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## *Generativity is a Core Value of the ESJ: A Decade of Growth*

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century<sup>1</sup>. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

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<sup>1</sup> Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:<http://dx.doi.org/10.1037/0003-066X.50.9.796>

generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

*Sincerely,*

***Daniel B. Hier, MD***

*European Scientific Journal (ESJ) Natural/Life/Medical Sciences*

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# Fife Years After Reform: Assessing the Adequacy of the Pension System in Georgia and EU Countries

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## Abstract

Due to demographic changes and increasing life expectancy, more people retire than are added to the workforce. This is the main reason why, in recent decades, there has been a wave of pension system reforms with the primary objective of improving their financial sustainability. However, several actions implemented as part of these reforms negatively affect the adequacy of pension systems because they involve a decrease in the replacement rate. Hence, balancing the goals of sustainability and adequacy poses a primary challenge for pension policymakers in the upcoming years. This paper aims to determine pension systems' adequacy in Georgia and EU countries based on the Open Method of Coordination (OMC) indicators. OMC evaluates pension systems in terms of three main objectives: adequacy, sustainability, and modernization of pensions. Our methodology is based on multivariate statistical analysis and employs synthetic indicators for adequacy objectives for 2010, 2015, 2018, and 2023. The results of our study show an adverse change in pension system adequacy indicators from 2010 to 2023 in most European countries, including Georgia.

**Keywords:** Pension system; pension adequacy; pension reform in Georgia

## Introduction

Around the world, most old-age support comes from pensions, and in most countries, public pension systems provide the majority of pensions'

value. A significant challenge for governments is enabling people to consume more smoothly. Pensions need to be enough to avoid poverty and social exclusion or to provide sufficient income to maintain the previous standard of living.

A generous pay-as-you-go (PAYG) defined benefit (DB) system can guarantee a comfortable old-age life. Via the PAYG system in most countries, the generous pension payout is financed by tax revenue from the current labor force, and the state guarantees the benefit (pay-out). However, the aging population has threatened the state budget sustainability, as the ratio of the number of tax-payers to the number of retirees becomes smaller (Danzeret al. 2016, Mertl et al. 2019, and Wang 2021). As a result, young people need to save much more for their retirement age to obtain pension benefits at the level enjoyed by current retirees (Amaglobeli et al., 2019).

Therefore, many countries have been shifting to a defined contribution (DC) pension system, where individuals save their income, invest the income, and use the accumulated savings to finance their old age. A defined contribution system guarantees state budget sustainability as the responsibility to provide old-age financial adequacy is shifted from the state to the individuals themselves. Pension system reform is on its way in Georgia.

A Pension Agency established following the 2018 pension reform started collecting and administering the participants' funds of the mandatory funded pension scheme on January 1, 2019. The funded pension scheme in Georgia is based on the 2% + 2% + 2% principle of accumulation. The employer transfers on behalf of the employee 2% of the untaxed amount of the employee's salary to the employee's pension account. The employer contributes the exact amount to the employee's pension account on their behalf. Based on the amount of the employee's salary (but not more than 2% of the untaxed wage), the contribution for the benefit of the employee is also made by the state.<sup>1</sup>

This paper aims to assess the adequacy of the Georgian pension system for the transitioning period and compare it to EU countries' adequacy indicators. It is a continuation of our research aimed at observing indicators of the adequacy of pension systems and determining changes in dynamics. The first research data started in 2010. Results for 2010-2018 have already been published (Ghaniashvili, 2020), and the paper below analyzes updated data from 2010 through 2023.

No matter how we define the pension system, its goals, or its functions, there is no doubt that the system's primary purpose is to provide a retiree with an adequate income at retirement age. Traditional studies on the degree of achievement of the mentioned goal were usually limited to studying the level

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<sup>1</sup> <https://nbg.gov.ge/en/page/funded-pension-scheme>

of pension issued. This is a one-dimensional approach to assess the adequacy of the pension system. In the study below, we discuss a multidimensional approach based on the pension system's macro-functioning, namely the income distribution throughout the life cycle.

One of the critical macro-functional aspects of the pension system is the distribution of GDP between the working-age generation and the rest of the population, including retirees. This means that the income of a current retiree depends, on the one hand, on the level of income allocation over the life cycle and, on the other hand, on current GDP and its redistribution between generations. This must be considered when assessing the adequacy of the pension system. Evaluating the pension system's adequacy also requires indicators for measuring income, poverty, and income inequality.

According to the EU OMC Framework Policy document, there are three main groups for evaluating the effectiveness of pension systems: adequacy indicators, sustainability indicators, and modernization indicators (Table # 1).

