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Decision Making Process: Factors and Influences

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Abstract

The authors of this research try to determine what are the most relevant factors and influences in the decision-making process. Namely, according to the relevant literature there are different factors that influence the politicians or other government officials before they make the final decision. According to the authors opinions` the most relevant factors that should be taken into consideration that can influence the decision-making process are: values (personal, organizational, professional, political, ideological); party affiliation; constituency interests, public opinion; adherence or invocation of authorities or precedents and decision rules. The researchers give an overview to this most relevant decision factors and try to determine which one is the most relevant.

Keywords: decision making, factors, influences.

Introduction

Decision making can be studied as an individual or as a collective process. In the first case, the emphasis of the study is on the criteria used by individuals when making choices and decisions. In the latter case, the emphasis of the study is on the processes by which majority is built or by which approval is obtained. The individual can be subject to various influencing factors when deciding how to vote or resolve a particular issue. What will affect the individual the most in this case is difficult to determine and specify. Officials often make statements explaining their decisions made in Congress or other official institutions. They do this through social networks, in political speeches, at press conferences, in separate court opinions, memoirs and elsewhere.
The following criteria can be pointed out as criteria that influence the political choice:
- Values (personal, organizational, professional, political, ideological);
- Party affiliation;
- Constituency interests
- Public opinion;
- Adherence or invocation of authorities or precedents;
- Decision rules.[1]

1.Values
Values create the framework from which the individual or group is motivated to act, throw which they perceive reality and through which they communicate with the environment. The value system directs the choices and provides criteria according to which the group or individual decides or evaluates. Public values are not rational because they are deeply ingrained beliefs, and as such are grounded in feelings and emotions.[2]

1.1. Organizational values
Here it is important to emphasis that the values of the public institutions are separate and different from the values of the individuals that work in the public institutions, and those are fundamentally different from the values of individuals.[3]
The values of the public organization are created by the public body or the institution responsible for it. These values should be different from the values that are created as a result of individuals deciding to create an interest group in order to achieve their

[1] Anderson,James.E; Public Policymaking; Houghton Mifflin Company; New York 2003(p.126).
[2] Firth, Linda J; ``Role of values in public decision-making: where is the fit?``; Impact Assessment and Project Appraisal; volume 16, number4, December 1998, (p 327), Beech Tree Publishing. 10 Watford Close, Guildford, Sum:y GUI 2EP, UK. ISSN: 1461-5517 (Print) 1471-5465 (Online) Journal homepage: https://www.tandfonline.com/loi/tiap20; accessed on 23.04.2021.
[3] Ibid.

common values and goals because there is a difference. Individuals working in a public organization are not emotionally attached to the values of the public organization. Because the members of the organization are not emotionally connected to a common value (important enough for them to defend it), the public organization lacks the irrational but energetic component.[4]

1.2. Professional values

The professional values of the employees in the organization have a certain impact when it comes to decision making. This is because professions tend to form characteristic preferences about how problems should be handled. Professionally trained employees carry these preferences or values with them when they are employed in organizations. Such an example is the importance that engineers in the National Administration for Road Traffic Safety and industrial hygienists in the Administration for Safety and Health at Work attach to occupational safety and health.

In that manner, the staff of the Administration for Safety and Health at Work determines the standards for the design and use of certain equipment, ventilation systems and safety devices in detail. While the performance standards set by the Road Traffic Safety Administration set health or safety objectives, the methods for achieving these objectives are left to the discretion of each company.[5]

1.3. Personal values

There are many different definitions of what personal values represent. Thus, some authors define personal values as transcendental goals that serve as guiding principles in a person's life and play an important role in understanding social phenomena of various kinds, both at the micro and macro levels. Other authors believe that values are relatively stable and enduring and hold individuals, but they are also cultures when shared with other people.[6] Personal values are important, but some authors argue that rational choice theorists go too far in explaining the behavior of government officials as being entirely driven by self-interest.[7]

1.4. Political values

Policy values are also important when it comes to decision criteria. It should not be mistakenly assumed that decision makers are influenced only by personal, professional and organizational considerations. Decision-makers in decision-making can also be guided by the public interest or their beliefs about what is right, necessary or morally sound public policy. Thus, members of parliament can vote in favor of enacting civil rights legislation because they believe it is morally sound and that equality of opportunity is a desirable policy goal, even though their vote could put them in political danger.[8]

1.5. Ideological values

During the late 18th century, the French philosopher D.de Tracy defined ideology as the "science of ideas." Since then, many authors have refined his conception of ideology into various claims. For example, some authors argue that "ideologies are relatively coherent sets of beliefs that bind some people together and explain their worlds in terms of cause-and-effect relationships." Other theorists argue that "ideologies are common beliefs that reflect social experiences in a particular context and at a particular time." What all ideologies have in common is that their main function is to gain as many adherents as possible. As the famous theorist D. de Tracy argued, the entire existence of the universe is conceptualized through different ideologies. Personal ideology is self-subjective consciousness or perception, while public ideology is a publicly-objectively recognized cognition. Personal ideology and public ideology can be linked and construct a new ideology. The recognized specific ideology can be stated and a public ideology can be built.[9]

Decision-makers in the decision-making process are often influenced by an ideology that is public and according to which they are guided. Thus, some decision-makers may be influenced by conservative ideology. If this is the case then those decision makers will consider that the government should be small, working mainly at the state or local level. They will advocate for minimal government interference in the economy and will prefer solutions to problems based on the private sector. If the decision-maker is influenced by "social conservatism" then he will be influenced by the idea that the government should respect traditional morals and therefore impose restrictions on contraception, abortion and same-sex marriage. On the other hand, if decision-makers are influenced by modern liberal ideology, they will believe that the government should intervene in the economy and provide a wide range of social services to ensure the well-being and equality of society. These decision-makers will be influenced by an ideology that believes that the government should not regulate sexual or social behavior. It should be noted here that there is also a progressive liberal ideology. The followers of this liberal ideology believe in protecting previously vulnerable groups from discrimination, while progressives believe that the government's job is to address past mistakes and reform the systemic problems caused by those inconveniences.

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[4] Ibid.

[5] Anderson,James.E; Public Policymaking; Houghton Mifflin Company; New York 2003(p.127).

[6] Nilsson, Jens; Lundmark, Carina; "The Effect of Personal Values And The Roles On Representational Principles In Natural Resource Management Decision-Making"; Heliyon Volume 6, Issue 5, May 2020, e04032; https://www.sciencedirect.com/science/article/pii/S2405844020308768#bib39

[7] Anderson,James.E; Public Policymaking; Houghton Mifflin Company; New York 2003(p.127).

[8] Ibid.

[9] Chen, Sea-Shon; The Relation between Ideology and Decision-making; http://www.jgbm.org/page/20%20Dr.%20Sea-Shon%20Chen.pdf; visited on 03.05.2021.

1.6. Interests of the voters from the constituency

There is one rule in the US Congress, and that is whenever the interests of the voters living in one constituency are contrary to the interests of the political party, the representative in the Congress should vote in favors to the interests of the citizens living in his constituency. This is because the representative in the Congress is accountable to his constituents who and if they are not satisfied with his work, may not vote for him for a new term.

In the interests of his constituents, the representative of Congress may act as a delegate, carrying out their instructions, or he may act as a creditor and apply his best judgment in voting on policy matters. Of course, a representative in Congress can try to combine these two styles, acting as a delegate on some issues and as a creditor of others.[10]

For example, in the past, members of the Congress from the southern states were well aware of the strong opposition among their white voters to civil rights legislation and voted accordingly. A Congress member that is elected from a constituency where there is a large number of working-class voters is likely to support legislation for a minimum wage and the right to work.

But on many issues, members of the Congress can hardly be informed for the interests of their constituents. Many of the electorate have little knowledge of most issues. Then the question arises how can the representatives in the Congress find out the preferences of their voters? In that case, they should make decisions based on their own values or other criteria, such as recommendations from party leaders or executives. They can also ask for the opinion of their constituents on how to act on a particular policy.[11]

1.7. Public opinion

Understanding the public opinion and its relationship to public policy became a central part of the democracy discussion in North America in the twenty-first century. It seems that public opinion, whether it means the results of surveys and focus groups, letters to the editor, letters to elected officials, communications for interest groups or communication with the media (such as talk radio shows and columns), has become part of the process of creating public policies in different ways.

Members of the public, as well as political actors (representatives of interest groups, bureaucrats, elected officials, etc.), are overwhelmed with discussions of public opinion. The results of the latest polls are present in all newspapers and on television, and the technological innovations have increased the ability to measure opinion and thus made the industry for measuring public opinion more visible.[12]

First of all, it is important how political actors understand public opinion (what forms that opinion and how it is measured). Those are important factors that influence whether the public opinion will be taken into account at all when making decisions for certain policies. There are a number of studies in the academic literature that provide explanations that may influence the attitude of the political actors for public opinion. Understanding who expresses opinion and in what form the public opinion are important considerations for understanding actors' perceptions of public opinion. Understanding the context around the political actor is key to understanding what his or her attitude towards public opinion will be. Both the election cycle and the political and ideological goals of political actors are important when it comes to building their attitude towards public opinion. Assessing the visibility of certain public policy issues and the type of policy being discussed are also important to build an understanding of the factors that can influence political actors' views on public opinion and how they can use it.[13]

Defining the public is a very complex issue because the public itself as a term is heterogeneous. Although the term "public opinion" is often used to imply a common view, it is clear that members of the public have very different views on any issue. Namely, there are different forms of public or audience that can be discussed:

“There is a "voting body" (those are the voters who actively go to the polls), a "careful public" (characterized by an interest in politics and at least occasional participation in debates on political topics), an "active public" (or also called careful public and the "special public", which differ from the ``active public` `only in number of people”.[14]

For the politicians the most important opinion is the opinion of the so-called electorate (the opinion of those who regularly go to the polls. Politicians find out their opinion through political polls and interviews. However, it is important to emphasize that when polling public opinion with the help of polls, researchers cannot always separate the opinion of the so-called active voters from the opinion of the so-called passive public, and therefore often results that are obtained from surveys do not fully correspond to the social reality.

But it is not just the term ``public`` that is complex to understand. Thus, the notion of opinion is also the subject of consideration and discussion in academic circles. While there are theorists who claim that "Citizens are rarely interested or educated enough to

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[10] Anderson,James.E; Public Policymaking; Houghton Mifflin Company; New York 2003(p.128).

[11]Ibid.

[12] Rounce, Andrea.D; Political Actors’ Perceptions of Public Opinion: Assessing the Impact of Opinion on Decision Making; Prepared for the Canadian Political Science Association’s Annual Meeting, Winnipeg, Manitoba, June 3 to 5, 2004; https://cpsa-acsp.ca/papers-2004/Rounce.pdf; visited on 18.05.2021.

[13] Ibid.

[14] Rounce, Andrea.D; Political Actors’ Perceptions of Public Opinion: Assessing the Impact of Opinion on Decision Making; Prepared for the Canadian Political Science Association’s Annual Meeting, Winnipeg, Manitoba, June 3 to 5, 2004; https://cpsa-acsp.ca/papers-2004/Rounce.pdf; visited on 18.05.2021.

articulate informed opinions" there are theorists who claim that public opinion often changes and it is not constant and even that people may express different opinions in different environment.[15]

Thus, it has been proven that individuals can express different opinions in different audiences, which is difficult for public opinion researchers to understand, but makes sense for individuals. Theorists explain this by saying "that there is a long history of respondents sending mixed messages about the government activities. On the one hand, they can express general views on what the government should do, and on the other hand, they can provide information on specific programs or activities that seem to contradict their general views".[16]

Some authors believe that the formation of public opinion is influenced by a number of factors: "the social climate, the technological environment and the attitude towards the environment in any democratic state together determine the way of the public opinion and the ways we try to measure it." Understanding the public opinion comes down to a technical question about how to measure the public opinion. One of the most pressing issues in the current literature is the seemingly reduction of "public opinion" to the results of public opinion polls.[17]

However, one thing can be said with certainty, and that is that public opinion polls influence the direction and the content of the public policy. Based on the pluralistic conception of the formation of mass opinion and the distribution of political power, democratic theories of accountability hold that public opinion "... is expected to be an autonomous force capable of shaping policy agendas and determining the activities of the policies` creators." In addition to shaping policy agendas, public opinion can influence the actions of policymakers by defining acceptable and unacceptable policy choices, providing support for higher spending in certain areas, and shaping policy outcomes.[18]

Conclusions

The decision-making process is a complex one to define and determine. There are a number of factors that influence on the politicians or other officials engaged in the decision making. As we can see from the text bellow that sometimes the officials are led by the organizational values from the organization they work in when making a final decision, but this situation is most rare one. It is more often that personal values to be taken into account when making a final decision. Even there is still arguing in the academic circles regarding claims that comes from the rational choice theorists about going too far in explaining the behavior of government officials as being entirely driven by self-interest, still it is inevitable to be presumed that there are a number of other factors that influence the decision-making process. It can be concluded that for the politicians more important are the interests of the voters from the constituency and the most important factor when comes to the decision making is the public opinion. This is because the representative in the Congress or in the Parliament is accountable to his constituents, who and if they are not satisfied with his work, may not vote for him or her for a new term. The same is the thing when it comes the word for the public opinion as an influential factor in the decision-making process. Politicians relay on the public opinion when they are about to bring a decision regarding a policy that will affect their electorate (the opinion of those who regularly go to the polls). That is why politicians very often check the public opinion through political polls and interviews before they bring important political decision.

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[15]Ibid.

[16] Cantril, Albert H. Cantril, Susan Davis ; Reading Mixed Signals-Ambivalence in American Public Opinion About Government; Woodrow Wilson Center Press; ISBN 9780943875910; 1999;p.10.

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[18] Ibid.

5.Linda J; Firth; "Role of values in public decision-making: where is the fit?"; Impact Assessment and Project Appraisal; volume 16, number4, December 1998, (p 327), Beech Tree Publishing. 10 Watford Close, Guildford, Sum:y GUI 2EP, UK. ISSN: 1461-5517 (Print) 1471-5465 (Online) Journal homepage: https://www.tandfonline.com/loi/tiap20;
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The Council of Europe's reliability in its contradictory relations

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Abstract

Over the years, international organizations have played critical roles in the interactions and relationships that develop within the international system between and among states.
In light of the latest developments in the conflict with Russia, the issue of the protection of human rights and fundamental freedoms, on which the Council of Europe is mainly focused, seems to be a key point in the European debate and beyond. As a result, the Council's integrity has become a source of consternation in recent years, accompanied by contradictory actions against its Statute. Analytically, it is fascinating to understand how the Council of Europe has influenced Russia through its mission, as well as what Russia has brought to it. The nature of Russia's membership in the Council of Europe is somewhat paradoxical, given how far it strayed from the organization's objectives and principles. As well as the organization's credibility and ability to promote democratic values throughout the Russian Federation by applying the European Convention on Human Rights.
At the end of this paper, all points where the Council of Europe deviated from its principles and objectives are summarized. It is recommended that the Council of Europe, among others, has to strengthen its authority and become more resilient and solid in the face of future crises.

Keywords: Council of Europe, Russia, European Court of Human Rights, Statute of the Council of Europe.

1. Introduction

The idea of a United Europe has followed us for a long time in history. There have been many politicians who have reacted to the creation of a United Europe. We can mention the Frenchman Edouard Herriot where he said *"I want to see the United States of Europe realized."*[1] After many efforts, the creation of one of the most important organizations, the Council of Europe, is finalized. Created after World War II, it aimed to prevent conflicts experienced by strengthening the rule of law.[2] The CoE is an organization that deals primarily with a wide range of human rights, as well as democracy and the rule of law. Founded in 1949, the Council of Europe seeks to develop throughout Europe democratic principles based on the European Convention of Human Rights and many other legal reference texts on the protection of individuals. The mission of the Council of Europe goes beyond its competencies, due to the continuous impact it has brought around and has played an important role in bringing fundamental change in the European countries that joined this organization. Each of the Council of Europe's member states is thus subject to independent institutions that monitor compliance with human rights and democratic practices, in accordance with the Council of Europe's powers. If this does not occur, the Council of Europe will impose measures that will be strictly enforced.

This paper analyzes the mission of the Council of Europe and its role in the international arena. This mission, which has been in the interest of many scholars over the years, and as a result of the topicality of its conflict with Russia and as a new issue, still remains not much studied. The relationship between the Russian Federation and the Council of Europe remains unclear, as only in 2019 Russia returned to the Council after a 4-year departure from the organization and for the importance that such a conflict enjoys for European countries (and not only), the study of such a topic remains the focus of interest.

The Council of Europe's stance on Russian reactions raises the question of whether it really is a credible organization in the international arena. The biggest dilemma remains that of interpreting the facts. Due to the interest that this organization has for the European society of the future, a more special focus should be paid to this very topic. Russia's membership in the Council of Europe is viewed with suspicion because of the situation Russia was in at the time of accession. It had different principles from the Council

[1] Colegrove, K. "The United States of Europe" By Edouard Herriot. Translated by Reginald J. Dingle. New York: The Viking Press,1930. pp. vi, 330. American Journal of International Law, 25(1), (1931) 178-179.
[2] European Youth Center Budapest (EYCB) – Council of Europe collaboration, "Building Peace in Europe" January 2017.

of Europe, where of course that was the main reason why it had to become part of it. To thus become a democratic state and the rule of law, where fundamental human rights and freedoms are exercised and guaranteed, and thus enjoy access to the principles and values affirmed by the CoE. However, despite this indisputable progress, serious questions remain regarding the democratic development of the Russian Federation and the very principle of democratization, as the gap between European standards and the reality of Russia.[3] As this as seen encounters difficulties in reality.

2. Russia: A case study as part of Council of Europe

Cooperation between Russia and the Council of Europe dates back a long time ago, but due to the study of this scientific paper, the focus will remain on Russia's membership in the Council. Russia's decision to join the Council of Europe had a positive impact on Russia and its citizens, as it was a post-communist country. Its membership coincided with the reform of national legislation. The Council of Europe Statute does not stipulate what the conditions are for membership, but Article 3 provides:

"Every member of the Council of Europe must accept the principles of the rule of law and of the enjoyment by all persons within its jurisdiction of human rights and fundamental freedoms, and collaborate sincerely and effectively in the realization of the aim of the Council as specified in Chapter I."

In view of this statute which expresses the principles and objectives of the CoE, we conclude that the implementation of fundamental human rights and freedoms are key to membership. Every country that becomes a member of the Council of Europe agrees to be monitored for compliance with human rights and democratic practices in all areas where the law is enforced. To meet the main criteria for accession to the Council of Europe, candidate countries must ratify the Convention on Human Rights, Protocol no. 6 on the abolition of the death penalty, and Protocol no. 13 which removes all circumstances for the death penalty. If these conditions are not met, then no country can claim to be part of the Council of Europe. In this way the situation of the Russian Federation had to be analyzed in order to be in line with the requirements of the CoE.

Upon joining the Council of Europe, Russia imposed a moratorium on the death penalty, as one of the absolute requirements of the Council of Europe for all its members is that the death penalty should not be carried out for any criminal offense.[4] Thus although the death penalty was abolished *de facto*, it still remains part of the Russian Penal Code and it has not yet been ratified to this day. Therefore, any case that could lead to conflicting consequences between the Council of Europe and the Russian Federation, makes you think about the risk of a return to the death penalty.

According to statistics published by the European Court of Human Rights, the Russian Federation is the country with the highest number of cases sent for violation of articles of the European Convention on Human Rights to this court (among 47 states that are members of the Council of Europe). Over the years, 2,884 cases have been reviewed, which places Russia as the second country with the most cases tried for violation of ECHR articles.

