian, P., & Uma, D. (2014). Production characterization and efficiency of biodiesel: a review. *International Journal of Energy Research*, 38, P. 1233 – 1259. DOI: <https://doi.org/10.1002/er.3165>
16. Ramar K., Subbiah G. A study of magnetic field influence on performance and emission using biodiesel in DI diesel engine. *AIP Conference Proceedings*, 2024. №3192(1). P.020082. DOI: <https://doi.org/10.1063/5.0241518>
17. Peng D.X. The Effect on Diesel Injector Wear, and Exhaust Emissions by Using Ultralow Sulphur Diesel Blending with Biofuels. *Materials Transactions*, 2015. Vol. 56. Issue 5. PP.642-647. DOI: <https://doi.org/10.2320/matertrans.M2014410>
18. Singapore's maritime decarbonisation centre completes its final marine biofuels trial. *Reuters Sustainability Reports*. 2024. № 7. (date of access: <https://www.reuters.com/sustainability/climate-energy/singapores-maritime-decarbonisation-centre-completes-its-final-marine-biofuels-2024-07-19/>)
19. Hanaki, K., Portugal-Pereira, J. (2018). The Effect of Biofuel Production on Greenhouse Gas Emission Reductions. In: Takeuchi, K., Shiroyama, H., Saito, O., Matsuura, M. (eds) *Biofuels and Sustainability. Science for Sustainable Societies*. Springer, Tokyo. https://doi.org/10.1007/978-4-431-54895-9_6
20. Biofuels & Greenhouse Gas Emissions: Myths versus Facts. *Department of Energy Resources Studies*. 2023. № 3. (date of access: <https://www.energy.gov/articles/biofuels-greenhouse-gas-emissions-myths-versus-facts-0>)

№151/2025

Norwegian Journal of development of the International Science

ISSN 3453-9875

It was established in November 2016 with support from the Norwegian Academy of Science.

DESCRIPTION

The Norwegian Journal of Development of the International Science, established in 2016 with support from the Norwegian Academy of Science, offers a platform for global researchers, academics, and students. Publishing 24 times annually, it covers current science topics. Submitting your article provides exposure to a diverse audience, enhancing your career. Our commitment to research and SEO ensures timely visibility. Submit to the Norwegian Journal of Development of the International Science today and join esteemed authors.

Editor in chief – Karin Kristiansen (University of Oslo, Norway)

The assistant of the editor in chief – Olof Hansen

- James Smith (University of Birmingham, UK)
- Kristian Nilsen (University Centre in Svalbard, Norway)
- Arne Jensen (Norwegian University of Science and Technology, Norway)
- Sander Svein (University of Tromsø, Norway)
- Lena Meyer (University of Gothenburg, Sweden)
- Hans Rasmussen (University of Southern Denmark, Denmark)
- Chantal Girard (ESC Rennes School of Business, France)
- Ann Claes (University of Groningen, Netherlands)
- Ingrid Karlsen (University of Oslo, Norway)
- Terje Gruterson (Norwegian Institute of Public Health, Norway)
- Sander Langfjord (University Hospital, Norway)
- Fredrik Mardosas (Oslo and Akershus University College, Norway)
- Emil Berger (Ministry of Agriculture and Food, Norway)
- Sofie Olsen (BioFokus, Norway)
- Rolf Ulrich Becker (University of Duisburg-Essen, Germany)
- Lutz Jäncke (University of Zürich, Switzerland)
- Elizabeth Davies (University of Glasgow, UK)
- Chan Jiang (Peking University, China) and other independent experts

1000 copies

Norwegian Journal of development of the International Science

Iduns gate 4A, 0178, Oslo, Norway

email: publish@nor-ijournal.com

site: <https://nor-ijournal.com>



© 2025 The Norwegian Journal of Development of the International Science

nor-ijournal.com