**Table #1**

OMC Indicators	
Adequacy Indicators	
ARP	at-risk-of-poverty rate of pensioners
MRI65+	median relative income ratio of $\frac{1}{SEP}$ elderly people aged 65+
ARR	aggregated replacement ratio
S80/S20	inequality of income distribution for people aged 65+
Sustainability Indicators	
PE/GDP	total current pension expenditures as % of GDP
EMP55-64	employment rate of people aged 55–64
DWL	duration of working life
Modernization Indicators	
dARP	gender difference in the at-risk-of-poverty rate of pensioners, $ARP_{males} - ARP_{females}$ , optimal value - 0
dMRI	gender difference in the median relative income ratio, $MRI_{males} - MRI_{females}$ , optimal value - 0
dARR	gender difference in the aggregated replacement ratio, $ARR_{males} - ARR_{females}$ , optimal value - 0

We assess the adequacy of the pension systems of Georgia and EU countries according to the indicators (ARP, MRI, ARR, S80/S20) of the first group of the OMC framework policy.

### Literature review

It is challenging to find a proper explanation for the effectiveness of the pension system at the macro level. Many authors study pension systems at a theoretical level. For example, Ayede (2010) studies the behavior of older

people within the pay-as-you-go system. Breyer and Kolmar (2002) investigate labor market responses during the PAYG system. Wrede (1998) explores the Pareto effectiveness of the PAYG system. Hansen and Lonstrup (2009) analyze the optimal retirement age for both women and men.

As for pension adequacy, its extensive discussion has been proposed by Hurd and Rohwedder (2008). They believe that pension adequacy should be considered primarily in terms of individual well-being and that income expressed in absolute or relative terms (e.g., replacement ratio) does not constitute a proper measure. Borella and Fornero (2009) conducted a comparative analysis of the adequacy of the pension systems of 12 countries. Their study includes comprehensive replacement rates (CORE). It is based on a ratio of the standard of living after retirement to the standard of living a person had before retirement. However, they focus on only one dimension of pension adequacy, as CORE applies only to the optimal rate of uniform distribution of consumption.

Unlike in the generous PAYG system, the old-age financial adequacy in a defined contribution system depends much on individual performance in the labor market and the success in investing the savings. Those who earn little money and those who do not work will have no pension payout. Furthermore, as shown in De Santis (2021), shifting from a PAYG, defined benefit pension system to a defined contribution pension system is complicated because the young generation will have to pay more—financing the current older people and preparing the financing for themselves when they are old. Therefore, old-age financial adequacy and state budget sustainability are often seen as a trade-off (Babajanian, 2010; Baulch & Wood, 2008; Clark, 2012; Diamond, 2012). Countries have been trying to solve the issue of state budget sustainability and old-age financial adequacy by making programs with a combination of PAYG defined benefit system (state responsibility) and a defined contribution system (individual responsibility).

Many existing studies have examined the sustainability and adequacy of pension systems. In a broader sense, these can be divided into analyses within the Overlapping Generations (OLG) framework or other complex forecasting models, often single-country studies, and comparative analyses that aim to classify or rank countries using a set of sustainability and adequacy indicators or a synthetic indicator. Several OLG studies of pension systems and pension reforms are essential to mention (Buyse et al., 2017; Bouzahzah et al., 2002).

In recent years, synthetic indicators have become one of the most commonly used tools of analytical measurement in practice in many fields of social reality (Alonso-Fernandez et al., 2018) and pension economics. Several authors have developed their pension indicators, such as Chybalski (2016) and Alonso-Fernandez et al. (2018). Chybalski points out that the

multidimensional nature of his indicators enables comparisons of many different empirical pension systems.

Since calculating the indicators does not require prior data standardization, this method is more resistant to the relativity of the measurement and comparisons in cross-section studies. However, the relativity enables the analysis since the efficiency-inefficiency border is not determined. Therefore, the proposed approach is efficient only when a few pension systems are compared, and then it is possible to rank them.

### Research Methodology

The study uses a quantitative analysis of pension systems developed by the Polish scientist Filip Chybalski (2016), which is particularly suitable for the macro scale of the pension system and considers its openness at the global level. The method is based on empirical research and allows us to compare the pension systems of several countries or the pension systems of the same country in different periods. This paper will focus on the first group of OMC objectives - the four variables of adequacy indicators.

- (1) The first phase of the research involves collecting the statistical data for the adequacy indicators given in Table # 1 for Georgia and European countries for 2010, 2015, 2018, and 2023 - ARP, ARR, MRI, and S80 / S20 (see statistics in Appendix 1 and Appendix 2).
- (2) The next step is to transform the data. Of the four variables used, ARP and S80 / S20 have a destimulator character (the lower the score, the better it is). In the case of ARR and MRI indicators, the best pension systems are characterized by a high score for these indicators. We transform the ARP and S80 / S20 variables with the following formula:  
$$x_{ij} = \max x_{ij} - x_{ij}$$

The obtained  $x_{ij}$  value is the optimal value of the given (i) indicator for the (j) object.