Russian Federation	Total number of judgments	2884
	Judgments finding at least one violation	2724
	Right to life – Deprivation of life	330
	Right to a fair trial	935
	Right to liberty and security	1203

Tab. 2.1[5]

[3] Jean-Pierre Massias, "Russia and the Council of Europe: Ten Years Wasted", Russia/NIS Research Program, France, January 2007, p. 12.
[4] Parliamentary Assembly of CoE, Doc. 10911, Rapporteur: Mrs Renate Wohlwend, Liechtenstein, Group of the European People's Party "Position of the Parliamentary Assembly as regards the Council of Europe member and observer states which have not abolished the death penalty" 21 April 2006.
[5] European Court of Human Rights, August 2021"Statistics by State, Violations by Article and by State 1959-2020".

The cases lost by Russia in the Strasbourg Court speak of a necessity that citizens have and a need for "protection" when they cannot find justice in their courts. The opportunity to appeal to the Court of human rights (by ECHR) following the use of national judicial forms is a right already enjoyed by every Russian citizen since the accession of the Russian Federation to the Council of Europe. Of course, this should not be lost despite the conflicts that occur between Russia and the Council of Europe. Russian citizens have overloaded the system with petitions, and the ECHR has often criticized the Russian state for failing to address issues and resolve them in accordance with the European Convention on Human Rights. While Russia has been accepted into the CoE with the optimistic idea that "integration is better than isolation; cooperation is better than confrontation", it generally has a good record of paying fines, although it has not been responsible in addressing the request of the European Court of Human Rights to reform the fundamental shortcomings within its legal system.[6]

What puts all of the above even more at risk is the annexation of Crimea by Russia. Ukraine and many other countries did not recognize and condemned the annexation carried out by Russia, considering it a violation of international law and the agreements signed by the latter, which preserve the territorial integrity of Ukraine. The fact that Russia and Ukraine are members of the CoE forms the basis of conflict and contradiction of the CoE actions. The Council of Europe has given its full support to the territorial integrity and national unity of Ukraine and strongly condemns the violation by the Russian Federation of the sovereignty and territorial integrity of the country.[7]

Given the opportunity for dialogue, the CoE Assembly in this way did not cancel the credentials of the Russian Federation but made a temporary suspension of them until the end of the 2014 session, the voting rights of the Russian delegation, as well as its right to be represented in the Bureau, the Presidential Committee and the Standing Committee of the Council Assembly, including his right to take part in election observation missions.[8] It should be noted that the Parliamentary Assembly of the Council of Europe clearly stated through a resolution that if the Russian Federation did not escalate the situation and stopped the annexation of Crimea it could cancel its credentials. The Parliamentary Assembly stated that: *"threats against Crimea, is beyond any doubt, a serious violation of international law."*[9]

What is understood from this situation is that the Parliamentary Assembly has maintained the right stance as by violating the sovereignty and territorial integrity of Ukraine, the Russian Federation has thus created a threat to stability and peace in Europe. In case of non-response of organizations or states to the issue of Crimea and the conflict with the CoE and Russia, they would bring big steps towards an existential international danger. To protest the decision taken by the Assembly, the delegates left the assembly hall, leaving before the vote on the resolution.[10] What further escalated the conflict situation between Russia and the CoE was the fact that in 2017 Russia suspended its payment to the Council of Europe (a payment which is mandatory for every member state of the Council of Europe for the progress of the organization).

"Since we are not allowed to take part in decision-making, we think it is our right not to pay," commented Vyacheslav Volodin Speaker of the State Duma.[11] This situation was understandably difficult for the Council of Europe as Russia is one of the main donors to the organization's budget. According to her, the resumption of payment would take place only if the Council of Europe agreed to completely abolish the mechanism of imposing sanctions on the delegations of member states. All this was totally contrary to Article 3 of the Statute of the Council of Europe, for the spirit of cooperation that should exist between the member states and the Council itself. Such claims, with a boldness of demands, do not jeopardize Russia's credibility if it really wants to be part of the Council of Europe or wants to downplay and underestimate the CoE role in the international arena. This is considering that the opposite should happen, as Russia as a member of the Council of Europe should strengthen its support for the Council's policies and not fight them.

As a result of all the situation we just mentioned, we can conclude that the Committee of Ministers could request the removal of the Russian Federation from the organization, as long as it for years refused to contribute to its obligations as well as implement the resolutions and the Statute of Council of Europe. These obligations follow every member state with their membership in the Council of Europe. But is this the right choice for the situation?

We have two sides to the coin. The first which demonstrates to us that the Council of Europe should have acted against the Russian Federation and that non-reaction leads us to assess the veracity and credibility of the organization. But on the other hand, if he had acted and removed the Russian Federation from the Council, he would have openly admitted that he could not cooperate with a

[6] Pomeranz, William E. "Uneasy Partners: Russia and the European Court of Human Rights." Human Rights Brief 19, no. 3 (2012): 17-21
[7] Parliamentary Assembly, "PACE strongly supports Ukraine's territorial integrity and national sovereignty", 03/07/2014.
[8] Press Release - Parliamentary Assembly,"Citing Crimea, PACE suspends voting rights of Russian delegation and excludes it from leading bodies", April-2014.
[9] Ibid.
[10] The Guardian, Hardin L. "Russia delegation suspended from Council of Europe over Crimea" 04/10/2014
[11] The Federal Assembly of the Russian Federation, "Chairman of the State Duma spoke about the need to return money paid to PACE by Russia", 02/01/2019.

member state. And so, it would equally damage its reputation as an organization and its strength in the international arena was called into question. Although the organization is not responsible for the reactions of member states, it remains responsible for the way it will react when faced with such a conflict situation.

3. Consequences of the Russia-Council of Europe conflict

The Council of Europe was hit by a budget crisis and was forced to freeze some of its projects as well as change some procedural rules.[12] What strikes me from this analysis is the fact that the Council of Europe is financially fragile and and at any moment it can cease to exist if the states which have the largest contribution to the budget withdraw. This situation clearly shows the need for the Council of Europe to cooperate with its member states or not, for the continuity of the organization and the mission of its creation. Moreover, the damage caused due to non-payment of obligations by Russia goes further than it seems. This is due to the fact that the already limited budget and in crisis makes no progress. The budget is thus used only for existing projects and work, to monitor and report on what has already been achieved by the Council of Europe and its continuation, and nothing new and evolving for further progress.

As it is known, Russia returned again after a vote in the Assembly.[13] The Parliamentary Assembly of the Council of Europe decided in June 2019 through a resolution that: “the rights of CoE members to vote, to speak and to be represented in the Assembly and its bodies will not be suspended or withdrawn in the context of a challenge (threat) or review of credentials.[14]
From this we conclude that the Resolution was drafted in a way that did not specifically mention Russia, as it emphasizes the rights of members to vote and speak, and not to suspend their membership, but that directly affects Russia in this moment of conflict between them; which is undoubtedly in its full interest. Which makes you reason that it was run as a decision for Russia. The Council of Europe, if it is to maintain its credibility, cannot allow a country to violate the rules laid down by it through the Parliamentary Assembly, to threaten, and then to return without explaining any reason that led to the conflict. However, on the other hand it is likely that financial concerns motivated the decision to allow Russia to return. So, apparently a strategy to make Russia part of it again (staying at peace with it), but also setting a precedent which is quite dangerous for the Council of Europe.

This is because other countries with financial power for the Council of Europe can threaten to leave the organization to meet some possible requirements or conditions that they want to meet. Certainly in this way the organization jeopardizes the purpose of its creation and loses credibility in the millions of people who need its existence and functioning. The suspension or expulsion of a CoE member state from the organization is a very serious measure and hits the sanctioned state hard, which can lead to serious international debates as the goal of the organization is international peace and security of states. But, on the other hand, the non-reaction of the Committee indicates its inactivity and the result goes directly into question on the credibility and authenticity of the Council of Europe. The transparency required in this case for this non-reaction has never been done by the Committee of Ministers and this may raise doubts. However, the challenges of the future are directly related to Russia’s conflict with Ukraine and the issue of Crimea, making coexistence in this organization difficult. Questions are raised about the continuation of the Russian Federation's membership in the Council of Europe. Following the recent events of 2022, the situation of the Russia-Ukraine conflict goes beyond the importance of membership in the Council of Europe and a diplomatic solution is still possible.

4. Conclusions

The most serious dilemma confronting the Council of Europe is directly related to its conflict with Russia. The Council of Europe was forced to choose between two dangerous and unfavorable options. The first option and risk is associated with Russia's decision to accept its terms of readmission, thereby "betraying" its principles and values. The second option and risk is related to the choice of Russia to leave the organization permanently due to the violations committed and threats against it, which puts in total danger the existence of the organization due to the importance of the financial contribution of the Russian Federation to the Council. Placing a balance between these two dilemmas is extremely difficult to find a solution to, but can be jeopardized for the common good. For that, Russia must be a part of it. If Russia leaves the Council of Europe, it will remove a tool for millions of its citizens to protect their rights and freedoms and reduce attention to violations that may occur within the country. The Council of Europe, always intervening to avoid and prevent violations by Russia, is carrying out its mission, but does this not call into question the will of the Russian Federation?

[12] Parliamentary Assembly of CoE, “Modification of the Assembly’s Rules of Procedure: the impact of the budgetary crisis on the list of working languages of the Assembly” 03/16/2018
[13] The Council of Europe's Parliamentary Assembly voted 118 in favor and 62 against restoring Russia's voting privileges, which had been banned since 2014. Regardless of the majority, it is clear that a big number of countries were opposed to Russia's conduct, regardless of their policy or relation with Russia.
[14] PACE,” Strengthening the decision-making process of the Parliamentary Assembly concerning credentials and voting”, Resolution 2287 (2019)

The solution to any problem that has arisen is and should be open dialogue between states. What should have been done is as follows:
- Tougher sanctions against Russia and intolerance of revolts within the Assembly without a sanction. The organization must follow the rules outlined in its own statute.
- Readmission to the CoE of Russia to ensure the protection of its citizens, but accompanied by a warning about the risk of membership in case of recurrence of conflicts of this nature.
-Perhaps, what is needed for the CoE is to strengthen its procedural policies of membership and expulsion from the organization. In order for any state that joins or aspires to leave it, to think much better about the consequences that will accompany it.
Conflict situations, various dilemmas and assumptions about possible solutions lead to the conclusion that the truthfulness, credibility, effectiveness of the Council of Europe will always be a question mark, as long as its focus and importance is high.

The role of the Council of Europe is much debated after the conflict with Russia, so to overcome the current crisis in relations between Russia and the CoE one had to think beyond what was already known. The future must be about restoring CoE authority. Restoring and increasing its impact. Increasing the role in discussing and solving all the priority problems that concern all countries of the continent. It must fight for the credibility of the millions of people in need of it and its aid routes, to become more resilient and powerful in the face of possible new crises. To focus together with its member states on the common good "the well-being of the citizens of these states and the protection of their rights", in order to expect a secure and better future for future generations.

Nomenclature

CoE Council of Europe
ECHR European Convention of Human Rights
PACE Parliamentary Assembly of the Council of Europe

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Venezuelans on the Move: Seeking for Public Policies that Address the Migration Crisis[1]

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Abstract

For obvious geopolitical reasons, the European public discourse and interest in recent years has been strongly concerned by migration originating from the Middle East and currently from Ukraine. At the same time though, much less attention has been paid to Latin America, where the whole region has been hit hard by the Venezuelan refugee crisis since 2014, soon getting ahead of Syria in terms of the number of people displaced outside their country of origin. Venezuela's economic, institutional and political instability has led to mass exodus of Venezuelans; according to the latest figures, some 6 million people from Venezuela have fled their homes in search of more secure conditions and livelihood, 84% reside within the region. The countries most affected include Colombia, Peru, Ecuador and Chile, all striking to reach a balance between the obligation to provide assistance, while strictly regularizing and legalizing their statuses, noting that most of them arrive on an irregular basis. The research focuses on the enlarging migration crises caused by the situation in Venezuela, and the responses of the destination countries that are struggling the most with the influx (Colombia, Peru, Ecuador and Chile). The research seeks to answer questions such as; how do affected countries in the region approach the challenges of mass Venezuelan immigration, and what public policies are implemented by the local governments to address the phenomenon that is exacerbated by the COVID-19 pandemic

Keywords: Venezuela, migration crisis, refugees, Colombia, Peru, Ecuador, Chile

1. Introduction

"Never in our history in Latin America have we faced such movement of people out of a country that was one of the richest in the region and a country that is not at war," said Eduardo Stein, special representative of the UNHCR, and the International Organization for Migration (IOM) (The Guardian 2021). His words outline the seriousness of the phenomenon that the Latin American region has been facing, experiencing an unprecedented Venezuelan exodus since 2014, as a result of a severe political and economic crisis under Venezuelan president Nicolás Maduro. More than 6 million have fled their homes in search of more secure conditions and livelihood, most of them (84%) residing within the region (RMRP 2022). The Venezuelan exodus has put increasing pressure on Latin America's system of free mobility, and governments reacted in different ways to the influx. The countries most affected include Colombia, Peru, Ecuador and Chile, this paper thus focuses on the aforementioned four countries' policy responses, seeking to answer questions such as: how affected countries approach the problem and challenges of mass Venezuelan immigration, and what public policies are implemented by the local governments to address the phenomenon.

The paper begins by embedding the focus in the context of the region's migration landscape and regulations, then it contextualizes the Venezuelan crisis to have a deeper insight into the motivation of people escaping the South American oil country. After introducing the main policy responses and measures taken by the governments of the selected countries to address the increasing migration pressure one by one, a comparative analysis is presented. The analysis is supported by the latest figures available on R4V platform and national statistics and it takes into account the recent and current state of national policies and regulations.

The topic is of great relevance, given that the situation is unchanged in Venezuela under the Maduro regime ("frozen crisis"), migration is expected to continue in the future, in fact, it is predicted to increase one and a half times in a single year. The policy responses of some Latin American countries to be highlighted in this research and their experiences with mass immigration can be truly instructive to other governments in the region, as well as to those facing similar challenges in Europe. Although the volumes

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and/or the context may be different, it may help to formulate public policies and establish common good practices and encourage international cooperation.

2. Changes in the Migration Landscape and the Regulation of Migration in Latin America

The migration landscape of Latin America has undergone profound changes in recent decades in terms of direction, intensity and composition of migratory flows. What is seen is that Latin America has transformed from being an immigrant receiving region to one that let go of a huge emigration population, that tend to reside within the region. The real dynamics of immigration started after independence, the age of mass migration, from the 19th century, when Latin America has received a large number of international migrants, some 29.5 million (Durand – Massey 2010; Jancsó 2021). Although, the most attractive destination on the continent was apparently the United States, while Latin America being only an additional landing place for many, the countries of the region had an "open door" for immigrants. Trying to encourage inflows and to facilitate the resettlement, various laws and regulations were created with measures that included granting citizenship, tax exemption or exemption from military service among others (Jancsó 2018). The first immigration laws were the ones of Chile (1824) and Venezuela (1831), followed by the other countries in the middle of the century, elsewhere a few decades later. These policies were liberal in most of the countries, however they preferred 'white' immigration from northern and western Europe. Nevertheless, groups of different religions and nationalities came from Asia, Africa and Europe, having a significant impact on the society and culture of these areas, turning the region to be a place of diverse people, with new mixtures of races and cultures (Durand – Massey 2010).

However, what is essential to be noted in terms of this immigrant-friendly image of Latin America characterized by supportive, pro-immigration government policies, is that it underwent major changes since the first decades of the 20th century. An opposite attitude of the 'proactive approach' emerged in the political behavior, one with anti-immigration sentiments. It is not surprising though, since the number of migrants has increased at an unprecedented rate all around the world to this point (281 million international migrants in 2020), thus considerable efforts have been made to control the movement of people across state borders (Bertossi 2008). In Latin America, after decades of unrestricted migration protocols, by the last third of the century, several conditions for immigration were laid down (being healthy, receptive, fertile) and even lists of undesirable persons appeared in the text of laws and regulations (criminals, vagrants, fools, barbarians or unwelcomed groups as Asians or Gypsies) (Jancsó 2018). The necessity for regulations and additional administrative barriers (e.g., raising settlement taxes) arose due to emigration of European masses after World War I. emerged and these new waves appeared in even larger scales as a result of the US's restrictive measures, enacting immigration quotas.

The Great Depression of 1929-1930 had further challenged the continent's immigration policies, with extensive restrictions imposed in all countries as a result of the economic recession and emerging unemployment. In some cases, governments even banned immigration altogether. Along this way, by the postwar period, the region saw the onset of change in the direction of migratory currents as it ceased being a place of destination for immigrants from overseas and became a sender of migrants to distinct places of the globalized world. It became characterized by undersized inflows from Europe with much more sizable outflows from various countries of the region. From this time on, three fundamental migration processes have been characterizing the region: 1) Transatlantic and transoceanic migration, 2) South-North migration, and 3) Intra-regional migration. The latter one includes the flows of the Venezuelan migration crisis, which has been one of the biggest challenges of LAC.

Considering the migration trends of the selected countries, Colombia stands out with its tight links of Venezuelan-Colombian migration relations. Historically, Colombia was characterized by high levels of emigration, with Venezuela being one of the main migratory destination for its nationals. Economic migration – as a result of the oil boom – and refugee migration – owing to FARC and other guerilla groups – was also present during the second part of the 20th century from Colombia towards Venezuela. Colombia's migration profile today is very complex; it is not only an origin country, but a destination, a return, a transit, and it takes part in circular migration as well. Around 2000 Venezuelans are crossing the borders day by day (UN 2021), most of them staying in the first secure country, not moving onward once they arrive in Colombia.

Peru, also with a complex migration profile, hosts over one million displaced Venezuelans, a substantial increase from 7,000 in January 2016. At the same time of being a receiving country, it is a transit state as well, since on average 30% of Venezuelan migrants entering Peru are in-transit to Chile or to other countries in the region (RMPR 2022).

Ecuador, on the one hand is a country with 6,7% of its population living abroad, while on the other hand has been one of the largest recipients of refugees in Latin America. It welcomed Colombians displaced by a decades-long civil war, while most recently Venezuelans are also entering the country. 96% of Venezuelans state that their migratory route ends in Ecuador; while 2% continues to Peru, 1% to Chile, and less than 1% returns to Venezuela (IOM 2021).

Chile, one of the wealthiest nations in South America with the highest proportion of foreigners (7,8%), is (also) characterized by solidarity in relation to Venezuelans, since many Chileans fled to Venezuela during the Pinochet dictatorship. In 2020, the largest share of immigrants in Chile originated from Venezuela, with more than 30% being Venezuelans (INE 2021). Another large group of foreigners in the country (12,5%), illegal immigration of Haitians provoked the restriction of policy reactions in Chile, which affected the welcoming of Venezuelans too (Thomázy 2020).

3. An Overview of the Venezuelan Crisis

3.1. The roots of the Crisis

From the 60's to the early 21st century the republic was one of the most democratic and politically stable state in Latin America, and it developed into the richest country in the region, the destination of thousands of immigrants. Its economy benefited from a thriving petroleum industry that capitalized on the world's largest known oil reserves. In addition to the increase in oil production and export volumes, the state's international role also increased when it became a founding member of the International Organization of Petroleum Exporting Countries (OPEC) in 1960. The country was in an oil euphoria, when its oil production reached an all-time high in 1970, producing 3.8 million barrels per day (BPD). Even through former Venezuelan Oil Minister and OPEC co-founder Juan Pablo Perez Alfonzo, as a "prophet" warned that „Ten years from now, 20 years from now, you will see, oil will bring us ruin," (Useem 2003) the government was not aware, blindly believing in the black gold.

However, only a few decades later we are facing a country struggling with a massive political, economic and social crisis, with pervasive problems, such as hyperinflation, chronic shortages of food and medicine, closure of businesses, high unemployment, deterioration of productivity, authoritarianism, human rights violations, all resulting many to leave their homes in search of better opportunities and safe life circumstances. Being aware of the contemporary Venezuelan situation, the question arises, how such a catastrophe on a historic scale could arise? To unfold the complexity of the current crisis a short history outline is needed.