- (3) Then, we plot all the indicators between [0, 1] using the normalization formula.
- (4) In the last step, we convert the indexed indicators into synthetic adequacy indicators using the following formula:

$$A_{ij} = \frac{1}{4}(xARP_{ij} + MRI_{ij} + ARR_{ij} + S80/S20_{ij})$$

The indicators defined by the OMC policy for European countries are available on the Eurostat website. As for Georgia, we used UNICEF data for 2010, 2015, and 2018 for the APR indicator. According to a UNICEF study, the pensioner poverty rate was 21.3% in 2010, while in 2017, the ARP rate among the retirement generation was 17.6%.

We calculated the MRI indicator for Georgia based on the World Bank data per capita net income and pension income ratio. The ARR index increased from 14% in 2010 to 19.1% in 2019 but decreased during last year and was 0.15 in 2023.

We also calculated the values of the S80/S20 indicator for Georgia based on the World Bank statistical database. The indicator shows the difference between the income of the wealthiest 20% of the country's population and the income of the poorest 20%. The lower the rate, the better it is. In addition, in the case of Georgia, it took a lot of work to find data on income inequality by age category. So, we used the whole picture. Moreover, when comparing the data of the EU countries for the S80 / S20 indicator, the rates of the total population and the population aged 65+ slightly or do not differ. In the case of Georgia, the income inequality rate was 7.9 in 2010, 6.6 in 2018, and 7 in 2023.

**Table #2:** Research results: Pension Systems' Synthetic Indicators of Adequacy by Years and Countries

Country	Pension system Synthetic indicators of adequacy by years			
	2010	2015	2018	2023
EU27	0.61	0.63	0.63	0.6
Belgium	0.53	0.67	0.64	0.63
Czech Republic	0.83	0.78	0.70	0.70
Denmark	0.51	0.68	0.66	0.55
Germany	0.61	0.60	0.53	0.56
Estonia	0.61	0.39	0.32	0.32
Ireland	0.61	0.53	0.54	0.56
Greece	0.46	0.76	0.74	0.68
Spain	0.46	0.79	0.65	0.62
France	0.71	0.79	0.76	0.70
Italy	0.61	0.73	0.65	0.60
Cyprus	0.27	0.52	0.47	0.42
Latvia	0.48	0.34	0.20	0.27
Lithuania	0.68	0.46	0.30	0.32
Luxembourg	0.89	0.93	0.76	0.80
Hungary	0.97	0.87	0.77	0.63
Malta	0.51	0.62	0.6	0.44
Netherlands	0.76	0.78	0.7	0.70
Austria	0.58	0.74	0.7	0.60
Poland	0.69	0.78	0.71	0.70
Portugal	0.41	0.64	0.55	0.52
Romania	0.67	0.58	0.59	0.66
Slovenia	0.53	0.64	0.61	0.60
Slovakia	0.87	0.87	0.85	0.84
Finland	0.60	0.69	0.69	0.67
Sweden	0.73	0.66	0.66	0.58
The Great Britain	0.41	0.59	0.75	

Norway	0.70	0.8	0.79	0.79
Georgia	0.02	0.14	0.19	0.15

Source: Table data is based on the results of a quantitative survey conducted by the authors.  
Data: eurostat; geostat.ge; nbg.gov.ge; world bank

**Limitations:** Since Georgia, unlike European countries, does not publish indicators yearly, the authors had to calculate the indicators themselves. That is why we cannot compare countries' pension systems with 100% accuracy in Georgia. However, the research results give us a clear idea of the development trends of the Georgian pension system based on the OMC framework adequacy indicators.

### Research results and recommendations

Our research has revealed several trends (Table #2):

- Between 2010 and 2015, only eight countries out of 27 European countries (Czech Republic, Germany, Estonia, Ireland, Latvia, Lithuania, Hungary, and Sweden) changed the adequacy ratio of the pension system to the worse.
- From 2015 to 2018, the adequacy ratio of the pension system of most European countries we studied deteriorated. The only exceptions in this case are Ireland, Romania, and the United Kingdom, whose pension system adequacy ratio has improved over the three years since 2015. Indicators of Finland and Sweden remained unchanged.
- As for 2023 data, in most countries, the adequacy indicator of the pension system remained unchanged or worsened. Except for Germany, Ireland, Latvia, Lithuania, Luxembourg, and Romania, their pension system adequacy indicator improved from 2018 to 2023.

As for Georgia:

- The adequacy rate is increasing as the starting point is shallow—in 2010, it was 0.02 points; in 2015, it was 0.14; and in 2018, it was 0.19.
- However, it decreased after 2018 and was 0.15 in 2023.
- Not surprisingly, Georgia's pension system has the lowest level of adequacy among the countries surveyed. Regarding adequacy, Georgia's pension system is close to Cyprus, Estonia, Latvia, Lithuania, and Malta.