The uncertain and dangerous stance of Venezuela in the world has become evident from the second decade of the 21st century as a result of poor governance and mismanagement of oil revenues of the controversial rule of revolutionary leader Hugo Chávez, and his successor, Nicolás Maduro's increasing authoritarianism, combined with a significant decline in the fortunes of Venezuela's petroleum industry and the inclusive dependence on oil prices. After Chávez was elected, – perhaps the most controversial 'populist' and pink tide figure in contemporary Latin America (Zúquete 2008) – he focused on enacting social reforms, including the so-called Bolivarian missions, as part of the Bolivarian Revolution, all financed from oil revenues. It obviously made him very popular after such governments that were forced to take very unpopular measures (starting with Carlos Andrés Pérez) such as radically curtailing welfare spendings in return for IMF loans. Chávez intervened significantly in the economy, and though he understood that the transformation and diversification of the economy was needed, with the reduction of oil dependence, he failed to meet his promise.

Chávez's social support was founded in his welfare policy successes, funded by petrodollars, that had valuable results; such as improvements in areas like poverty, literacy, income equality and quality of life. Social spending doubled from 11.3% of GDP in 1998 to 22.8% of GDP in 2011 (Johnston – Kozameh 2013). Poverty and unemployment decreased; in 1999, 14,5% were unemployed and 23.4% of the population were recorded as being in extreme poverty, the latter fell to 8.5% in 2011, while unemployment also dropped to 7.6% in 2009 according to official government figures (The Guardian Data 2016). However, the government continuously overspent on social spending and was careless to allocate enough money for any future economic turmoil. Another pillar of the problem was that in the wake of remarkable results, bureaucracy has proliferated. The profits of the oil industry have been lost to corruption and overambitious foreign policy, and at the same time political clientelism has been built with excessive leadership.

Chávez's main program, the so called "bolivarianism" was longing for national and economic independence, the guarantee of political sovereignty, and the creation of a direct participatory democracy based on the will of the people, coupled with anti-imperialist, anti-capitalist, and anti-neoliberal rhetoric (Hegedűs 2019). In order to reach independence and sovereignty, he often used his oil supremacy, and – in the name of Bolívar, through the idea of uniting the region – he also promoted regional integrations (such as ALBA and CELAC) wishing to increase autonomy from the U.S. and European governments. Meanwhile, he was also looking for global partners – Russia, China, Iran – with whom he intended to strengthen himself primarily against the United States. The aforementioned ties are the ones being tested today for the survival of Chávez's 21st century socialism.

After Chávez's unexpected death in 2013, ending his nearly one-and-a-half-decade presidency, Nicolás Maduro followed in his position, however with much less charisma. The new government inherited a country that had already lived its golden age, and by the means of the system contradictions coming into the surface, it had become more and more apparent what Chávez had left for the country. While in 2012, the price of crude oil per barrel was at an all-time high of $109.45, after the worldwide oil price collapse in 2013, from 2014 it began to fall, only stopped at $40.68 in 2016 before slightly recovering (Statista 2022).[2] This trend made it clear that black gold alone will not solve Venezuela's problems anymore. The degree of oil dependency has been steadily rising and by 2019 Venezuela's oil revenues accounted for about 99% of export earnings (OPEC 2021). The whole system was depending on – a fundamentally uncontrollable factor, – the world market price of crude oil that had drastically dropped in the beginning of Maduro's

[2] Also, no substantial developments have taken place in the oil industry, thus infrastructure and technology had become increasingly obsolete. The amount of oil extracted has also decreased significantly.

presidency. This trend has launched an economic chain reaction that led to the current economic and humanitarian crises. While the declining economy undermined Maduro's social support, his political legitimacy has been also challenged.

The continuous irrational economic policies and the inability of the government to deal with the so called "Dutch disease" – not only of Chávez and Maduro, but all the irresponsibility leading governments since 1958 – has questioned the sustainability of Venezuela's economic and political system in its entirety. After all, the question has not been whether the system will collapse, but that when it will do?

3.2. The Current State of the Political and Economic Crises

Although Nicolás Maduro, head of the Venezuelan United Socialist Party (PSUV) had won the 2018 presidential elections (by 67,8%), the fairness of the elections was highly questionable for fraud, thus several countries moved to recognize Juan Guaidó as interim president (U.S. Argentina, Chile, Colombia, Brazil, Canada, Germany, France etc.) from the beginning of 2019. However, with the December 2020 parliamentary elections, where the coalition of the left and its allied forces won more than two-thirds of the seats in the National Assembly, the government gave another reason for sharp criticism from the international community; the EU, the U.S. and the OAS also rejected the result of the vote. At the same time, the president of the Assembly, Guaidó, has lost his constitutional authority in the absence of a mandate, – as he boycotted the vote – thus his previously accepted legitimacy has become controversial, creating a presidential crisis in Venezuela.

Following previously failed negotiations, in 2021, the government and the opposition held two rounds of talks in Mexico. The opposition sought to improve election conditions and wanted to guarantee the release of political prisoners, as well as the influx of humanitarian aid and COVID-19 vaccines, while Maduro's allies called for the lifting of sanctions brought in by former U.S. President Donald Trump that have hit Venezuela's economy hard since 2019. In fact, Washington made the lifting of the imposed sanctions conditional on the announcement of free presidential elections as soon as possible and the resignation of Maduro. The South American administration, although was initially surprisingly open to the Caracas-Washington dialogue after Biden's election, rejected the demands. After the regional and local elections of 2021, the PSUV ensured even bigger success than in 2017, further consolidating the power of the „son of Chávez".[3] However, the willingness to vote was low (41%), which again indicates the declining social support of the Chavismo.

While political stability is more than doubtful, the economic circumstances of the Venezuelan society have been worsening day by day. Venezuela's gross domestic product (GDP) has further decreased by 5% in 2021, after 30% last year, according to the IMF. Meanwhile, the unemployment rate rose from 55.5% last year to 58.3% this year and expected to further surge to 60.1% in 2022, according to a Washington-based organization (IMF 2022). The budget deficit is significant, and the government debt-to-GDP ratio is already well above 300% (Statista 2021). Accumulating credit, mismanagement, systemic corruption, and the US sanctions against Venezuela, – which is putting significant pressure on the country's most important pillar of the economy, the oil industry and the financial sector, – have led to the collapse of Venezuelan oil production. According to OPEC, Venezuela produced only 527,000 barrels of oil per day in September 2021, corresponding to an 82.9% decrease in oil production capacity compared to 2013 levels (Ramirez 2021). In order for emissions to increase, new wells and infrastructure upgrades are needed.

Due to fearsome hyperinflation, a total of 14 zeros have been cut from the national currency over the past 13 years. By 2022, the IMF is announcing a further 2,000% rise in consumer prices, which is certainly unsustainable with a minimum wage of $1.87 a month (OVF 2021). 94.4% of households are malnourished, and after reporting losing on average 11 kilograms in body weight (Sequera 2018), the population that are living in extreme poverty – three out of four Venezuelans – have reduced their food consumption by a further 6.6% compared to 2020 (ENCOVI 2021). Poverty has also exacerbated social inequality. 10% of Venezuelans retain 40% of the national income (Singer 2021). According to the government's narrative U.S. sanctions are responsible for poverty and virtually all of the country's troubles. Even though the embargo does worsen the economic situation, the problem – as it was elaborated in the previous chapter – is much more the result of a flawed economic policy of domestic origin and primarily based on oil dependence. Besides the embargo, the COVID-19 pandemic has also deteriorated opportunities. Venezuela's vaccination campaign is behind most countries in the region. The government is (supposedly) using every possible source to fund vaccinations, let it be it frozen funds, gold or even oil. Economic growth in the future will depend heavily on the epidemic, but challenges to treating COVID-19 include a weak health care system, an exodus of skilled health personnel, and an unreliable power and water supply.

Domestic power relations are strongly determined by the fact that the military, special forces and police are on the side of Maduro, having no interest in a regime change, as they have been deeply embedded in the state bureaucracy and various illegal activities ever since the presidency of the late Hugo Chávez. As for Venezuela's 21st century foreign relations, they are characterized by cooperation with states traditionally in conflict with the United States; Cuba, Iran and Turkey, and Venezuela's two largest creditors, Russia and China. These actors have an interest in the survival of the current government – at least for the time being – so their goal is to at least

[3] It is an interesting turn that the President of Cuba congratulated his close ally on the victory even before the official results were announced (BBC 2021b).

keep the suffering country breathing (Pál 2018). Although Latin America is famous for its oversupply of regional integrations, it is also clear that the international community remains divided on how to respond to the Venezuelan crisis and the scenarios it sees for resolving it. For instance, we suspect the deficiency of the Lima Group – formed in 2017 to guarantee the peaceful resolution of the Venezuelan crisis with the signing of 12 Latin American nations, – with Argentina announcing its departure in March 2021, undermining the regional bloc's policy of isolating Venezuela, saying it "led to nothing" (Reuters 2021). Meanwhile, Maduro's anti-imperialist rhetoric that constantly blames external interference is, in fact, working, and in the case of sanctions, it is not entirely unfounded, as economic pressure is indeed a kind of intervention tool (Városi 2021).

Although the eventual fall of Venezuelan socialism is expected, it seems that neither the U.S. nor the economic crisis nor the epidemic could force the country to its knees (Vogel 2021). However, if the illegal system seems to be well adapting to the new circumstances created by diplomatic and economic pressure, the question arises as to whether the sanctions are effective. In the face of further U.S. sanctions, the Venezuelan economy in short time suffers such catastrophic damage that it will be terribly costly to repair – if at all future recovery is among the goals set. What is for sure is that the priority of dealing with the humanitarian disaster must be recognized by the international community, otherwise the emigration rate of the country of 28 million will continue to rise, which could destabilize the region as a whole.

3.3. Humanitarian and Refugee Crisis

Venezuela used to host thousands of emigrants from the region and other parts of the world. However now, as the result of the political, economic and humanitarian crisis, massive migrant flows are leaving Venezuela; more than 6 million have fled their homes since 2015 in search of safer conditions and livelihoods. Reasons for their migration include violence, insecurity, lack of employment and opportunities, as well as food, medicine and other services. Out of these 6,041,690 million emigrants, 84%, almost 5 million Venezuelans stay within the region. The countries most affected include the neighboring Colombia (1.8 million) as primary destination, – which accepts 30% of refugees, – Peru (1.3 million), Ecuador (500,000), Chile (450,000) and Brazil (260,000) (R4V 2022). Reports notes that, before the arrival of the pandemic, about 5,000 Venezuelans fled their country daily (OAS 2020). It has become the largest external displacement crisis in the region's history. The OAS estimates that by 2022, the number of displaced people will reach 7 million, already exceeding the number of Syrian refugees. Nevertheless, the Venezuelan refugee crisis is the most underfunded in terms of international aid. The Syrian exodus ($20.8 billion) has received nearly fifteen times as much funding as the Venezuelan community ($1.4 billion) (Bahar – Dooley 2021).

Figure 1. Venezuelan refugees and migrants in the LAC region

Source: R4V 2022.

Some Venezuelans cross the border temporary, to return with urgently needed food and medicines, while many families want to settle permanently either crossing to the neighboring Colombia or Brazil, or transiting to third countries such as Peru, Ecuador or as far as Chile. The majority of Venezuelan migrants arriving in these countries are families with children, pregnant women, elderly people and people with disabilities. Often obliged to take irregular routes to reach safety, they walk hundreds of miles as "*caminantes*", and are likely to fall prey to smugglers, traffickers and irregular armed groups (UNHCR 2022). In fact, they are in immediate need of documentation, protection, shelter, food and medicine.

Border closures due to the pandemic stalled migration for a while, but since the borders reopened, thousands of people have been leaving in hurry every day. However, many had to return after losing their jobs abroad in the wake of the pandemic. (For instance, 37% of Venezuelans in Colombia lost their jobs (López Villamil – Dempster 2021). Shortages of fuel, electricity, and clean water have sparked riots and left many migrants with no choice but to flee again.

We have seen exemplary solidarity, hospitable spirit in receiving countries, however the influx from Venezuela has also caused tensions in host countries, especially that waves of demonstrations and social unrest has been evident throughout the continent especially since 2019.

4. Policy Responses to Address the Venezuelan Influx

First of all, there is a fundamental legal and policy dilemma; whether the Venezuelans leaving their country shall be considered as refugees? According to the 1951 Geneva Convention, refugees are those who must flee their country "owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion". Along these lines, most of the Venezuelans do not fall within this definition as they make their decision to emigrate rather owing to the collapsing economy, the complete devaluation of the local currency, food and medicine shortages and catastrophic public security. However, the Cartagena Declaration (1984), Latin America's own regional asylum convention operates with a broader definition on refugees, under which the deprivation experienced by Venezuelans, the serious disruption of public order and the systemic violation of human rights are to be considered "valid reasons" which could, in principle, provide a legal basis for seeking international protection (Soltész 2021). It is another question, however, of how politically desirable and feasible it is for host countries to grant refugee status to hundreds of thousands of Venezuelans. Many Venezuelans who would meet the criteria do not register for refugee procedures and instead opt for illegal or alternative legal forms of stay, which are easier and faster to obtain and allow access to work, education and social services – at least for the short term (UNHCR 2022). Countries of LAC started to issue permanent residence permits to Venezuelan immigrants. The essence of these permits has been its temporality, meaning that governments consider the stay of Venezuelans only to be a temporary state, expecting them to return, and are interested in resolving the Venezuelan political situation as soon as possible.

Virtually every South American citizen was free to travel within the continent without a passport and visa – in possession of an ID card –, as well as the right of entry and residence was granted to Venezuelan citizens in all South American countries. However, the emerging Venezuelan exodus has put increasing pressure on this system of free mobility. As a result, since 2017, several LAC countries (such as Panama, Honduras, Guatemala, Peru, Chile, Ecuador, Dominican Republic, Mexico etc.) have stopped providing visa-free access to Venezuelans and reinstated visa requirements for those seeking to enter these countries. Also, as a consequence of the COVID-19, from March 2020, LAC countries have taken restrictive measures in order to freeze the spread of the virus. Borders being closed, illegal migration increased, and Venezuelan migrants continued to use irregular routes for entering host countries in the region. Hundreds of thousands of Venezuelans have remained without any documentation or permission to stay regularly in nearby countries, thus lacking guaranteed access to basic rights. This makes them particularly vulnerable to labor and sexual exploitation, trafficking, violence, discrimination and xenophobia.

As for the international cooperation and assistance, the IOM migration agency and the UNHCR, UN refugee agency have a truly active role in solving the situation. The Regional Intern-Agency Platform for Refugees and Migrants from Venezuela – R4V was created for the coordination of funds and international aid, as well as the Regional Refugee and Migrant Response Plan (RMRP 2022)[4] has been set up in order to strengthen protection of migrants' rights, improve access to services, and expand integration opportunities.

Receiving countries have had already almost five years to set up their policy responses in order to control and help immigration of Venezuelan nationals. In fact, Venezuelans have already spent multiple years in their host countries, thus their needs go beyond immediate life-saving interventions, and include access to asylum and regularization, longer-term protection, self-reliance and integration (RMRP 2022). In the forefront of exceptional efforts and public policy initiatives stands Colombia.

4.1. Colombia

[4] The RMRP 2022 brings together UN agencies, international and national NGOs, members of the Red Cross movement, refugee- and migrant-led diaspora organizations, academia and faith-based organizations, working together with host governments, local communities, donors and refugees and migrants themselves.

Colombia hosts more Venezuelans than any other country, more than 1.8 million migrants, out of which more than half (56%) has been undocumented, meaning that they have trouble accessing essential services and getting work. The Colombian government had to realize that Venezuelan migrants – whether through legal or illegal channels – will keep coming and are likely to stay in the country,[5] therefore what they need to do is to prevent Venezuelans from falling into an irregular status and facilitate their integration. Thus, the Colombian government made the decision to address the challenge with a proactive approach, acknowledging it as an opportunity for economic, social, and cultural growth for the country and act along its Constitution that states; "*Foreigners in Colombia shall enjoy the same civil rights as Colombians*" (Article 100). It has been addressing the migration crisis through resolute and human-centered government action, with bilateral solidarity, aiming to reduce informality (Muñoz Gómez 2020). The government have created the Comprehensive Migration Response Policy Agenda, along which they highlight Regularization, Identification, Communication, Intergovernmental coordination, Financial support and Digital & IT support; and such pillars for Venezuelan right and responsibilities as access to health, education and to welfare & protection to vulnerable groups, economic integration and citizen security.

Having a look at the policy responses and main measures taken by the Colombian government, we see great creativity in their initiatives. First of all, the government created the so-called Return Law (2012), which benefited Colombians returning from Venezuela as a result of the recession. In May 2017, they announced to issue the Border Mobility Card **(***Tarjeta de Movilidad Fronteriza,* TMF), which is a transit document for those who live near the Venezuelan-Colombian borders, for crossing the borders for max 7 days, thus facilitating circular migration. The issuance of the Special Stay Permits (*Permiso Especial de Permanencia*, PEP) was happening in several rounds, over and over, expanding the range of the eligible. It granted renewable legal status for 90 days (max 2 years) to Venezuelans who had entered the country and the permission to work. The Temporary Transit Permit (*Permiso de Ingreso y Permanensia de Tránsito Temporal,* PIP-TT) is strictly a transit document to foreigners who need to transit through Colombia either to take a connection returning to their country of origin or going to a third country (max. 15 days). Furthermore, in January 2020, so-called Special Permanence Permits for the Promotion of Formalization were started to get issued (*Permiso Especial de Permanencia para el Fomento a la Formalización*, PEP-FF), which allows Venezuelans in an irregular situation with a formal job offer to regularize their status. This opportunity to apply for such cards and permits creates legal pathways for those who would otherwise cross the 2220 km long borders illegally. To be able to take the appropriate public policy measures, further information was needed on the migrants in the country; the Administrative Registry of Venezuelan Migrants (RAMV) was a process – realized in two (2) months, between April 6 and June 8, 2018. Another humanitarian policy measure was that Colombia offered citizenship to 24,000 Venezuelan children born in Colombia, – as they were refused to be given Venezuelan nationality by the Maduro government – thus avoiding statelessness and making it easier for them to access education and health care (Estoy en la Frontera 2019). The government was also trying to support their integration by the recognition of foreign certificates or by issuing Student Special Permits, as well as in June 2021, it declared the extended recognition (for ten years) of expired Venezuelan passports.

All these measures were necessary, however Colombia made a historic gesture on 8 February 2021, when President Ivan Duque announced that Colombia will grant protected status for the next 10 years (*Estatuto Temporal de Protección,* PPT) for Venezuelans who entered the country before 31 January 2021 both through official border posts and those who slipped across without registering. It will also be on offer until 1 July 2023 to Venezuelans entering the country through legal channels. It aims to legalize undocumented, irregular Venezuelan migrants, who register in the RUMV system (*Registro Único de Migrantes Venezolanos).* The statute will support the regularization of around 1.7 million Venezuelan refugees and migrants living in Colombia, facilitating their access to healthcare and legal employment opportunities. It will also allow Venezuelan migrants in Colombia to transition from a temporary protection regime to an ordinary migration procedure, giving them ten years to acquire a resident visa. It is considered that through this initiative, with the implementation of the PPT, Colombia has given "a license to dream" to Venezuelan migrants (BBC 2021a).

Anti-migrant sentiments can be experienced, as Venezuelans from time to time are blamed for lower wages, worsening working conditions, and rising crime – something that has been experienced in other receiving countries as well. As a result, Colombians' support for the welcoming policy has lessened (López Villamil – Dempster 2021). Meanwhile, the current administration draws attention to the fact that the measures they take shall not be governmental policy, but a state policy. PPT is indeed a policy that shows shifting from temporary to permanent measures. However, criticism was formulated from the side of the Colombian opposition, fearing that the status would give immigrants the right to vote, helping the current government in the 2022 general elections.