Quantitative analysis of the pension system can identify the countries and, consequently, the pension systems that improve their pension adequacy ratios from year to year and those countries where the situation has deteriorated from 2010 to 2023. The examples of successful and unsuccessful countries can provide experiences and recommendations for Georgia. We



should also remember that the adequacy indicator does not give a complete picture of the multidimensional evaluation of the pension system, as adequacy is only one of the three groups of OMC framework policies.

It is also necessary to take into account the fact that only five years have passed since the implementation of the mandatory cumulative pension system based on contributions in Georgia, which only allows us to evaluate the reform's results partially at this stage.

According to Georgia's capital market development strategy for 2023-2028, in 2025, the total value of pension fund assets is planned to increase to 6.55 billion GEL, 3.25 times the value from 2021. 2028 it will reach 12.1 billion GEL, which means an increase of 6.02 times the value from 2021. So, in addition to the environmental conditions in the local or global economy, the increase in the adequacy ratio of citizens' pensions will significantly depend on the investment policy of the Georgian Pension Agency.

According to the regulations in Georgia, the share of foreign assets in the high-risk portfolio is allowed from 40 to 60%, in the medium-risk portfolio - from 20 to 40%, and in the low-risk portfolio - up to 20%. According to the updated strategy of the Pension Agency's Investment Board in 2023, these indicators were determined by 55%, 35%, and 20%, respectively. The investments of Pension Assets shall be carried out through three Investment Portfolios with different risks and expected returns. One of the main differences between the investment portfolios of the Georgian Pension Agency is the percentage of international assets purchased, and the risks stem from this, as the value of stocks on the stock exchanges often fluctuates. When investing pension contributions in shares, profits are expected over a more extended period, and hence, this package is preferred by those with a long time left before retirement. The low-risk investment portfolio is approximately 20% in international stocks and 80% in Georgian financial products. In the medium-risk portfolio, approximately 35% is placed in global stocks and 65% in Georgia. The high-risk investment portfolio has approximately 55% international stocks and 45% Georgian assets and bonds.

The success of the pension system reform will depend mainly on the investment activities of the Pension Agency. Unlike economically developed countries, Georgia will not have the means of compensating for the mistakes made in managing pension assets with taxpayers' money. One of the main reasons for the implementation of the mandatory DC scheme is that the taxpayers, in the conditions of the increase in the share of pensioners in the population and the average life expectancy, can no longer cope with the provision of pension contributions necessary to ensure a valuable retirement life for pensioners. If we look at world practice, we often encounter unsuccessful pension fund experiences, especially in developing countries. Georgia is not a highly developed country and has no "right" to prevent the

pension system reform from being successful. Therefore, today, Georgia is facing a challenge — on the one hand, the implementation of a mandatory cumulative pension scheme due to the urgent fiscal policy need and, on the other hand, the success or failure of this scheme and the risks that accompany the reform in the long term.

At the initial stage of the reform, the Pension Agency invested pension funds only in low-risk portfolios for five years. Since August 2023, the Investment Board has already had the right to invest accumulated pension assets in medium—and high-risk assets, including assets from global markets.

In the long run, investing in global markets is essential, which means protecting the best interests of beneficiaries and beating inflation. Indeed, the period during which Georgia's pension assets were taken to the global market coincided with significant volatility in the financial markets. Still, we must consider the historical experience, according to which the stock market is growing in the long term. Therefore, the reservation, which provided for the redistribution of the riskiness of the pension savings portfolio according to age categories five years after the reform implementation in Georgia, is justified. Investment policy oriented on the global stock market will increase the Georgian pension system's adequacy ratio in the long term.

Taking into account all the trends we discussed above, we consider that:

- i. Growth at such a rate requires investing in assets with a higher risk than the existing ones; in particular, since the capital market assets have a higher rate of return, it is essential for the policy of the pension agency to increase the limits for investing in the foreign market, as there are not enough opportunities and alternatives in the local capital market;
- ii. The Georgian government should give the pension agency more flexibility in setting limits for low-risk, medium-risk, and high-risk assets to reflect the changes in both international and local markets;
- iii. If the assets are primarily directed to the purchase of shares or other relatively high-risk instruments, it will be possible to increase the returns. Changing the volume of pension assets placed in local deposits is essential. Giving preference to one instrument, such as bank deposits, especially in the face of rising inflation, cannot ensure stable real yields and a "decent" pension at retirement age; without a riskier investment policy, it would be challenging to increase Georgia's pension systems' adequacy ratio over the years.

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### Annex #1

Country	Adequacy Indicators							
	ARP		MRI		ARR		S80/S20	
	2010	2015	2010	2015	2010	2015	2010	2015
EU27	12.8	12.5	0.89	0.94	0.53	0.58	3.99	5.22
<b>Georgia</b>	<b>21.3</b>	<b>19.3</b>	<b>0.13</b>	<b>0.23</b>	<b>0.14</b>	<b>0.19</b>	<b>7.9</b>	<b>6.5</b>
Belgium	16.1	12.4	0.75	0.79	0.46	0.47	3.70	3.20
Czech Republic	6.6	7.4	0.82	0.81	0.54	0.51	2.38	2.41
Denmark	16.6	8.8	0.71	0.77	0.44	0.45	3.60	3.22
Germany	13.4	17.0	0.89	0.87	0.49	0.46	3.81	3.96
Estonia	17.9	40.1	0.73	0.62	0.55	0.43	2.94	3.45
Ireland	10.5	15.7	0.85	0.88	0.47	0.37	4.00	4.09
Greece	19.0	10.8	0.84	1.04	0.42	0.62	4.13	4.08
Spain	16.5	10.2	0.88	1.01	0.47	0.66	4.76	4.31
France	7.5	7.1	0.98	1.04	0.65	0.69	3.39	4.46
Italy	12.5	11.0	0.92	0.99	0.53	0.66	4.18	4.51
Cyprus	39.1	16.5	0.65	0.80	0.37	0.43	4.72	4.74
Latvia	19.6	36.7	0.78	0.65	0.47	0.42	3.83	4.20
Lithuania	12.6	27.6	0.93	0.73	0.58	0.46	3.63	4.20
Luxembourg	5.4	5.8	1.05	1.08	0.68	0.80	3.25	3.48
Hungary	4.0	5.8	1.01	1.01	0.68	0.65	2.55	2.99
Malta	17.9	18.7	0.81	0.75	0.44	0.54	3.72	3.41
Netherlands	5.7	6.2	0.87	0.89	0.47	0.52	3.10	3.05
Austria	15.5	12.9	0.90	0.98	0.57	0.62	4.21	3.75
Poland	12.8	11.1	0.93	0.99	0.57	0.62	3.52	3.48
Portugal	18.5	14.4	0.82	0.92	0.53	0.62	5.02	4.96
Romania	12.9	15.8	0.97	1.00	0.64	0.63	4.17	6.19
Slovenia	18.3	15.9	0.87	0.90	0.45	0.46	3.61	3.55
Slovakia	6.7	6.2	0.83	0.91	0.61	0.62	2.32	2.33
Finland	17.0	13.5	0.78	0.81	0.50	0.52	3.07	3.13
Sweden	14.3	17.2	0.79	0.79	0.59	0.57	3.10	3.30
The Great Britain	22.9	18.3	0.81	0.88	0.48	0.50	4.34	4.19
Iceland	6.3	7.3	0.96	0.82	0.48	0.53	3.95	3.49
Norway	12.7	10.1	0.85	0.92	0.50	0.61	2.83	2.91

Source: Table data is based on the results of a quantitative survey conducted by the authors.  
 Data: eurostat; geostat.ge; nbg.gov.ge; world bank

## Annex #2

Country	Adequacy Indicators							
	ARP		MRI		ARR <sup>2</sup>		S80/S20	
	2018	2023	2018	2023	2018	2023	2018	2023
EU27	15.2	16.8	0.91	0.89	0.57	0.57	4.12	4.12
Georgia	17.6	19.8 <sup>3</sup>	0.20	0.24	0.19	0.15 <sup>4</sup>	6.6	7 <sup>5</sup>
Belgium	14.1	15.8	0.78	0.75	0.47	0.48	3.06	3.19
Czech Republic	14.2	14.3	0.74	0.76	0.51	0.52	2.51	2.67
Denmark	9.3	11.1	0.78	0.78	0.45	0.47	3.20	4.49
Germany	18.7	18.4	0.84	0.84	0.46	0.49	4.29	3.92
Estonia	53.6	46.8	0.57	0.56	0.43	0.46	3.64	3.88
Ireland	19.9	16.7	0.84	0.92	0.37	0.39	3.73	4.01
Greece	8.7	17.6	1.01	0.94	0.62	0.78	3.86	4.15
Spain	13.1	18.3	0.95	1.02	0.66	0.77	4.5	4.98
France	7.3	12.4	1.04	0.94	0.69	0.59	4.1	3.74
Italy	12.0	16.9	1.01	0.98	0.66	0.75	4.86	5.22
Cyprus	21.5	23.6	0.8	0.77	0.43	0.42	4.55	4.72
Latvia	48.9	40.1	0.58	0.63	0.42	0.50	5.07	4.93
Lithuania	41.7	36.1	0.64	0.63	0.46	0.36	4.87	4.15
Luxembourg	9.2	10.5	1.11	1.12	0.87	0.97	4.98	4.63
Hungary	10	15.2	0.97	0.79	0.65	0.51	3.39	3.35
Malta	23.7	29	0.72	0.67	0.54	0.53	3.1	4.29
Netherlands	12	17.7	0.81	0.74	0.52	0.53	3.02	2.97
Austria	13.1	17.0	0.95	0.90	0.62	0.56	3.76	4.45
Poland	15	16.5	0.91	0.87	0.62	0.57	3.42	3.44
Portugal	15.7	17.1	0.90	0.94	0.62	0.61	5.23	5.49
Romania	19.5	15.4	0.90	0.93	0.63	0.48	4.46	3.48
Slovenia	18.1	19.2	0.85	0.80	0.46	0.44	3.44	3.40
Slovakia	7	9.6	0.90	1.01	0.62	0.62	2.31	2.53
Finland	13	13.6	0.82	0.80	0.52	0.52	3.02	3.18
Sweden	15.8	13.9	0.80	0.82	0.57	0.59	3.43	4.45
The Great Britain	22.8		0.88		0.50		4.7	
Norway	7.8	7.3	0.91	0.91	0.61	0.56	2.87	2.74