4.2. Peru

From Colombia, it is 32 days on foot to Peru, a destination for many Venezuelans crossing Colombia and/or Ecuador to reach the capital, Lima, – which is the main destination for Venezuelan migrants in Peru – where approximately 80% of the Venezuelans

[5] The borders between the two countries were officially closed between Feb. 2019 – Oct. 2021, unilaterally by Caracas, then from March 2020 till June 2021 because of the COVID-19.

migrants and refugees have settled due to employment opportunities and government services (Action Against Hunger 2019). At the peak of the wave, 90 000 Venezuelans immigrated to Peru in a single month (Vera – Jiménez, 2022).

In June 2018, Peru – as well as Chile and two months later Ecuador – started to request passports for Venezuelan entries – rather than ID cards. However, both exempted minors to enter, and Peru also exempted pregnant women and the elderly over 70 years old. As a result, entries decreased for a while, and even though a Peruvian judge found that it violates Venezuelans' freedom of movement (Gestión 2018), the government, from June 2019, subsequently required passports to enter (later not necessarily valid). However, in order to avoid illegal entries, the asylum system offered an alternative option for those without passport; they could immediately apply to asylum, so that they could enter the country without passport (Selee et al. 2019). This is the reason for Peru receiving the highest asylum claims among the four selected countries.

In order to regularize Venezuelan migrant population in the country, Peru has issued the Temporary Stay Permit (*Permiso Temporal de Permanencia,* PPT), which provided one-year legal status and work authorization to Venezuelans who entered Peru through legal channels before April 2017. It was in effect from 2017 to 2020. The government has since expanded the groups eligible for this permit several times. In 2018 administrative measures allowed Venezuelans to get work permits while they were waiting for their applications to be accepted, however these permits were often not accepted by employees (MPI 2019). After PPT, hoping that a new permit will have more scope and efficiency, the government provided another alternative regularization processes; the Temporary Residence Permit Card (*Carné de Permiso Temporal de Permanencia,* CCP) – besides the humanitarian residency permit, for asylum-seekers. The pre-registration process for renewed stay permits closed on 7 April 2021, until which deadline some 368,000 foreigners, mainly from Venezuela (98%), submitted their pre-registrations, including over 130,000 asylum-seekers (R4V 2021).

Some organizations though have seriously questioned the commitment of the Peruvian government to support the Venezuelan migrants with their policy measures. For example, the Amnesty International (2020) was noting that Peru has been unwilling or unable to adequately protect the rights and dignity of Venezuelans, while the Inter-American Commission on Human Rights (IACHR) released a statement expressing concern about the increasing military presence along Peru's borders (R4V 2021).

4.3. Ecuador

Originally, Ecuador has some of the most progressive human rights, migration, and asylum laws in the region, some provisions even exceed international standards for the protection of migrants and refugees (World Bank 2020). However, new regulations were implemented in Ecuador, as migrant waves started to increase in such degree that on August 27, 2018, more than 13,000 Venezuelans crossed the border into the South American country in 48 hours (Ibid). To curb the flows, visa requirements were introduced from August 26, 2019.

While declaring a national emergency in the area of human mobility, the government has started a regularization process in 2019 for Venezuelans who arrived before July of that year. The period to apply for the Humanitarian Visa (*Visa de Residencia Temporal de Excepción por Razones Humanitarias),* which facilitated access to social services for two years, ended on August 13, 2020, after which Venezuelan migrants already residing in Ecuador could no longer apply for a visa for humanitarian reasons. Further visa types and other categories of residence permits are available, however none of them was designed for the Venezuelan population without a valid passport not to mention that the costs exceed the budgets of many.[6] Similar to the Colombian RAMV census, the Ecuadorian government also created a registry system in order to put together an x-ray of the situation of Venezuelan migrants in Ecuador. Yet in 2022, out of the half million Venezuelans, around 62% are in an irregular situation, which makes them more vulnerable (El Universo 2022). The spread of the pandemic and restrictive measures worsened migrants' situation. The government granted vaccination to all refugees and migrants regardless of their status, which resulted better access to health care in this regard, but access to the formal labor market has not improved as 89% of Venezuelan migrants work informally (Riofrío 2021).

Although in mid-2021, the recently elected President, Guillermo Lasso announced a new regularization process that would allow Venezuelan citizens in Ecuador to legalize their migration status and work freely in the country, this step has not been made yet. Meanwhile Venezuelans residing in Ecuador without regularized status may be subject to a fine of USD 800 (the amount of two minimum wages) (Ibid).

4.4. Chile

Chile, even though it is to be reached from Venezuela only by crossing at least two other countries, has been a destination of choice for many Venezuelans. Before 22 June 2019, Venezuelans could enter Chile as tourists without visa requirements, however under the new provisions all Venezuelan nationals are required to obtain a visa at consulates (Colsular Tourist Visa) prior to their entry to

[6] The price depends on the type of visa (work, tourism, UNASUR, or study, among others), but the lowest value is $250 that has even increased to $450 lately.

the country, while their access to employment authorization and pathways to permanent residency was prohibited. Their alternative was to apply for a Democratic Responsibility Visa (*Visa de Responsabilidad Democrática* – VRD) that referred to the severe democratic crisis of Venezuela. It was valid for one year (extendable for extra 12 months) granting temporary residence permit, however the process needed a valid passport, a criminal history record, and it was too expensive for many (USD 50). For these reasons, this type of temporary residence visa tailored to Venezuelans did not meet previous expectations. Although many have applied, only 11% were accepted, due to the large percentage of rejection of applications and pending procedures (Thomázy 2021). In November 2020, the authorities stopped issuing VRDs, then a year later in September 2021, the Chilean consulate enabled the VRD request option again, although giving priority only to family reunification (parents, spouses and children).

Apart from VRD, there are other categories of temporary visas for foreign nationals – including Venezuelans, – (such as work visa, student visa, tourist visa etc.), but these also have a range of requirements, (such as having family ties to Chilean residents or having a professional degree) that many Venezuelans may not meet. At least, since May 2019, Venezuelan nationals are allowed to enter with expired passports or identification cards and are expected to regularize their status in Chile. However, the onerous application procedure of Chile's temporary residence visas has increased illegal forms of stays, rather than decreasing the phenomenon (Selee et al. 2019). Realizing this, the government has extended the validity date of expired Venezuelan passports, issued from 2013 onwards, until April 22, 2023.

In April 2021, Chilean President Sebastán Piñera signed a new migration law,[7] replacing the law dating from 1975. The new, unprecedented law urges deportations and makes it more difficult for migrants to adjust their status. Regularization is only possible to those who entered Chile through authorized checkpoints before March 18, 2020, when Chilean borders closed to curb the spread of coronavirus. Those who entered without authorization have a period of 180 days to leave the country, otherwise they could be arrested and deported en masse. Such deportation provisions are actually against international human rights laws in general, depriving foreign nationals the right to free movement, non-discrimination, as well as the right to request asylum. The government went on to declare that migration is not a human right, which was a big change compared to the policy of the previous government of Michelle Bachelet (Thomázy 2021).

Chile has already started mass expulsions. Between January 2018 and January 2021, 1,401 Venezuelans were deported without examination of their status or their consent, while other sources indicate that the Chilean government intended to expel 1,800 persons by the end of 2021 and has already scheduled 15 flights to do so (R4V 2021). As a response to these measures, UN migration agencies issued a statement expressing their concerns (OHCHR 2021), while apparently Venezuelans themselves are even more concerned with their distressed situation, as much as during the pandemic, some of them were too anxious to approach health authorities for the vaccination as they worried to get expelled from the country – R4V partners reported (Acosta 2021). The opening of all land border crossings will take place from May 1, 2022, which might again increase illegal entrances to the rich South American country.

5. Comparison of the Effected Countries

The mass exodus of Venezuelans has been unprecedented, turning the regions migration system upside down. By the beginning of this year, 2022, the R4V indicates some 1.8 million Venezuelans residing in Colombia, which is predicted to triple, reaching over 5.5 million very soon this year, out of which 4.8 million people are in need (RMRP 2022). These figures alone are a good indication of the seriousness of the situation, but the Colombian case is "just" the tip of the iceberg. A total of 6 million Venezuelans has left their country, which is expected to reach almost 9 million by the end of 2022. Predictions are also showing an immense increase in the case of Ecuador, where numbers might grow by one and a half times, while figures might show a 20-30% growth in Peru and Chile, hundreds of thousands of people in need (See Table 1).

Table 1. Venezuelan migrants' statistics

	Venezuelan migrants&refugees (Jan. 22, 2022.)	Projections for 2022.	People in need	Residence permits and regular stay granted (until Jan. 10, 2022.)	Pending asylum claims (until June 30, 2021.)	Recognized refugees from Venezuela (until June 30, 2021.)
Colombia	1 842 390	5 510 000	4 830 000	730 000	30 200	778
Peru	1 286 464	1 570 000	1 700 000	362 800	531 600	3 200
Ecuador	508 935	807 000	873 000	202 500	4 000	442
Chile	448 138	562 000	481 000	636 700	2 700	18
Total	6 040 290	8 900 000	8 400 000	2 624 317	952 246	186 832

Source: *own compilation based on R4V and national policies*

[7] Ley 21325; Ley De Migración y Extranjería por el Ministerio del Interior y Seguridad Pública

As flows were increasing, posing great challenges to governments, first Peru (June 15, 2019), then Chile in the same month and finally Ecuador in August responded by restricting inflows and started to request visa for Venezuelans to enter the country. All four countries require legal entry for Venezuelans, ie. all persons must enter or leave national territories through official migration control points, so that they are registered and regularized. However, due to such administrative entry requirements – the necessity of passports and different documents to apply for a visa, – irregular entries have been on the rise and will not decrease until such requirement continues to be in place (RMRP 2022). It is because the access of Venezuelan documents is extremely onerous and have become difficult to obtain due to costs, bureaucratic slowdowns, and sometimes political retaliation from the Venezuelan administration towards receiving countries as well as emigrating nationals. The real purpose of such tightened policies is on the one hand to curb the extraordinary inflows of migrants, and on the other hand to criminalize the entry of Venezuelans and provide a legal basis for their deportation. Chile has started deportations, but the other countries have also launched repatriation programs that seek to encourage Venezuelans to leave by providing one-time cash assistance and airfare (Soltész 2021). Since borders have been closed due to the COVID pandemic, it also increased irregular entries, which made it again necessary to regularize migrants within the national territories. The objective of such registries, in Colombia and Ecuador for instance, was to design and establish the most comprehensive public policies for the care of Venezuelan citizens residing in the country. In fact, countries were creative in many ways in their migration policies.

Table 2: Entry requirements for Venezuelans

	Colombia	Peru	Ecuador	Chile
Requires legal entry	yes	yes	yes	yes
Requires passport	yes (expired up to 10 years)	yes (6-month validity)	yes (6-month validity)	yes
Requires visa	no	yes, since 15 June 2019	yes, since 25 August 2019	yes, since 22 June 2019

The most asylum claims have been registered in Peru, where until June 30, 2021, some 3200 Venezuelans were recognized as refugees, while in Colombia (778) and Ecuador (442) much less was asylum an option for Venezuelans, even less it was in Chile (18). The aforementioned figures indicate the trend that – due to the underdeveloped asylum systems – instead of an asylum approach, the regulation of the entry and residence of Venezuelans has shifted towards the issuance of different special/temporary permits, while asylum has been largely inaccessible.

Peru was the first country in the region to issue a specific permit (PTP), then Colombia's PEP was similar, though the Peruvian permit lasted for a shorter period of time than the Colombian (one vs. two years), as well as it had a more limited access to public benefits, such as health care for instance, which was a huge challenge during the COVID-19 (MPI 2019). In Chile, the so-called democratic responsibility visa was introduced, while in Ecuador, the category of exceptional humanitarian visa has been the one to regulate the residence and employment of Venezuelans.

The country that demonstrated its commitment to support the migrant population from Venezuela the most was Colombia, granting protected status for Venezuelans. With the PPT, the government hopes to create a domino effect and other countries like Ecuador, Peru and Chile will follow suit. So did US President Joe Biden in March, fulfilling his campaign promise to grant temporary legal protection (TPS) to an estimated 320,000 Venezuelans, offering them work visa and 18 months of legal stay without deportation. In fact, migration patterns of the selected countries – Colombia, Peru, Ecuador and Chile – have reflected the reactions of their governments' institutional responses.

The socioeconomic profile of Venezuelan migrants varied across receiving countries, as well as over time within the countries (Vera – Jiménez 2022). The reports of the IOM Displacement Tracking Matrix (DTM) point out that Venezuelans who migrate to the Andean countries are less educated than those who migrate to Central America and the Southern Cone of America. In accordance, it is also realized that the first group realize their trip by bus, boat, and/or foot, while the latter group were able to make all or part of the trip by plane.[8]

Venezuelan refugees on the move, as well as receiving countries are in a desperate need for help and international aid, especially since their situations in the context of COVID-19 has worsened. Fleeing from crisis to crisis, an unusual "double-flow" of migrants has been precedented, with thousands of Venezuelans returning home. For such moves, migration corridors and isolation centers were opened, but these flows – largely uncontrollable (Acosta 2020) – just reinforce the desire of Venezuelans to meet with lenient, solidary and open-door migration policies in the receiving and transit countries.

[8] See Reports: https://dtm.iom.int/reports

6. Evaluation, Recommendations and Future Scenarios as Conclusion

This paper has given a comprehensive analysis of the policies towards the Venezuelan population on the move, highlighting the most essential measures of Colombia, Ecuador, Peru and Chile, although the policies taken by the host countries are not limited to the ones introduced. In fact, different policies are needed for such a diverse migration.

Governments of LAC in general showed notable solidarity, but migration has put significant pressures on institutions, service delivery systems, the labor market, and social dynamics in receiving areas. Research suggests that for ensuring long-term positive outcomes for migrant host countries, necessary measures include the regularization of the migrants' status, their labor integrate integration, and their basic access to public services (Selee et al. 2019). Yet, not all countries have taken such proactive approach in dealing with the influx, but rather had a reactive plan, viewing migration as a challenge that needs to be solved and implemented strict entry requirements. This attitude could be explained by the fact that these countries – with their already limited resources and infrastructure, – are experiencing an economic turndown as a result of the pandemic, while anti-migrant sentiments have also been precedented in the host communities with increased sporadic xenophobia, often accusing Venezuelans of poverty and unemployment.

However, seeing that the migration crisis will likely continue, it is time for the region to start to look beyond the immediate humanitarian situation, and shift from temporary to permanent measures. It has become evident, that Venezuelan migrants will not return to their homeland in the short term – until the Caracas situation is solved – thus policymakers need to create legal pathways for the migrants to facilitate their full and swift integration.

The Colombian policy approach has been exceptional, distinct from that of other countries in the region such as Ecuador, Peru and Chile, which have enacted barriers to migration. Meanwhile, the creation of temporary permits in all four countries has helped ensure that many Venezuelans have some sort of legal status. Yet some of these measures have significant shortcomings in terms of coverage, permanence, or the access of public services they allow. For instance, seeing the high unemployment and informality in all countries, the private sectors should be more involved in policy considerations, promoting the benefits of hiring Venezuelans and expanding financial service. Also, women should be explicitly targeted with policies to support childcare and family responsibilities, as 67,6% of those in need are women and children (RMPR 2022). Another problem is that barriers to entry tend to empower migrants' smugglers and human traffickers. Such alternative means to enter the destination countries outside of legal channels is often the only choice of the already vulnerable population, who is willing to put their lives at risk.

The responses to the migration flows are extremely essential, however, the region and the international community need to focus on the roots of the crisis, the political situation of Caracas that gives rise to the challenges in the first place. Otherwise, if migration continues to such an extent, and the crisis is purely addressed, Venezuelan migration will put regional security and political stability at risk. Learning from past mistakes, there is a consensus that an urgent and complete change in economic policy is inevitable for the oil power, however any economic reconstruction can only be dreamed of with the Maduro regime being replaced. The nature of change is difficult to predict; scenarios may include a peaceful transition, but the chances of a bloody guerrilla or civil war revolution is also increasingly likely (Nagy 2019), although the political reality of international armed intervention is perhaps less likely to be reckoned with in the near future. In the short term, in all probability the "frozen crisis" will continue, in which, in the absence of democracy, Maduro deprives Venezuelans of the opportunity to shape their own future and forces many more to leave their homes.

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The buoy for measures Potential of Hydrogen ion (pH) to correct the acidic sea problem with Iron-fertilization processing

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Abstract

Our oceans are currently facing a marine crisis, the abundance of marine ecosystems is threatened by human activities. Including overfishing, pollution and climate change. These are the factors that cause Ocean Acidification (OA), that is the water in the ocean becomes more acidic. Because normally the sea water is alkaline. But when carbon dioxide is absorbed, it will either decrease the pH or increase the acidity. When the carbon dioxide goes into the sea. This affects marine life. From problems that arise we have studied the solutions to Ocean Acidification. The principle is that iron stimulates the growth of phytoplankton. Solution preparation process at difference $Fe(NO_3)_3$ for 7 experimental concentration then procedure for preparing Chlorella and dripping chlorella into the prepared solution, a total of 7 experimental sets and measuring the pH of each test kit at different times. From the experimental results, it was found that the experimental set at 1 + 10 % Iron of $Fe(NO_3)_3$ experiment, chlorella can grow as much and as best and it was the most effective experiment. The buoyancy works well. It has a durable construction. Including the ability to adjust the pH that requires seawater to change easily. If compared to the total price used to make it is considered very worthwhile because the system can be developed further.

Keywords: Ocean Acidification, The buoyancy, phytoplankton.

1. Introduction

Our oceans are currently facing a marine crisis, the abundance of marine ecosystems is threatened by human activities. Including overfishing, pollution, and climate change. These are the factors that cause Ocean Acidification (OA), that is the water in the ocean becomes more acidic. Because normally the seawater is alkaline. But when carbon dioxide (CO_2) is absorbed, it will either decrease the pH or increase the acidity. When the carbon dioxide goes into the sea. Some will be dissolved in the sea. Some will react with water to produce a multistep chemical reaction. This affects marine life such as the lower rate of skeletal growth in reefs that create, the rate of calcium carbonate production in seaweed decreased, increases susceptibility to coral (bleaching and disease), A change in sedation that occurs as a community responds to acidification, and the interactions between living things in different life stages. From problems that arise the organizer has studied the solutions to Ocean Acidification. A very interesting approach to the addition of iron into the sea is called iron fertilization. The principle is that iron stimulates the growth of phytoplankton. By accelerating the photosynthesis of phytoplankton in this process, Phytoplankton uses dissolved carbon dioxide as one of the raw materials from the iron fertilization process. This allows the organizers to create innovation, The buoy for measuring the Potential of Hydrogen ion (pH) to correct the acidic sea problem with Iron-fertilization processing. When the seawater is acidic pH, iron sulfate solution is released into seawater. This innovation is considered an aid to iron fertilization. In the area where the sea has become acidic immediately Because many phytoplankton use a lot of dissolved carbon dioxide in seawater. Thus, helping to reduce the amount of carbon dioxide dissolved in seawater which is an important factor that causes Ocean Acidification.

1.1. Relevance to environmental conservation by using Sustainable Development Goals (SDGs): Which SDGs does the problem and solution address?

- SDG 7 Affordable and Clean Energy: The use of light energy from solar cells, which is clean renewable energy. Solar cells are easy to purchase and reliable energy.
- SDG 9 Industry, Innovation, and Infrastructure: Adaptation for the strength of the innovation industry can be used in all areas by applying scientific and technological knowledge and to create things and make a sustainable income.
- SDG 13 Climate Action: The acidic sea affects animals, corals, and aquatic ecosystems. Along with the erosion of waves and direct currents. Our innovations are designed to address and manage climate-related problems.
- SDG 14 Life Below Water: Take into account the well-being of marine life. If the sea is acidic, it can be harmful to life's systems. Reduce and solve the effects of ocean acidification by enhancing cooperation science at all levels.