Source: Table data is based on the results of a quantitative survey conducted by the authors.

Data: eurostat; geostat.ge; nbg.gov.ge; world bank

<sup>2</sup> In case of Luxembourg and Malta ARR data are for 2022

<sup>3</sup> In case of Georgia we use share of population under 60% of the median consumption: <https://www.geostat.ge/ka/modules/categories/192/tskhovrebis-done>

<sup>4</sup> we used Average monthly nominal earnings and average pension indicator for calculating ARR in case of Georgia

<sup>5</sup> <https://knoema.com/atlas/Georgia/topics/Poverty/Income-Inequality/Income-share-held-by-lowest-20percent> in case of Georgia we have data for 2021 in case of S80/S20 indicator

## Percepciones Sobre la Evaluación en Línea del Aprendizaje Universitario

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### Resumen

En el ámbito universitario la pandemia instaló como parte de la oferta académica el formato de clases online, como una manera de mejorar la cobertura en el posgrado. El objetivo de este estudio es examinar las percepciones de los docentes de posgrado en educación sobre los procesos de evaluación del aprendizaje universitario de programas en línea. El presente estudio adopta un enfoque cuantitativo, no experimental y de corte transversal, utilizando estadísticas y cuantificando aspectos observables. La muestra consistió en 125 docentes de posgrado en educación, a quienes se les administró un cuestionario diseñado ad hoc, que contó con índices adecuados de validez y confiabilidad. Los resultados indican que evaluar en formato online es particularmente desafiante. Al indagar sobre el impacto emocional en la evaluación, se percibe una variación de los niveles de ansiedad de los docentes de una universidad a otra. La evaluación en línea presenta desafíos

según los docentes encuestados, quienes informan que tienen dificultades para evaluar la parte práctica, controlar las actividades de los estudiantes y atender consultas durante la prueba de evaluación. Además, los docentes experimentan más ansiedad al aumentar las horas en línea para atender a los alumnos.

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**Palabras clave:** Formación del profesorado; evaluación; enseñanza; aprendizaje

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## **Perceptions About Online University Learning Assessment**

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### **Abstract**

At the university level, the pandemic installed the online class format as part of the academic offer, as a way to improve postgraduate coverage. The objective of this study is to examine the perceptions of graduate educators in the field of education regarding the assessment processes of online university learning programs. Method. The present study adopts a quantitative, non-experimental, cross-sectional approach, using statistics and quantifying observable aspects. The sample consisted of 125 graduate educators in education, who were administered a specifically designed questionnaire with appropriate indices of validity and reliability. The results indicate that evaluating in an online format is particularly challenging. When investigating the emotional impact on assessment, variations in anxiety levels among educators from one university to another are perceived. Conclusions. Online assessment poses challenges according to the surveyed educators, who report difficulties in evaluating the practical component, controlling student activities, and addressing inquiries during the assessment test. Additionally,



educators experience increased anxiety as online hours for student support increase.

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**Keywords:** Teacher training; evaluation; teaching; learning

## **Introduction**

Hoy en día, la presencia de cátedras en las universidades en formato online es una realidad, ya no cabe duda de que las instituciones universitarias adoptaron post pandemia una parte de su labor académica presencial por una virtual (García-Peñalvo y Torres, 2020), que evidencia el impacto que tuvo la pandemia en el uso de las plataformas en la continuación de su quehacer académico (García-Peñalvo y Corell, 2020; Molina y López, 2019). Esta incorporación de las tecnologías en la docencia universitaria como un complemento al proceso de enseñanza (Cabero-Almenara, 2020), es una oportunidad para innovar y enriquecer el conocimiento (Cabero-Almenara, 2014; Cabero-Almenara y Barroso, 2016; Guri-Rosenblit, 2018; Pinto et al., 2017).

Cabero-Almenara (2020) plantea que el paso a las tecnologías ha revelado que la formación virtual no es de segunda categoría, el problema está en la falta de competencias digitales docentes (Aguilar, 2020; Cabero-Almenara, 2020), confirmado por la OCDE (2019), que señala que un 40% de los docentes no estaban preparados para utilizar tecnologías de enseñanza-aprendizaje. No obstante, la transformación digital en la docencia universitaria que generó la pandemia implicó no sólo enfrentar la pandemia en términos de continuar con la docencia de manera más efectiva, sino intentar lograr aprendizajes más autónomos (Amador et al., 2017; Prendes et al., 2017).

García-Peñalvo (2020), plantea que las universidades ya no debaten sobre usar o no un modelo híbrido para la enseñanza ni de su efectividad como ocurría antes de la pandemia, sin embargo, pese al reconocimiento del aporte de las plataformas para hacer docencia online, si se cuestionó la preparación y el conocimiento de los profesores. Para algunos autores, existen limitaciones de las herramientas tecnológicas que garanticen sus aprendizajes, en especial la manera de evaluar éstos (González et al., 2020; Maor y Currie, 2017; Mercader y Gairín, 2017; Mercader, 2019; Serey et al., 2023).

Si bien, las lecciones positivas aprendidas en la docencia online son irrefutables para el rediseño de los procesos de enseñanza y de aprendizaje (García-Peñalvo et al., 2020; Vlachopoulos y Makri, 2019), esto, no se vivió igual desde los modelos de evaluación que no estaban pensados desde lo virtual. En este sentido, la experiencia de la docencia online puede ser una oportunidad para mejorar el sistema de evaluación desde la adquisición de competencias tecnológicas que caminen más allá de la urgencia que planteó la pandemia (Cabero-Almenara y Llorente-Cejudo, 2020; García y de la Cruz,

2014; Garcia-Peñalvo, 2020; García-Peñalvo y Corell, 2020; Gutiérrez et al., 2016; Llorens-Largo, 2020a, 2020b; Pardo y Cobo, 2020; Pérez et al., 2020; UNESCO, 2020a, 2020b).

La innovación educativa que está ocurriendo en el mundo, obliga a un cambio del rol docente (Gálvez, y Milla, 2018), esto implica de lleno, lo referido a cómo evaluar y qué evaluar, donde se relacione la evaluación con los aprendizajes que van desarrollando los estudiantes (Amurrio, 2017), es decir, como un diagnóstico para hacer análisis sobre los mismos instrumentos que permitan evaluar la calidad de la enseñanza universitaria desde la misma satisfacción de las expectativas de aprendizaje del estudiantado (Leiva, 2016), que vaya más allá que solo medir los resultados de la calidad de la educación, valorar los resultados del aprendizaje, comprobar y valorar el logro de los objetivos, situación que ha cambiado (Navarro et al, 2017; Serey et al., 2023). Desde esta perspectiva, la evaluación no debe concentrarse solamente en apreciar los procesos de enseñanza-aprendizaje, sino que lleve a un conocimiento significativo (Acebedo-Afanador et al., 2017). Puesto que, en el contexto educativo online la evaluación debe permitir la explicación de cómo se está desarrollando el proceso de aprendizaje (Martínez-Miguel, et al., 2018), entendiendo que la evaluación es una dimensión polisémica que va más allá de una simple calificación (Asun y Zuñiga, 2017; Chaviano et al., 2016), sino que permita una autogestión de los conocimientos y de esta manera de asegurar la calidad de la docencia (García-Peñalvo y Corell, 2020), que ponga el acento en la autonomía del aprendizaje (García-Marcos et al., 2020).

La evaluación en entornos virtuales debe planificarse y ejecutarse minuciosamente atendiendo cada uno de sus elementos y debe ser continúa utilizando diferentes instrumentos de manera que se pueda evidenciar el avance de cada uno de los estudiantes (Lezcano & Vilanova, 2017).

Los desafíos han traído un sentido de incertidumbre, producto de la priorización curricular de las prácticas pedagógicas de enseñanza-aprendizaje, que se llevan a cabo sin estar conscientes de ello. En ese sentido, priorizar el currículo no se trata entonces de desarrollar una nueva habilidad, sino de hacerlo de manera menos tradicional, en la que no escapa la manera de realizar las evaluaciones (Serey et al., 2023).