1.2. Work process flowchart

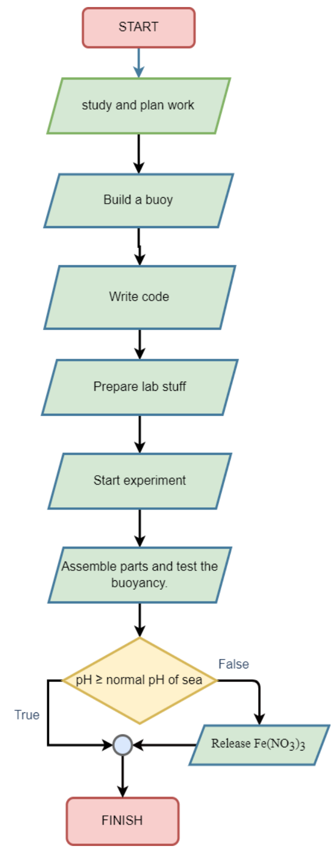

Figure 1. Diagram of process of project

2. Body of Manuscript

2.1. Research and theory

- Carbon sequestration

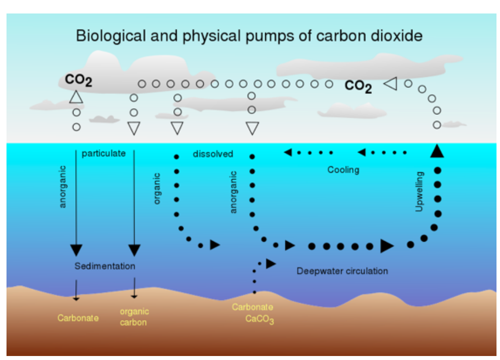

Figure 2. Air-sea exchange of CO_2
source: https://fmss12ucheme.wordpress.com/2013/05/05/ocean-acidification-2/

Previous instances of biological carbon sequestration triggered major climatic changes, lowering the temperature of the planet, such as the Azolla event. Plankton that generate calcium or silicon carbonate skeletons, such as diatoms, coccolithophores and foraminifera, account for most direct sequestration. When these organisms die their carbonate skeletons sink relatively quickly and form a major component of the carbon-rich deepsea precipitation known as marine snow. Marine snow also includes fish fecal pellets and other organic detritus, and steadily falls thousands of meters below active plankton blooms.

Of the carbon-rich biomass generated by plankton blooms, half (or more) is generally consumed by grazing organisms (zooplankton, krill, small fish, etc.) but 20 to 30% sinks below 200 meters (660 ft) into the colder water strata below the thermocline. Much of this fixed carbon continues into the abyss, but a substantial percentage is redissolved and remineralized. At this depth, however, this carbon is now suspended in deep currents and effectively isolated from the atmosphere for centuries. (The surface to benthic cycling time for the ocean is approximately 4,000 years.)

- Ocean Acidification

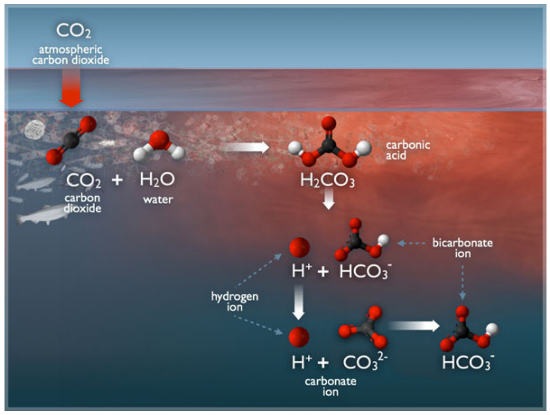

Figure 3. Ocean Acidification
source: https://en.wikipedia.org/wiki/File:CO2_pump_hg.svg

Ocean acidification, the worldwide reduction in the pH of seawater as a consequence of the absorption of large amounts of carbon dioxide (CO_2) by the ocean. Ocean acidification is largely the result of loading Earth's atmosphere with large quantities of CO_2, produced by vehicles and industrial and agricultural processes. Since the beginning of the Industrial Revolution about 1750, roughly one-third to one-half of the CO_2 released into Earth's atmosphere by human activities has been absorbed by the oceans. During that time period, scientists have estimated, the average pH of seawater declined from 8.19 to 8.05, which corresponds to a 30 percent increase in acidity.

Some scientists estimate that the pace of ocean acidification since the beginning of the Industrial Revolution has been approximately 100 times more rapid than at any other time during the most recent 650,000 years. They note that concentrations of atmospheric CO_2 between 1000 and 1900 CE ranged between 275 and 290 parts per million by volume (ppmv). In 2010 the average concentration was 390 ppmv, and climatologists expect the concentration to rise to between 413 and 750 ppmv by 2100, depending on the level of greenhouse gas emissions. With additional CO_2 transferred to the oceans, pH would decline further; under worst-case scenarios, seawater pH would drop to between 7.8 and 7.9 by 2100.

- *Chlorella vulgaris*

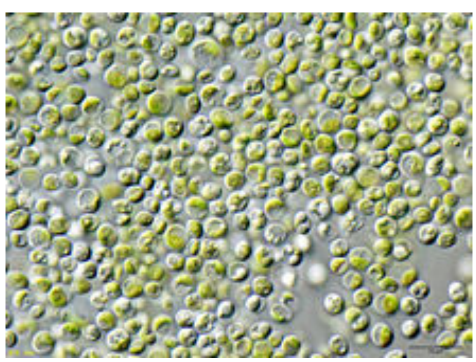

Figure 4. *Chlorella vulgaris*
source: https://en.wikipedia.org/wiki/Chlorella

"*Chlorella vulgaris*" is a eukaryotic, unicellular green alga. "*C. Vulgaris*" is estimated to have been on Earth for more than 2.5 billion years. During that time, it has needed to evolve for survival, resulting in many of the useful functions we use today and in the future (Liebke). Most of the important features deal with its ability to rapidly grow. Common practice normally involves growing populations of photobioreactors (Sacasa 2013). These chambers are consistently shaken and used to control certain aspects of metabolism in "*C. Vulgaris*". Variables such as media, carbonation, and light have been researched heavily to understand the best means of optimal growth. Yuvraj et al. (2016) demonstrated that photoautotrophic growth of *C. Vulgaris* is generally limited by depletion of nutrients (especially nitrogen), light attenuation, change in pH, carbon limitation, and accumulation of photosynthetic oxygen. Several uses of "*C. Vulgaris*" have been researched. Despite the range of benefits, a negative aspect is the cost to grow "*C. Vulgaris*". Vast areas would need to be used to make much of an impact. CO_2 is a limiting resource for large quantities of C.

Structure of the cell wall is unique for "*C. Vulgaris*" compared to most related green algae. It possesses an enzyme-digestible cell wall which is unlike other green algae. *C. Vulgaris* is somewhat versatile with fixing carbon. "*C. vulgaris*" is a photolithoautotroph. Depending on the environment (media) it exists in, changes in the byproducts result from metabolic processes. *C. Vulgaris* is similar to most phototrophs because the light is absorbed via the chloroplast. Green algae then fix the CO_2 into fatty acids within the cell. *C. Vulgaris* fatty acid biomass changes with different amounts of carbohydrates present in the media. The presence of carbohydrates causes the formation of intercellular fatty acids to have long chains. In situations with little or no carbohydrates, this green algae forms linolenic acid. Similar to most green and red algae, *C. Vulgaris* doesn't make unsaturated fatty acids (harris). This is important for the high lipid amounts found in green algae biomass. Also rather important, when *C. Vulgaris* is grown on inorganic media, it contains more linolenic acid. This relates to the vast research about using Chlorella as a food source. Some green algae can be high in protein and are believed to be a healthy substance for human consumption (Warren 1997). Once the appropriate fatty acids are formed oxygen is then respirated and the CO_2 is stored.

The type of reproduction of the microalgae is asexual and it is by self-sporulation that it takes around 24 hours to perform its division. Cell division consists of 6 steps, which include; 1) increase in cell size, 2) formation of the inner cell wall for the daughter cell, 3) division of the chloroplast into 2, 4) second division of chloroplasts to form 4, 5) formation and maturation of the daughter cell wall. Division of the 4 new cells and 6) Cell rupture of the old wall for the release of the 4 daughter cells (Safi et al., 2014). It is important to mention that this process is carried out as long as the cell is in favorable growth conditions since if it is subjected to stress, it can have a longer growth time.

- Iron Fertilization Processing

Iron fertilization is the intentional introduction of iron to iron-poor areas of the ocean surface to stimulate phytoplankton production. This is intended to enhance biological productivity and/or accelerate carbon dioxide (CO_2) sequestration from the atmosphere.Iron is a trace element necessary for photosynthesis in plants. It is highly insoluble in sea water and in a variety of locations is the limiting nutrient for phytoplankton growth. Large algal blooms can be created by supplying iron to iron-deficient ocean waters. These blooms can nourish other organisms.Multiple ocean labs, scientists and businesses have explored fertilization. Beginning in 1993, thirteen research teams completed ocean trials demonstrating that phytoplankton blooms can be stimulated by iron augmentation. Controversy remains over the effectiveness of atmospheric CO_2 sequestration and ecological effects. The most recent open ocean trials of ocean iron fertilization were in 2009 (January to March) in the South Atlantic by project LOHAFEX, and in July 2012 in the North Pacific off the coast of British Columbia, Canada, by the Haida Salmon Restoration Corporation (HSRC).

Fertilization occurs naturally when upwellings bring nutrient-rich water to the surface, as occurs when ocean currents meet an ocean bank or a sea mount. This form of fertilization produces the world's largest marine habitats. Fertilization can also occur when weather carries wind-blown dust long distances over the ocean, or iron-rich minerals are carried into the ocean by glaciers, rivers and icebergs.

- Counting phytoplankton cultures with the hemocytometer

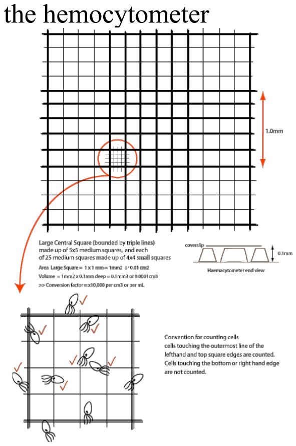

Figure 5. Hemocytometer

source: https://research.csiro.au/anaccmethods/phycological-techniques/biomass-estimation/haemacytometer/

1. Algal Sample – Non-motile cells which do not need fixing can be counted as soon as the sample is collected. However, if there will be a delay between sample collection and counting, or if the cells are motile then the sample will need to be preserved. The most common fixative used for marine microalgae is Lugol's Solution. The recipe for the acidic form is given here but note that in the case of microalgae with calcium carbonate scales, such as the coccolithophorids, the acid will destroy the organisms and a basic solution should be prepared instead.
   For cultures add 1 drop of 1-2% Lugol's solution to 1 mL sample, for field samples 10 drops per 200 mL of sample or until the color of weak tea. Overuse of Lugol's will cause some delicate flagellate species to overstain, lose flagella or

blow up entirely.
Lugol is made by dissolving 100 g Potassium Iodide (KI) in 1 L of distilled water, then 50 g crystalline Iodine (I2) is dissolved in this solution and then 100 mL glacial acetic acid is added. Lugol's should be stored in the dark as the iodine is light sensitive and will degrade. It should also be stored with a tight-fitting lid and kept away from the general cultural environment.

2. To fill hemocytometer chambers, place the thick cover glass over both grids and take a Pasteur pipette and fill its tip by capillary action with the sample. Hold the pipette at an angle of ~450 (higher or lower to control flow rate) and place the tip at the leading edge of the coverslip. With very gentle pressure, allow the sample to flow quickly and evenly into the chamber, exactly filling it. The chamber surface in the Neubauer brand is a flat mirror-like rectangle and the sample must cover this rectangle but not flow over its edges. It is useful to rest your hand on a bench and steady the pipette tip with a finger.
    - If flooding occurs, rinse the hemocytometer and coverslip with distilled water, and repeat the procedure.
    - Refill the pipette for each chamber. The time taken to fill the chamber should be short, to minimize the setting of cells in the pipette.
3. Allow cells to settle (~1 min) and check the grid under the microscope (x 20 objectives) for satisfactory distribution of cells, i.e., evenly spread.
4. The hemocytometer grid in detail: The grid is divided into 9 large squares, each 1 mm x 1 mm, by triple lines. Each large square is divided into 25 medium squares, each 0.23 mm on a side, and each medium square is further divided into 16 small squares, each 0.05 mm aside. For all hemacytometers, the fundamental measurement is the average number of cells per 1 mm square, so the center large square is usually counted. To obtain the total number of cells in this large square, the number of cells in each of the 25 medium squares is counted, recorded then added (see sample cell count)
5. After counting each of the two hemocytometer chambers, the hemocytometer and coverslip are rinsed with distilled water. Usually, the procedure is repeated twice more to give a total of 6 counts.

To obtain the cell density, calculate the average cell count and multiply by the conversion factor (for Neubauer = $x10^4$)

2.2. Method

The buoyant serves to monitor the pH value when the pH is lower than normal or the seawater is more acidic (Typically seawater has a pH of 8 or slightly alkaline). It can release $Fe(NO_3)_3$ solution, with iron being the raw material for the Iron Fertilization Processing reaction in phytoplankton for a less acidic sea.

1. Operation of the buoyancy
consists of 2 main parts:
1.1. Buoyancy body
The prototype body is made of PVC pipe which is cheap and lightweight due to its low mass. It has a width of approximately 25.9 cm. and 38 cm. And there will be a plastic water bottle that acts as a buoy on all 4 sides of the frame. Next will be the cycle of releasing substances into the sea. It will be put in a plastic box size 29.5 x 43 x 14 cm. and will have the following components: 1. Solar cell 2. pH sensor 3. 2-liter solution tank of $Fe(NO_3)_3$ 4. Solution pump $Fe(NO_3)_3$ 5. Arduino 6.6V battery. The pH sensor finds the pH value is lower than 6.20 (which we can change in the program). The program will command the substance in the tank of solution $Fe(NO_3)_3$ to come out. pH as required The program will automatically stop the pump.

1.2. Code section: Clean energy is transferred from small solar cells to the battery. And it is the power to Arduino Uno r3. Then it works like the below code, i.e. if pH is less than specified. The pump will release $Fe(NO_3)_3$ for 1.4 seconds. (This time was calculated by including the $Fe(NO_3)_3$ siphon rate time) After that, the pump will stop running immediately for 10 seconds and continue running for 1.4 seconds, loop like this until the pH is desired and the pump will stop working, i.e. if the pH is already at the optimum (pH of normal sea or pH is a base). The pump will not operate. For the solar cell, check with a multimeter, it really works. Including the circuit and the code that actually works.

Characteristics of welding equipment: pH Sensor >> Arduino , Vcc >> 5v , Gnd >> Gnd , In >> A0, Out>>13. In the part of the water pump we use a small USB water pump 3-5V pump mini micro water pump 2-way hole white voltage DC 3V-5V >>100-200 mA current, >>Flow rate 1.2-1.6L / min. , >>Weight 28 g. and coding of the pump on the loop of pH sensor code.

```
#define SensorPin A0          // PH meter Analog output is connected with the Arduino's Analog
unsigned long int avgValue;  // Store the average value of the sensor feedback
float b;
int buf[10],temp;

void setup()
{
  pinMode(13,OUTPUT);
  Serial.begin(9600);
  Serial.println("Ready");    //Test serial monitor
}
void loop()
{
  for(int i=0;i<10;i++)       //Get 10 sample value from the sensor for smooth the value
  {
    buf[i]=analogRead(SensorPin);
    delay(10);
  }
  for(int i=0;i<9;i++)        //Sort the analog from small to large
  {
    for(int j=i+1;j<10;j++)
    {
      if(buf[i]>buf[j])
      {
        temp=buf[i];
        buf[i]=buf[j];
        buf[j]=temp;
      }
    }
  }
  avgValue=0;
  for(int i=2;i<8;i++)                      //Take the average value of 6 center sample
    avgValue+=buf[i];
  float phValue=(float)avgValue*5.0/1024/6; //convert the analog into millivolt
  phValue=3.5*phValue;                      //convert the millivolt into pH value
  Serial.print("    pH:");
  Serial.print(phValue,2);
  Serial.println(" ");

  if(phValue<=6.20) //Can chage pHvalue to normal pH of sea or synthetic sea
  digitalWrite(13, LOW);
  delay(1400); //The time that Feso4 were pushed by pump
  digitalWrite(13, HIGH); //released
  delay(10000);
  //10 seconds the pump will stop and release again in 1.4 seconds to arrive Keep looping if the pH value is still not desired.
}
```

Figure 6. Coding of measures pH from sensor and time for release $Fe(NO_3)_3$ by Arduino IDE

2. Experimental Method

2.1. Preparation of solutions and test kits

1. Synthesize seawater at the ratios shown in Table 1.

Table 1. The formula of the synthetic sea. (pH = 8.52)

Substance	Quantity used
Water	100.0 L
NaCl	2.7 kg
$MgCl_2$	200.0 g
$MgSO_4$	250.0 g
$CaCl_2$	130.0 g
KCl	40.0 g
$NaHCO_3$	20.0 g

source : https://home.kku.ac.th

2. Concentrated H_2CO_3 was added to 2% V/V of synthetic seawater to synthesize acid seawater.
3. Drop Chlorella in 312,500 Cell/L synthetic acid seawater.
4. Add a solution of $Fe(NO_3)_3$ to 5 concentrations of synthetic acid seawater with a volume of 0.8 ml/L.
   - 4.1 10% W/V Iron of Iron(III) nitrate
   - 4.2 30% W/V Iron of Iron(III) nitrate
   - 4.3 50% W/V Iron of Iron(III) nitrate
   - 4.4 70% W/V Iron of Iron(III) nitrate
   - 4.5 90% W/V Iron of Iron(III) nitrate
5. Exposure to Chlorella at Illuminance 7500 lx for 15 hours.

2.2 The procedure for measuring the pH of each experimental set at different times.
The pH of each experiment was measured at 3, 6, 9, 12, 48 hours with a pH meter.
2.3 The procedure for quantifying the changed chlorella of each set of experiments.
1. Chlorella from each experiment was taken to measure the number of chlorella cells starting with the hemocytometer.
2. After 48 hours, the chlorella from each set of chlorella cells was measured again with the hemocytometer.
3. Take the number of chlorella from each experiment set to create a graph to compare the amount of change in the number of chlorella from each experiment set.

6. Results

A reaction in which phytoplankton receives a certain amount of iron, resulting in the rapid expansion of phytoplankton. The phytoplankton contributes to the capture of CO_2 in the sea because phytoplankton requires CO_2 in the process of photosynthesis, so the sea does not contain too much CO_2, resulting in acidic seas. Seas normally have a pH of around 8, and the occurrence of acidic seas results in low marine pH, which affects a wide range of ecosystems. From the above, the organizers have thought of building buoyancy for releasing iron into seawater to reduce sea acidity. The authors have taken into account the amount of iron released into the seawater so that it will not affect the environment in the future. Studies have shown that 1 liter of seawater should not contain more than 0.72 g of iron, an amount that does not affect the environment. Thus, five concentrations of $Fe(NO_3)_3$ were created to be mixed into synthetic marine acidified H_2CO_3 solutions; it was determined not to have a pH lower than 7 because it was not an ideal condition for living phytoplankton. The results of the experiment were as follows.

Table 2. The pH value changes over time.

Substance	initial pH	3 hours	6 hours	9 hours	12 hours	48 hours
Sea + chlorella-------------1	8.52	8.52	8.53	8.52	8.54	8.52
Acid sea + Chlorella------2	7.13	7.45	7.83	7.96	8.00	8.51
2 + 10% W/V Iron of Iron(III) nitrate	7.00	7.58	7.93	8.05	8.13	8.51
2 + 30% W/V Iron of Iron(III) nitrate	7.03	7.55	7.88	8.04	8.17	8.53
2 + 50% W/V Iron of Iron(III) nitrate	7.02	7.45	7.68	7.90	8.03	8.47
2 + 70% W/V Iron of Iron(III) nitrate	7.06	7.48	7.75	7.96	8.08	8.55
2 + 90% W/V Iron of Iron(III) nitrate	7.19	7.49	7.71	7.92	8.02	8.40

After 3 hours a sediment was formed, presumably $Fe(OH)_3$ and $Fe_2(CO_3)_3$ sediments.

Table 3. Results of Counting Chlorella

Substance	Number of Chlorella (default) (cell/ml.)	Number of Chlorella (48 hrs. later) (cell/ml.)
Sea + chlorella-------------1	0.4*10^5	0.45*10^5
Acid sea + Chlorella------2	0.4*10^5	0.5*10^5
2 + 10% W/V Iron of Iron(III) nitrate	0.4*10^5	1.03*10^5
2 + 30% W/V Iron of Iron(III) nitrate	0.4*10^5	0.57*10^5
2 + 50% W/V Iron of Iron(III) nitrate	0.4*10^5	1.03*10^5
2 + 70% W/V Iron of Iron(III) nitrate	0.4*10^5	0.5*10^5
2 + 90% W/V Iron of Iron(III) nitrate	0.4*10^5	0.7*10^5

7. Conclusions

The buoyancy works well. It has a durable construction, float and when simulating the acidic-base situation of the sea, it can actually be used as well. Including the ability to adjust the pH that requires seawater to change easily. If compared to the total price used to make it is considered very worthwhile because the system can be developed further. From the experimental results, it was found that the experimental set at 1 + 30 % W/V Iron of Iron(III) nitrate has the highest pH value changes, but due to the 1 + 10 % W/V Iron of Iron(III) nitrate experiment, chlorella can grow as much and as best. In conclusion, it was the most effective experiment. Since the iron content of the experimental series 1 + 10 % W/V Iron of Iron(III) nitrate is suitable for the growth of chlorella resulting in the highest pH change. If the amount of iron is too much or too little will result in less growth of chlorella resulting in fewer pH changes as well. And in the future, we will improve the condition of the buoy to be better, install a GPS system to determine the location of the buoy, and make it more accurate. In addition, we will create a notification application to provide users with more up-to-date information.

8. Suggestions

- From the experiment, it was found that after 3 h after the addition of $Fe(NO_3)_3$ to the synthetic acid sea, which is thought to be the sediments of $Fe(OH)_3$ and $Fe_2(CO_3)_3$. The reason for the sediment is that the lack of iron used by animals causes the iron ions to bind to other elements of the sea. Further studies are needed to determine the total iron availability of animals along with the appropriate iron content in the marine environment. So as not to affect the environment.
- There should be an efficient pump to discharge small volumes and an efficient water cut-off system to avoid siphoning, as if the pump is too powerful or a siphon occurs, the required $Fe(NO_3)_3$ will not be released.

Nomenclature

Sea: The seas referred to in the article are those that were synthesized in the laboratory using the ratios listed in Table 1, with a pH of approximately 8.52.
Acid Sea: The acidic seas referred to in the article are synthetic seas where H_2CO_3 is added to have a pH in the range of 7.00 – 7.20.

Appendix

- **Originality:**

Table 4. Outlining existing features vs. innovative features of new model OR why their invention is original

Existing features	Innovative features of new model OR
1. The addition of iron in seawater is by quantification. causing side effects to the environment, such as a decrease in the amount of oxygen in the water and Changes in the ecosystem in an adverse way. 2. The information obtained from the innovations is not currently causing delays in problem-solving. 3. High cost and energy consumption	1. The user knows the pH in water and the amount of solution. Iron(II)sulfate should be added to the sea suitable for that area. 2. Innovations provide real-time information. Able to know information at any time 3. Use solar panels to turn solar energy into electricity. It is an energy source in the Iron Fertilization process.

- **Cost analysis:**

PVC pipes + Sockets	10.58 USD
Substances Box	3.03 USD
Solar cell	5.83 USD
Silent pump mini micro water pump	1.22 USD
Battery 6V	6.10 USD
Gallon 2 L	0.46 USD
rubber tube	0.76 USD
pH sensor	20.83 USD
Relay module + water pump USB	3.61 USD
Total	52.42 USD

Annotation: Arduino Uno r3, Jumper Wire, Electric wire including technician, technology and chemical equipment contained within the school. Phytoplankton (Chlorella) received from Songkhla Coastal Aquaculture Research and Development Center (Songkla, Thailand).

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Post-pandemic students' behavior in HEIs

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Abstract

Research made during 2020 showed that the lockdown of covid-19 had an impact on students' anxiety and academic performance. Variables as stress, anxiety, laziness were measured to be at high levels among students during 2020. Academic performance was affected as lifestyle changed for most students all over the world.

This research aims to investigate the behavior of students in higher education, in a post-pandemic world. Through an online survey this study explores and describes students' behavior, after they got back in physical classes, when lockdown period was finished and students got back to the offline classes.

Some of the research questions of this study how were their concentration levels; what challenges did they face; did they feel motivated or not and how important investing in higher education is to them; what affects them most.

Keywords: post-pandemic, student, behavior, HEI, performance

1. Introduction

It feels like everything started not longer than a week ago, but in fact, two years have passed since the beginning of the pandemics. Everybody's lifestyle changed, and so did even education and students' life and behavior.
Transformation. This was the keyword we learned during the pandemics.

The pandemic of Covid-19 affected severely schools and learning. According to the World Bank report "The state of the global education crisis", "the global learning crisis has grown by even more than previously feared: this generation of students now risks losing $17 trillion in lifetime earnings in present value as a result of school closures, or the equivalent of 14 percent of today's global GDP, far more than the $10 trillion estimated in 2020". (IBRD/World Bank/UNESCO/UNICEF, 2021)

The lockdown period had a great impact on learning and students' feelings. Research done during 2020-2021 to study students' performance, challenges, and problems faced during the lockdown of Covid-19 and the impact of restrictions shows that students faced anxiety, lack of concentration, laziness, and lost the desire to study, etc. By 2020, most countries applied remote learning. Students took online classes and changed their lifestyles. The changes affected them. A study conducted in Albania from 30th April to 15th May 2021, found that the level of stress for female students was rated in a mean of 7.77, while for male students it was 6.97, on a scale from 1 to 10 (1 is not at all, 10 extremely much). Measured in the same scale as mentioned above, the means for other variables in this study were: the desire to study – female 5.71, male 5.66; laziness – female 7.61, male 7.38; concentration – female 4.81, male 5.28. (Bozdo R., 2021). In this study students show high levels of stress and laziness (above 6.97 from a maximum of 10) and lower levels of desire to study and concentration (below 5.71 from a maximum of 10).

A study conducted in the UK in August 2020, shows that "The level of stress students experienced as a result of the lockdown was evident. 32% of students reported they had trouble concentrating pre-lockdown compared with 71% during the lockdown." This research also states that during the lockdown, there was also an increase of nearly 20% in students who reported experiencing blue mood, despair, anxiety, and depression during this period and a 39% increase in students who reported their concentration levels decreased. (Bashir A., et al., 2021)

Malcom D. (2020) concludes in a study that because students and young adults are at higher risk for loneliness than other demographic groups, a fact which has only been magnified by the pandemic, "faculty members and administrators across the Academy should recognize and acknowledge the full spectrum of emotions present in ourselves and our learners and proactively seek to prevent and address the downstream effects of grief and loneliness". Malcom D., (2020)

Daniels et al. (2021) report the results of a survey with 98 undergraduate students of different disciplines at Canadian universities, which shows that students' achievement goals, engagement and perceptions of success all significantly decreased during the ERT (Emergency Remote Teaching) semester, while their perceptions of cheating increased.

According to Rapanta Ch. et al., emergency remote teachers had to face challenges related to learners' motivation, socio-emotional distance, socio-economic gaps and cultural isolation.

During that difficult time of lockdown, students and higher education institutions faced a lot of challenges related to the future. Some students were unable to attend online classes due to the lack of computers and internet in remote areas. Those who were lucky enough to attend classes agreed to a relatively high percent that there was a drop in the quality of the university program, with no opportunity for training programs that would be sufficient to prepare them for the future. (Hirvath, 2022)

Online education has been an existing concept before 2020, as part of digitalization, however, the concept began being widely used across educational institutions in 2020.

E-learning is the new definition of online learning, which is based on the development of the ICT sector, making technological literacy one of the most basic skills (Moore J.L., et al., 2011). Coursera, a famous site for online learning, has posted a 644% increase from the same period last year in courses enrollments (DeVaney, J., 2011).

There are many tools and resources that can be used to create a reimagined education, which will later contribute to creating new models that fulfill the needs of students, customers, and the entire society. For some schools, the new 'normal' will be online learning, which will become more affordable, data and results-driven, and more accountable (DeVaney, J., 2011).

Higher education institutions will evolve by providing practical and soft skills to their students, raising cultural awareness and doctrinal knowledge. Due to this evolution, HEIs will have to stop following the overall approach of "one size fits all", but instead will focus on delivering a new personalized learning approach, where students' diversity, performance, and behavior are taken into account (DeVaney, J., 2011).

Covid-19 showed a Black Swan opportunity in reimagining education, to better design learning curricula, reduce costs for students, and offer practical and soft skills to students, in order to embrace the change in the business climate.

It was a difficult time for students, as well, who were deprived to talk to university staff (Aristovnik, A. et al, 2020) for their future career goals and had a less face-to-face collaboration with their peers (Wilson, S. et al, 2020), especially for those that started university during the pandemics, making it more difficult to build social relationships online.

As for the emotional life, students have provided feedback on feeling a lot of negative emotions like anxiety, frustration, anger, hopelessness, and shame, rather than positive ones like hope, joy, and pride (Händel, M et al, 2020). According to Biavardi (2020), online learning caused some negative psychological effects, like stress, confusion, and anger. The same results were obvious even in Strack. et al (2021), where students reported emotional loneliness. Meanwhile, others reported fewer negative emotions, and more joy, due to having the right tools and a higher digital ability and experience.

The pandemic was very difficult for young workers, less than 20 years old, and for people who did not have more than a high school diploma, who were employed in jobs that do not have long-term contracts and can be easily terminated. According to Strack et al. (2021), 7 in 10 people were willing to upskill, in order to perform better in their jobs because they had more free time to train and learn. Upskilling makes people feel more secure about their future and offers job security and also opportunities. Two-thirds of the surveyed people had spent a few weeks or more on improving their skills, mostly through online education and mobile apps, which was 12% more than data collected in 2018.

Meanwhile, although students have spent a lot of time online during the pandemics, according to Economy Policy Institute (2020), that time was spent on social activities, browsing the Internet, and playing games (Kálmán, B., Tóth, A.,2020). According to the previous study conducted in 2021, Bozdo's research showed that 47,2% of the participants had studied fewer hours in 2020, compared to the period before 2020, even though there was more available time to study since outdoor activities were forbidden due to lockdown. 73% needed more courses during 2020, while 39.9% of respondents had taken courses during 2020.

2. Research Methodology

An online survey was conducted among students of higher education institutions from 18th to 23rd March 2022. The questionnaire was administered with Google Forms. Participants received the link and fill out the questionnaire individually, voluntarily, and anonymously.

The survey was conducted among 157 participants, with participation of 84% females and 16% males. The median age of the participants was 21.07 years old. Data were analyzed by using SPSS, version 23, with descriptive statistics, correlation, and linear regression.

Variables taken into consideration for this research paper are stress, anxiety, concentration, laziness, and the desire for professional courses.

The aim of this paper is to investigate students' overall behavior and stress in higher education institutions in the post-pandemic world to learn, concentrate and attend professional courses.

The research questions for this paper are:
1. What is the overall level for the variables of stress, desire to study, concentration, and concentration experienced during the first semester of the academic year 2021/22?
2. How did these levels change compared to the data from previous research during the pandemic?
3. Did students take any courses during 2021?
4. Are students willing to spend money on courses in the near future?

3. Research Results and Findings

The online survey with 157 respondents had participation of 84.1% females and 15.9% males (Table 1). This participation is related to the fact that there are more registered females in higher education institutions, compared to males. The same can be said even for graduation from these institutions. According to INSTAT, the Institute of Statistics for Albania, for the academic year 2019 – 2020, 11,556 females graduated out of a total of 17,585 students in bachelor's programs, and 9,329 females graduated with a master's degree, out of a total of 13,937 students [13]. Meanwhile, for the academic year 2020 – 2021, 74,821 females were registered in higher education institutions, compared to 48,976 males [14].

Gender	Frequency	Valid Percent
Male	25	15.9%
Female	132	84.1%
Total	157	100.0%

Table 1 - Gender frequency and percentage

92% of the participants belong to the group age 18 – 23 years old. While the mean age of the participants is 21.07 years old.

The respondents are from all the 12 regions of Albania. 67.5% of them are from Tirana, the capital city of Albania, which covers 1/3 of the entire population.

85.4% of the participants had 0 – 50,000 leks monthly personal incomes. 58.6% were highly dependent on their families to cover the costs of their student life, while 33.1% of them were currently working.

Where does your monthly income come from?	Frequency	Valid Percent
Work	52	33.1%
Contributions from the family	92	58.6%
Other resources	1	.6%
All of the above	11	7.0%
Other	1	.6%
Total	157	100.0%

Table 2 - Monthly incomes

According to the study, on a scale of 1 - 5, the stress level of the participants is 75.6%; the desire to study is 72.8%; concentration level is 59.8% and laziness is 51%.

	Age	Stress Level	Level of desire to study	Concentration Level to study	Level of Laziness felt
Mean	21.07	3.78	3.64	2.99	2.55
N	157	133	133	133	133
Std. Deviation	2.107	1.170	1.117	.949	1.041

Table 3 - Descriptive statistics

36.7% of the respondents are studying less compared to last year, while 33.3% are studying more.

How were your study hours during the first semester 2021/2022 compared to previous years?	Frequency	Valid Percent
I have studied less than before	55	36.7%
I studied the same as before	45	30.0%
I have studied more than before	50	33.3%
Total	150	100.0%
System	7	
Total	157	

Table 4 - Study hours of the first semester '21/'22 compared to previous years

45.2% of respondents said that they completed courses in 2021.

69.4% of respondents said that they were planning to spend money on courses this year and 24.8% said they didn't know what they were going to do.

During 2021, did you complete any course/training aimed at your professional growth:	Frequency	Valid Percent
Yes	71	45.2%
No	86	54.8%
Total	157	100.0%

Table 5 - Courses/Training completed during 2021

Do you plan to spend money during 2022 on studies and training?	Frequency	Valid Percent
Yes	109	69.4%
No	9	5.7%
I don't know	39	24.8%
Total	157	100.0%

Table 6 - Plans to spend money during 2022

4. Discussion and Conclusions

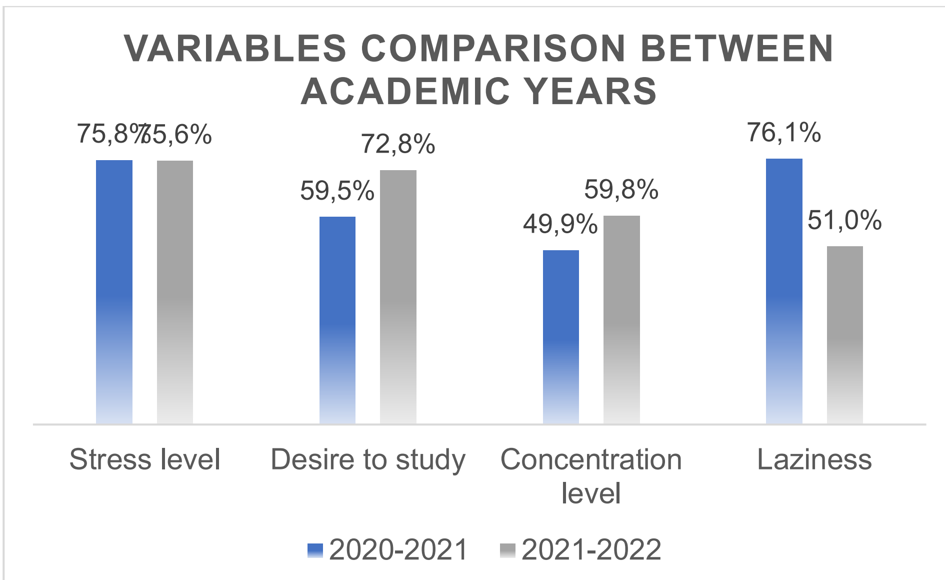
The levels for the variables in this study are compared to the ones from the study made in 2021 on students' behavior during pandemics.

Key findings based on a previous study by Bozdo R. (2021) are shown in blue color in this graph:

- The desire to study has increased by more than 13%, while laziness has decreased by 25%.
- The concentration level has also increased by 10%.

During online learning, although there was plenty of time to learn, due to lockdown, most of the students felt lazy, with a lack of desire to learn and lower concentration levels.

Returning to auditoriums has increased students' desire to learn and their concentration to study; therefore, the laziness level has considerably decreased.

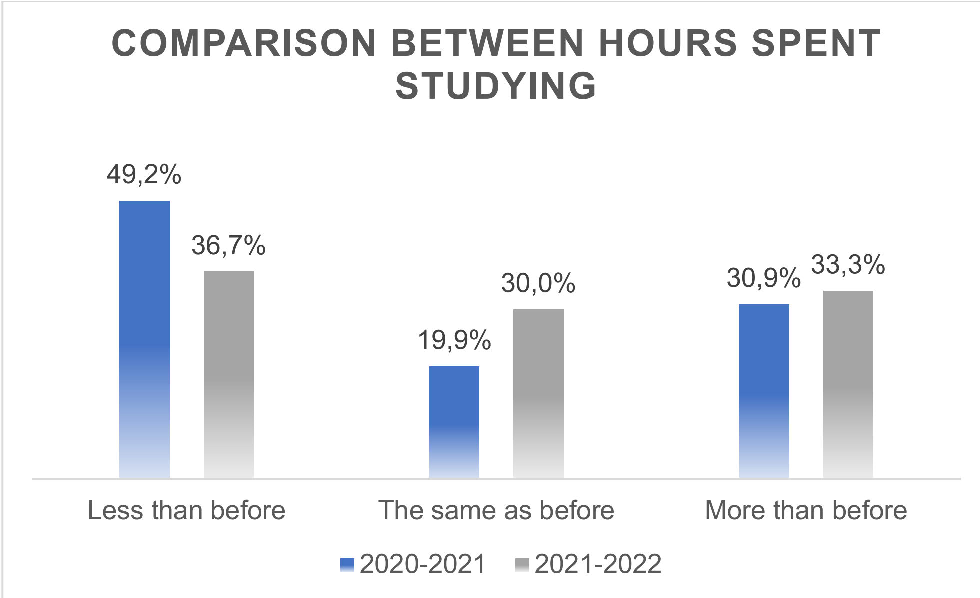


Graph 1 - Comparison between academic years

Key findings based on a previous study by Bozdo R. (2021):

- The percentage of participants who have spent fewer hours studying has decreased by more than 12%.

Having to attend lectures and seminars has made students spend more hours studying, compared to the 2020-2021 academic year.

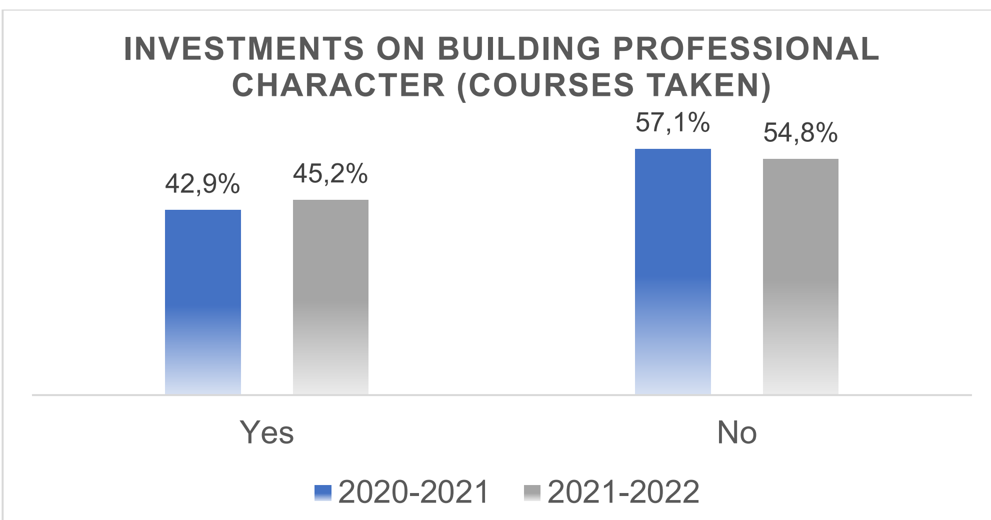


Graph 2 - Comparison between study hours

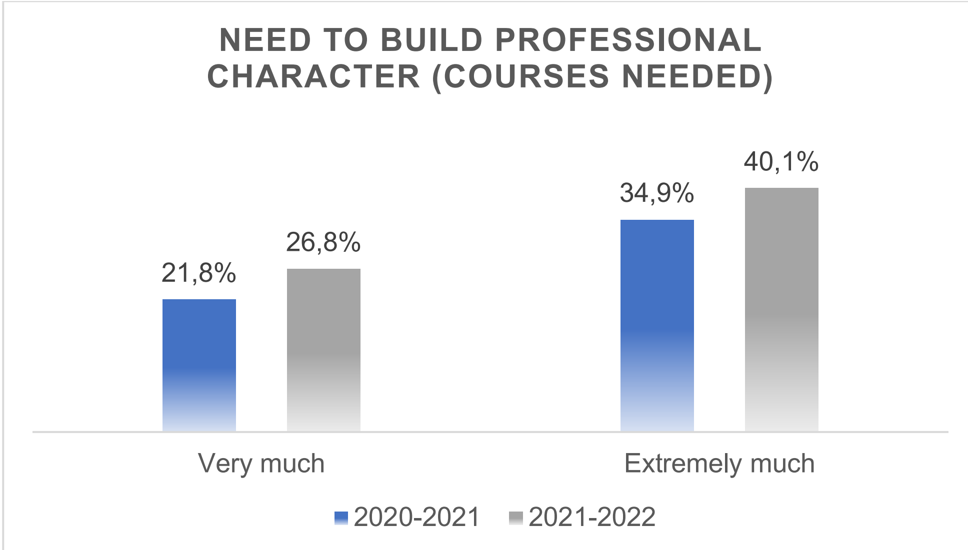
Key findings based on a previous study by Bozdo R. (2021):

- There is a slight increase of participants who have taken professional courses compared to the two academics years.
- Although only 45.2% have taken courses, more than 65% feel the need to take professional courses, which seems to have increased a lot from the previous years.

The pandemics made a lot of students fall behind on knowledge, and this justifies the need to take courses to "gain" some skills.



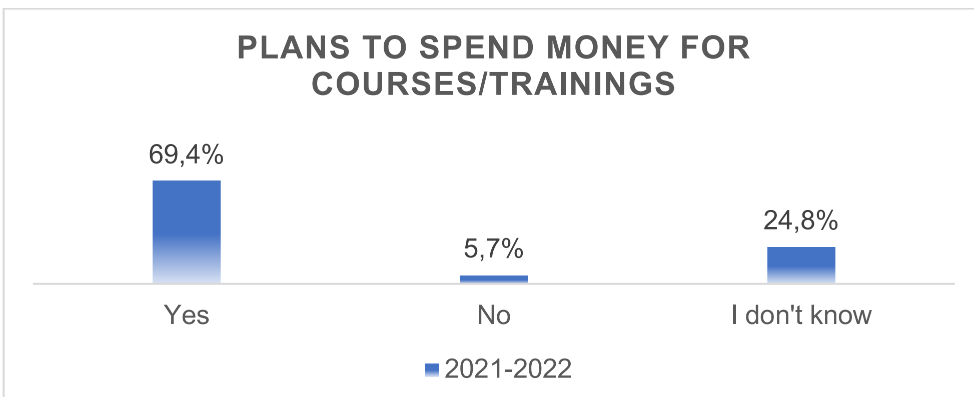
Graph 3 - Comparison between courses/training taken



Graph 4 - Comparison between courses/training needed

Key findings based on a previous study by Bozdo R. (2021):

- Although almost 55% didn't take a professional course or training during these last 4 months of the new academic year (graph 3), almost 70% plan on spending money to attend one course/training throughout 2022.



Graph 5 - Plans to spend money on courses/training during 2022

- According to the study, on a scale of 1 - 5, the stress level of the participants is 75.6% (3.78/5); the desire to study is 72.8% (3.64/5); concentration level is 59.8% (2.99/5) and laziness is 51% (2.55/5). The levels for the variables in this study are compared to the ones from the study made in 2021 on students' behavior during pandemics. The desire to study has increased by more than 13%, while laziness has decreased by 25%. The concentration level has also increased by 10%.

- 62.1% of respondents cover their costs during the study period only through contributions from their families.

- During the first semester of 21/22, 36.7% of respondents are studying less compared to last year and 33.3% are studying more compared to last year.

- The percentage of participants who have spent fewer hours studying has decreased by more than 12%.

- There is a slight increase of participants who have taken professional courses compared to the two academics years.

- Although only 45.2% have taken courses, more than 65% feel the need to take professional courses, which seems to have increased a lot from the previous years.

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The effect of digital process maturity on efficiency in product development – a review based structural equation model

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Abstract

It should be clear to everyone that digitization has become an integral part of our lives. Especially in product development, digitization is an essential component that helps with new developments and thus ensures the continued existence of the company in a difficult competitive environment. This paper shows the development of a structural equation model based on literature with a focus on German and Austrian mechanical engineering. This structural equation model is subsequently used to confirm or deny the main hypothesis, "a high degree of digitization increases efficiency in product development", by means of empirical results. In this paper, dependent and independent variables are created, the use of these is argued accordingly and combined into a coherent model. The modeling of maturity models and the possibility of carrying out efficiency and performance measurements are discussed in detail. This results in variables and questions for empirical data collection based on a structural equation model. The result is a valid model, which is subsequently used for further considerations in the mechanical engineering sector.

Keywords: structural equation model, efficiency, maturity model, digitalization, product development

Introduction

German mechanical engineering sector experienced a new boom in 2017 and 2018. Sales increased by 2.8% from EUR 226 to 232 billion, and the number of employees increased by 3.2%.1 Apparently the crisis years 2008/09 are behind us and the growth of the branch seems to have stabilized. However, the expansion of the German production industry and above all of mechanical engineering is strongly export-oriented. Around 60% of the sales realized in 2018 resulted from exports. At least 600,000 jobs depend on the stability of this export quota. Together with Latvia, Lithuania, Great Britain and Switzerland, Germany is one of the largest exporters of machines in the European Union.[2]

Given the current political developments, the players in the machinery and automotive industries are skeptical about the future stability and growth of exports:

Low interest rates keep the euro exchange rate low, which means optimal conditions for exporting companies, whose products are then comparatively cheap abroad. With interest rates close to zero in the EU, however, there is little potential for further cuts. US monetary policy has recently tightened interest rates, putting pressure on the EU central bank to follow the policy.[3]

These figures show the importance of this sector. Interestingly, the majority of the companies have already been on the market for several decades, which means mature and solid structures. Taking these boundary conditions into account, a connection between digital process maturity and efficiency in product development should be established. This connection is to be made using a structural equation model based on empirical data. The structure of the structural equation model is part of this document.

[1] VDMA. Maschinenbau in Zahl und Bild 2019; Mechanical engineering – figures and charts 2019, 2019, available at: https://www.vdma.org/documents/14969753/26250981/Maschinenbau+in+Zahl+und+Bild+2019.pdf/fe7cbf9d-3873-d927-4d98-c979dac2b5f0, access on Oct 18, 2019, p. 7.

[2] VDMA. Maschinenbau in Zahl und Bild 2019; Mechanical engineering – figures and charts 2019, 2019, available at: https://www.vdma.org/documents/14969753/26250981/Maschinenbau+in+Zahl+und+Bild+2019.pdf/fe7cbf9d-3873-d927-4d98-c979dac2b5f0, access on Oct 18, 2019, p.4

[3] Domm, P.. Trump's trade threats increased the chances for a recession, but also a Fed rate cut, 2019, CNBC, contribution of Aug 23, 2019, retrieved from: https://www.cnbc.com/2019/08/23/trumps-trade-threats-just-increased-the-chances-for-a-recession.html, access on Oct 18, 2019.

Construction of the structural equation model and initial model

Efficiency refers to the technical productivity or economic performance of a process or operation. Key figures referring outcome to effort or input, for instance produced amount to used resources, or yield to cost are apt to describe efficiency. [4]

Maturity in the digital product development process is a reliable measure for the level of digital technology application. Maturity models are proven for technical and econometric performance assessment and provide standardized measures for the progress of a development process towards an ideal standard. Maturity models illustrate the progress made towards an objective and allow to develop guidelines for further development activity to approach this target. Maturity models like SPICE, CMM or CMMI-DEV have established in business practice since the early 1980ies, and have gained particular attention with the progress of electronic technologies in the recent decade. [5]
So speaking, hypotheses were created that act on the model with the preliminary question:

Is a high maturity in the digital product development process increasing the efficiency of product development?

H1 Maturity model application enhances digital process maturity.
H2 Digital process maturity significantly enhances technical efficiency.
H3 Digital process maturity significantly enhances financial efficiency.
H4 Technical efficiency enhances financial efficiency

Graphically and simplified, the model looks as follows:

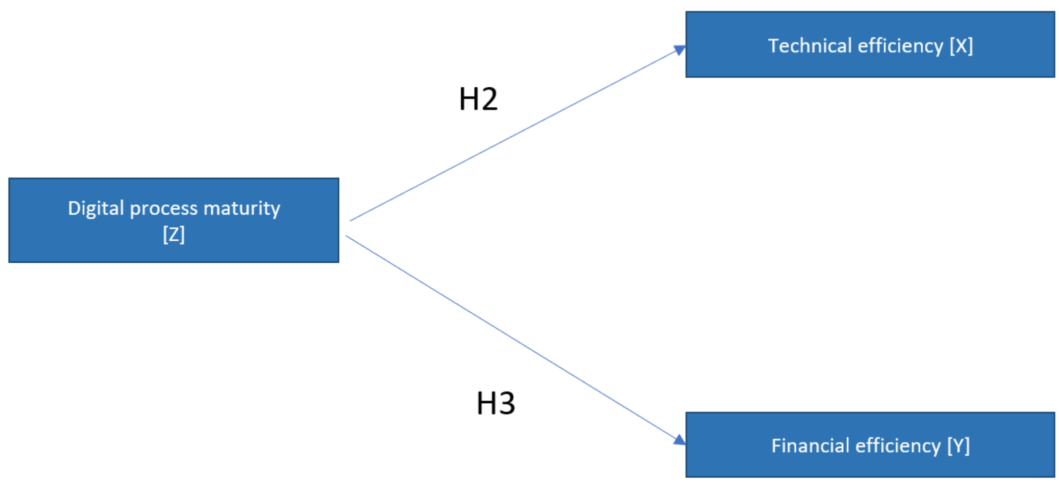

Figure 1. Simplified Model [own draft]

Each of the 3 variables (x, y and z) have sub-variables that are merged into a total variable using valid statistical methods. Considering the insights on the mechanical engineering industry in Germany in general now the interviews with representatives of such businesses are prepared. Interview implementation comprises the selection of interview participants, the draft of the questionnaire and the conception of the interview evaluation strategy. In order to create a correspondingly valid and all-encompassing model, selected experts were interviewed. The selection of study participants determines to what extent the results are representative, i.e. provide a comprehensive picture of the underlying reality. Uncritical participant selection can produce misleading insights, when the interviewees are themselves biased or do not have comprehensive knowledge concerning the points inquired about.[6]

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[4] Bellini, Emilio, and Corrado Lo Storto. "The impact of software capability maturity model on knowledge management and organisational learning: empirical findings and useful insights." *International Journal of Information Systems and Change Management* 1.4 (2006): 339-373.
[5] Tiku, Sanjay, Michael Azarian, and Michael Pecht. "Using a reliability capability maturity model to benchmark electronics companies." *International Journal of Quality & Reliability Management* 24.5 (2007): 547-563.
[6] Sayer, Andrew. "Who's afraid of critical social science?." *Current sociology* 57.6 (2009): 767-786.

Organizations are complex entities and comprise multiple levels of activity, but only some are potentially relevant to analysis.[7] Research neglecting the comprehensive analysis of all major levels relevant to a topic is necessarily incomprehensive and biased by the perspective of the selected interviewees.[8]
To obtain representative information on the impact of digital process maturity on the efficiency of product development in German mechanical engineering, people involved with digital processes and active in product development in a German mechanical engineering company are selected. The sector overview has shown that the majority of businesses in the target sector are SME. Correspondingly, this study focusses on such companies and intends to include participants from SME of different sizes and orientations. The results of these interviews have been presented previously.[9]

Final structural equation model, review and interview founded
The model obtained from these insights combines literature with expert opinion and was expanded to include appropriate moderators. All hypotheses are thus mapped accordingly and can be confirmed or refuted by means of empiricism.

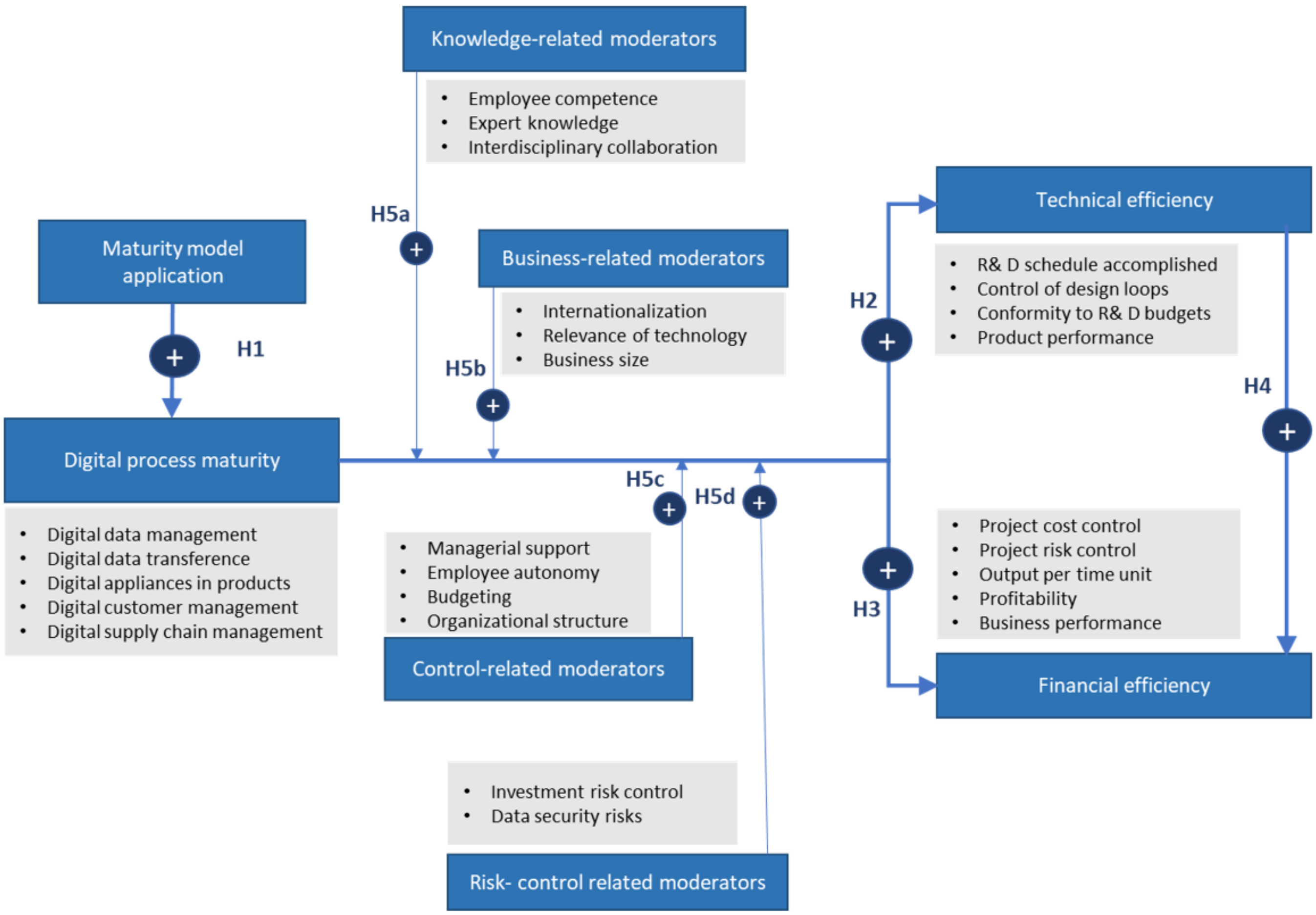

Figure 2. Final model [own draft]

Outlook and further research
A valid model is the basis for successful empiricism. The model created is used to answer the research questions and is a substantial part of it.

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[7] Astley, W. Graham, and Andrew H. Van de Ven. "Central perspectives and debates in organization theory." *Administrative science quarterly* (1983): 245-273.
[8] Miller, Kent D., and Eric WK Tsang. "Testing management theories: Critical realist philosophy and research methods." *Strategic Management Journal* 32.2 (2011): 139-158.
[9] Schüssler, F. „DIGITAL PROCESS MATURITY AND THE IMPACT ON EFFICIENCY IN PRODUCT DEVELOPMENT - A FINDING FROM SPECIALISTS." *International Academic Institute - International Virtual Academic Conference*. June 2020

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Study of physicochemical parameters of pasteurized milk depending on storage time

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Abstract
Raw milk is a source of infection, the perfect environment for the development of disease-causing microorganisms such as tuberculosis and typhoid fever. The purpose of thermal treatment is to achieve the destruction of pathogenic bacteria that are harmful for human health, microorganisms that affect the reduction of milk quality and safety and increase its shelf life (shelf-life). For this reason, the purpose is to study the effect of storage time at the same temperatures, on the initial opening date of the pasteurized milk samples and on the expiration date. The samples studied represent pasteurized milk samples of the market. Their physico-chemical parameters were determined with the lactoscan apparatus on the initial date of opening of the samples for analysis and on the expiration date, for the same treatment temperatures. Determined physico-chemical parameters (%) are: fat content, protein content, lactose content, salt content, water added), density, freezing point, dry matter. From the study we concluded that all measured physico-chemical parameters vary depending on the storage time and depending on the treatment temperature.

Key words: pasteurized milk, physico-chemical parameters, Lactoscan, fat content, protein content, lactose

Introduction
Milk is an excellent medium for microbial growth (5,6). At ambient temperature storage, soon a lot of microorganisms and pathogen bacteria can develop in milk. Pasteurization is a process in which milk is treated between 63-66 °C for 30 min or 72–74 °C for 15 s; then immediately cooled to a temperature 4 °C to 8 °C; to keep the milk quality and safety. The process aims to destroy bacterial vegetative cells or inhibit enzyme in milk but not destroy bacterial spores (1). Several factors affect the shelf-life of pasteurized milk (2). The quality of the raw milk which must be of a very good quality from the microbiological point of view, the hygienic and sanitary practices followed after the thermal treatment of the milk, the purity of the packaging material and the storage temperature (3). During the storage time, the physico-chemical parameters of pasteurized milk change. (4,7). For this reason, our study is focused on the observation of physico-chemical parameters, of pasteurized milk samples of Albanian markets, during the period of their storage for different treatment temperatures.

Material e methods

Samples
The samples represent samples of pasteurized milk, of Albanian markets. There are analyzed many pasteurization milk samples. Samples were taken at random and identified with the relevant codes M1, M2, M3, M4. These samples were initially homogenized. The same sample was then analyzed on first date of milk sample opening and expiration dates (based on the label) at temperatures 0ºC,10 ºC,20 ºC,30 ºC,40ºC.

Methods
The aim of the study was to assess the physico chemical changes occurred during storage of pasteurization milk at different temperatures 0ºC,10ºC, 20ºC, 30ºC, 40ºC. Fat content, protein content, lactose, density, freezing point, total solids were the parameters used for physico chemical analyses. These parameters are determined by the Lactoscan milk analyzer according to the instruction of the manufacture instructions. For this, all pasteurized milk samples were first homogenized, treated at the respective study temperatures and then the physico chemical parameters were determined by Lactoscan (fat, protein, density, freezing point, solid, etc. expressed in%). This procedure was followed on the sample opening date and expiration date. All measurements for each milk sample are repeated twice, on two dates.

Results
The determined parameters for each pasteurized milk sample are fat, protein, density, freezing point, total solid (%) etc. These were evaluated at temperatures of 0 ºC,10ºC, 20ºC, 30ºC, 40ºC on the two study dates. All results were summarized in the respective tables for each sample.

Table 1. Table of physico-chemical parameters values, of pasteurized milk sample M1, on the first day of opening and expiration date, for the same temperatures.

Sample M1	Opening date of sample					Expiration date of sample				
%	0ºC	10ºC	20ºC	30ºC	40ºC	0ºC	10ºC	20ºC	30ºC	40ºC
F	3,24	3.17	3.14	3.12	3.11	4.11	3.19	3.17	3.17	3.17
S	8.36	8.17	8.11	8.04	8.03	9.01	8.18	8.18	8.16	8.11
D	29.50	28.84	28.64	28.38	28.32	29.28	28.88	28.87	28.78	28.62
P	3.25	3.18	3.16	3.13	3.13	3.23	3.19	3.18	3.17	3.16
L	4.35	4.33	4.30	4.26	4.25	4.45	4.34	4.33	4.32	4.30
Pfr	-0.510	-0.497	-0.493	-0.488	-0.488	-0.501	-0.498	-0.498	-0.496	-0.493
Sol	0.65	0.64	0.63	0.63	0.63	0.64	0.64	0.64	0.63	0.63

Table 2. Table of physico-chemical parameters values, of pasteurized milk sample M2, on the first day of opening and expiration date, for the same temperatures.

Sample M2	Opening date of sample					Expiration date of sample				
%	0ºC	10ºC	20ºC	30ºC	40ºC	0ºC	10ºC	20ºC	30ºC	40ºC
F	2.05	2.00	2.04	2.04	2.05	2.16	2.13	2.06	2.01	2.01
S	7.52	7.42	7.32	7.32	7.28	7.58	7.56	7.45	7.32	7.25
D	27.96	26.57	26.45	26.25	26.22	26.96	26.59	26.48	26.29	26.15
P	2.91	2.87	2.85	2.33	2.26	2.95	2.88	2.82	2.80	2.76
L	4.00	3.95	3.93	3.90	3.84	4.01	3.95	3.96	3.92	3.88
Pfr	-0.450	-0.444	-0.441	-0.436	-0.432	-o.4550	-0.445	-0.441	-0.440	-0.440
Sol	0.58	0.57	0.57	0.56	0.56	0.60	0.59	0.59	0.59	0.59

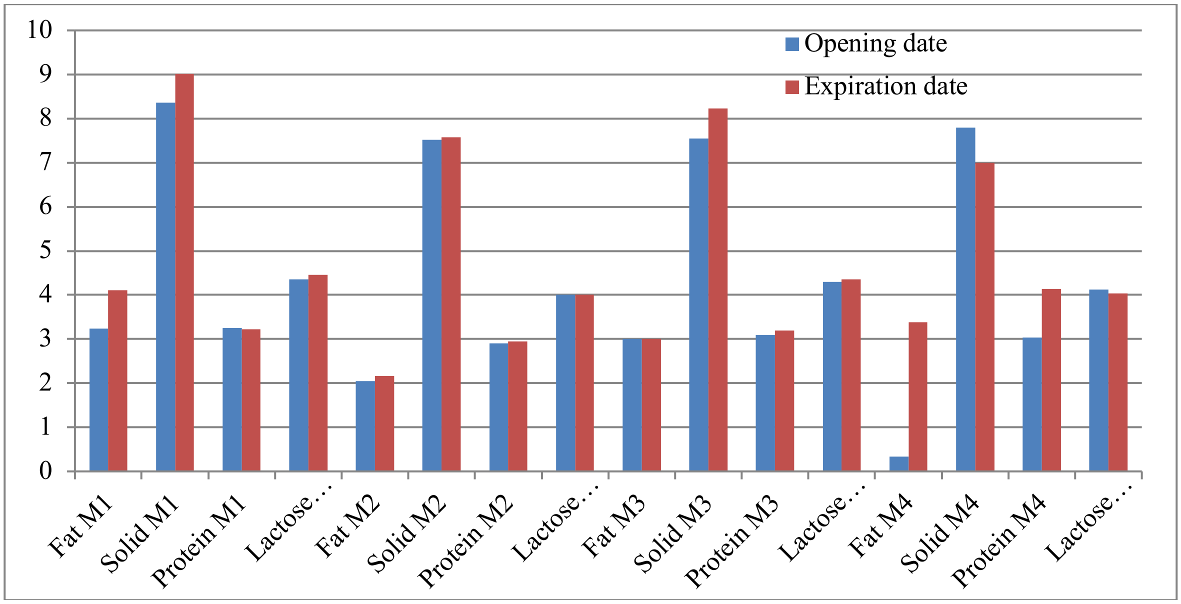
Table 3. Table of physico-chemical parameters values, of pasteurized milk sample M3, on the first day of opening and expiration date, for the same temperatures.

Sample M3	Opening date of sample					Expiration date of sample				
%	0ºC	10ºC	20ºC	30ºC	40ºC	0ºC	10ºC	20ºC	30ºC	40ºC
F	3.01	2.98	2.98	2.92	2.90	3.00	2.99	2.93	2.90	2.80
S	7.55	7.91	7.91	7.69	7.63	8.23	7.85	7.84	7.85	7.80
D	28.01	27.95	27.95	27.16	27.10	29.13	27.96	27.76	27.71	27.66
P	3.09	3.07	3.07	2.99	2.91	3.20	3.04	3.05	3.05	3.04
L	4.29	4.19	4.19	4.08	4.01	4.36	4.19	4.15	4.15	4.12
Pfr	-0.455	-0.479	-0.464	-0.464	-0.460	-0.478	-0.478	-0.474	-0.472	-0.472
Sol	0.59	0.61	0.61	0.60	0.60	0.61	0.61	0.61	0.61	0.61

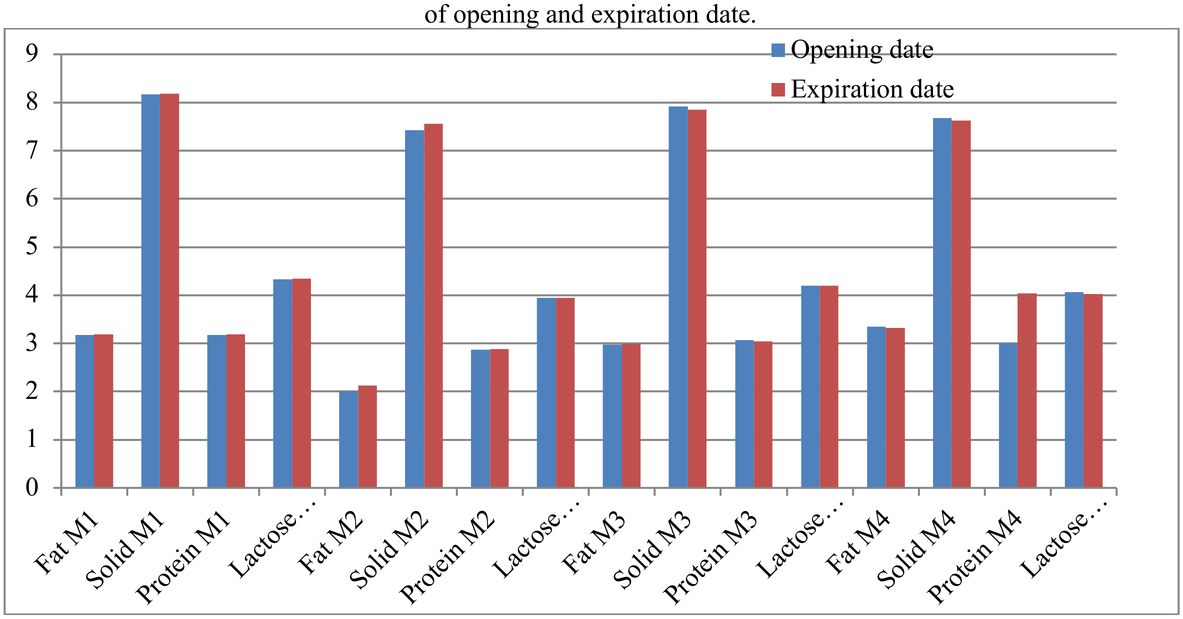
Table 4. Table of physico-chemical parameters values, of pasteurized milk sample M4, on the first day of opening and expiration date, for the same temperatures.

Sample M4	Opening date of sample					Expiration date of sample				
%	0ºC	10ºC	20ºC	30ºC	40ºC	0ºC	10ºC	20ºC	30ºC	40ºC
F	3.40	3.35	3.35	3.33	3.30	3.38	3.32	3.27	3.21	3.14
S	7.79	7.68	7.66	7.60	7.56	7.80	7.63	7.51	7.35	7.23
D	27.30	26.90	26.77	26.64	26.52	27.35	26.73	26.33	25.77	24.74
P	3.04	3.00	2.99	2.97	2.95	4.13	4.04	3.39	3.11	3.04
L	4.12	4.06	3.97	4.00	3.95	4.04	4.03	3.97	2.87	2.68
Pfr	-0.473	-0.465	-0.463	-0.460	-0.460	-0.473	-0.461	-0.454	-0.443	-0.432
Sol	0.61	0.60	0.59	0.59	0.59	0.61	0.60	0.59	0.57	0.57

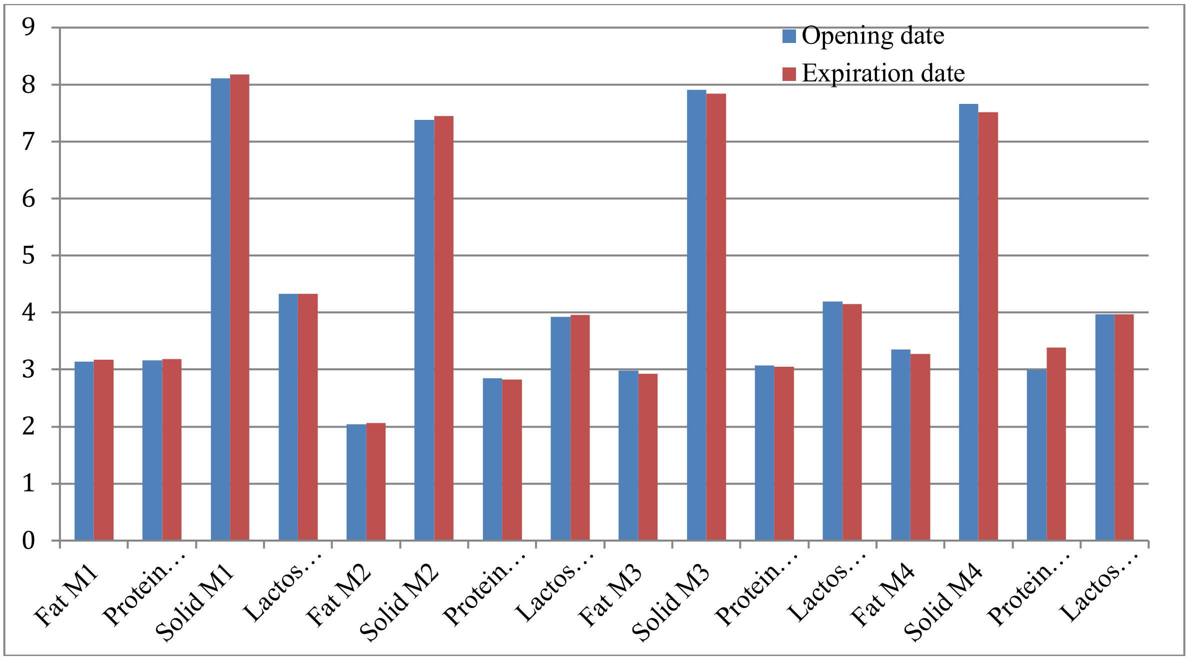
It was seen from the tables above that for all samples, the physico-chemical parameters have changed, in relation to the storage time and treatment temperatures. The results showed an increasing trend in acidity, total solids content and protein content while in lactose content, fat content showed a decreasing trend with the increase in temperature (9) and storage period (4,8,10,11,5,6).



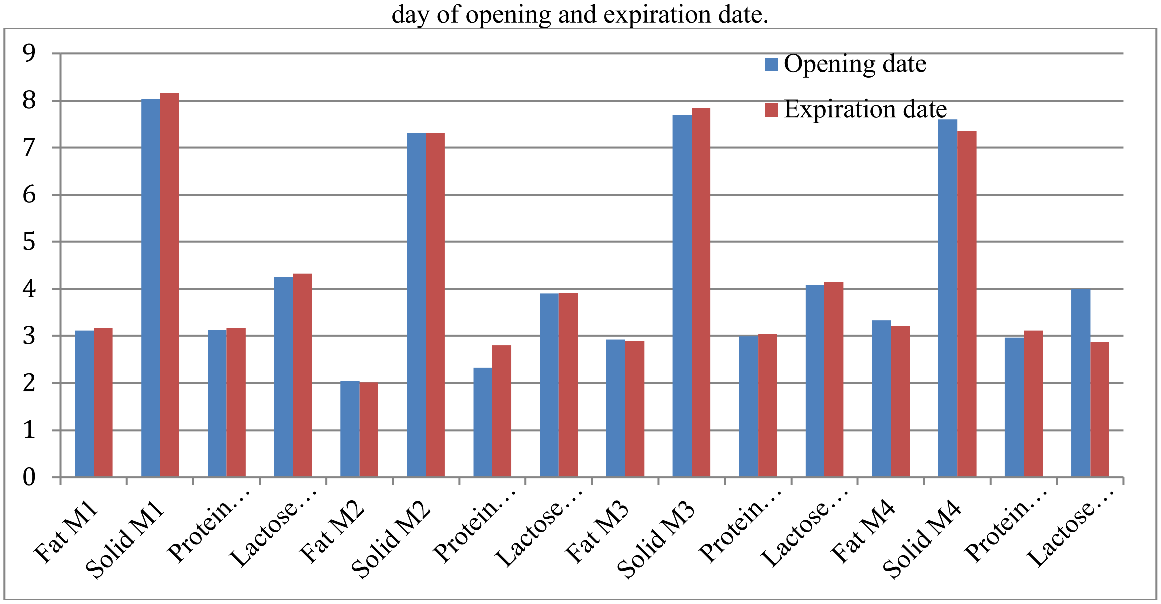
Graph1. Graph of physico-chemical parameters values (%), for pasteurized milk samples, at a temperature of 0ºC, on the first day of opening and expiration date.



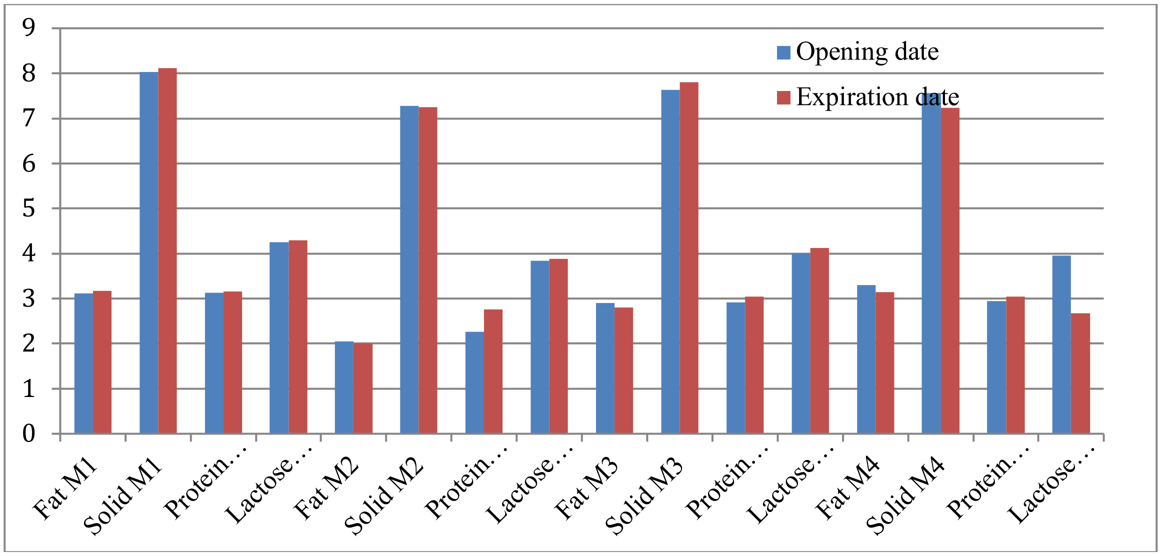
Graph2. Graph of physico-chemical parameters values (%) , for pasteurized milk samples, at a temperature of 10ºC, on the first day of opening and expiration date.



Graph3. Graph of physico-chemical parameters values (%), for pasteurized milk samples, at a temperature of 20ºC, on the first day of opening and expiration date.



Graph 4. Graph of physico-chemical parameters values (%), for pasteurized milk samples, at a temperature of 30ºC, on the first day of opening and expiration date.



Graph 5. Graph of physico-chemical parameters values (%), for pasteurized milk samples, at a temperature of 40ºC, on the first day of opening and expiration date.

It was resulted that physical chemical parameter values are more stable at temperature of 10 degrees Celsius (10ºC) during the storage period and are less stabile at respectively temperature of 20ºC, 0ºC, 30ºC, 40ºC.

Conclusions

- Pasteurization is a process to keep the milk quality and safety.
- From the obtained results, all physico-chemical parameters measured, vary depending on the storage time and on the treatment temperature. The results of this study showed there were an increased trend in acidity, total solids content, proteins content while a decreased trend in lactose content, fat content with the increase in temperature and storage period.
- During the storage time the fat value decreases as a result of thermoresistant bacterial enzymes lipase. The increase of the fat percentage is a consequence of the failure to homogenize the milk in the processing lines. The protein percentage increases during the storage period. This is due to the increased solubility of proteins contained in milk, as a result of protein hydrolysis by the action of thermoresistant enzyme proteases, which have survived the pasteurization process.
- In the pasteurized milk that are traded for consumption in the Albanian market, the physico-chemical parameters are generally stable referring to the international standard.
- It was resulted that physical chemical parameter values are more stable on 10ºC during the storage period and are less stabile on 20ºC, 0ºC, 30ºC, 40ºC. So, it is recommended kept the milk in under cooling condition (4-8ºC) to save their quality.
- The highest stability of physico chemical parameters has shown M2 samples. which means that this pasteurized milk processing line has fulfills the criteria for better preservation of milk quality during the storage period.

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