La evaluación, en la docencia online cobra especial importancia, ya sea por la forma polisémica, o por la búsqueda de la mejora de diversos procedimientos (Rodríguez y Salinas, 2020), esto es lo que permite mejores prácticas evaluativas, en cuanto proceso mediador de un determinado tipo de producción educativa (Remolina-Caviedes, 2020), situación que escapa a la tendencia que existía de creer que la evaluación es de medir resultados (Chaviano, et al., 2016). Por el contrario, hablar de evaluación es entender el proceso educativo de la enseñanza-aprendizaje, como aquello que permita alcanzar una visión sistémica desde diferentes instrumentos que evalúen

diferentes dominios de aprendizajes (Vidal-Taboada et al., 2019). Los estudios realizados sobre la evaluación apuntan a conocer los resultados de aprendizajes a través de los procesos de evaluación formativos (Sonllewa et al., 2018), esto implica, enmarcar la evaluación dentro de una multicitada de acciones pedagógicas enlazadas al diseño de la enseñanza- aprendizaje desde la evaluación (Cerón, et al., 2020).

Esto pone de manifiesto la necesidad de examinar las percepciones de los docentes de posgrado en educación sobre los procesos de evaluación del aprendizaje universitario de programas en línea. De ahí surgen las siguientes preguntas de investigación: ¿Cómo perciben los docentes de posgrado en educación la validez y confiabilidad de las evaluaciones utilizadas en programas en línea para medir el aprendizaje de los estudiantes?, ¿Cuáles son las opiniones de los docentes de posgrado en educación sobre la equidad y la imparcialidad en los procesos de evaluación del aprendizaje en programas en línea, considerando factores como la diversidad de los estudiantes y el acceso a recursos tecnológicos?, ¿Qué desafíos identifican los docentes de posgrado en educación al evaluar el aprendizaje en programas en línea y cómo perciben que estos desafíos pueden afectar la calidad y la eficacia de la evaluación?

Por tanto, se plantean las siguientes hipótesis de estudio: Hipótesis 1: Los docentes de posgrado en educación tienen percepciones positivas sobre la flexibilidad y la adaptabilidad de los procesos de evaluación del aprendizaje en programas en línea, ya que permiten una mayor personalización y seguimiento individualizado del progreso de los estudiantes. Hipótesis 2: Los docentes de posgrado en educación tienen percepciones mixtas sobre la equidad y la imparcialidad de los procesos de evaluación del aprendizaje en programas en línea. Consideran que, si bien ofrecen la oportunidad de evaluar a un mayor número de estudiantes y facilitar la retroalimentación constante, pueden existir desafíos en cuanto a la autenticidad y la identificación precisa del trabajo de cada estudiante. Hipótesis 3: Los docentes de posgrado en educación identifican desafíos significativos al evaluar el aprendizaje en programas en línea, como la dificultad para medir el nivel de participación y colaboración de los estudiantes, así como la falta de interacción cara a cara que puede afectar la interpretación de las respuestas y la retroalimentación efectiva.

## **Metodología**

Para esta investigación con relación al tipo de diseño, se utilizó el Diseño No Experimental, puesto que, esta indagación se llevó a cabo sin la necesidad de manipular deliberadamente las variables, es decir, observar fenómenos tal y como se dan en su contexto natural, para después analizarlo (Hernández-Sampieri y Mendoza, 2018). También se fundamenta en el uso de estadísticas y cuantificación de aspectos observables, analizando los datos

mediante herramientas estadísticas y utilizando procedimientos empíricos-analítico (Sáez, 2017). Es un método que expande y normaliza los resultados (Bernal, 2007). El tipo de muestra fue no probabilística o intencionada por sujetos– tipos (Moral de la Rubia et al., 2013).

**Muestreo**

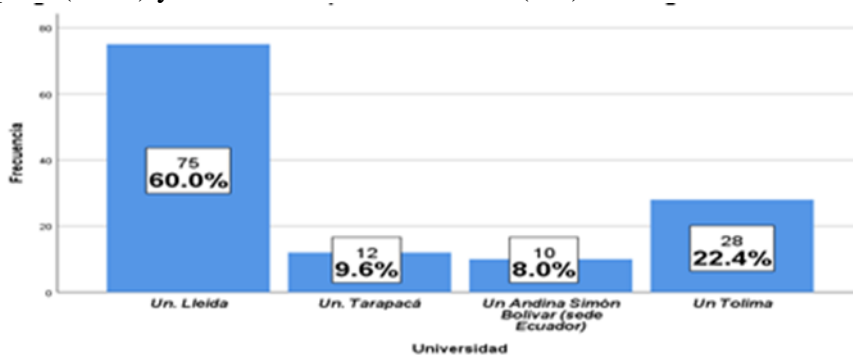
Dado el carácter del estudio, la muestra fue elegida por conveniencia y estuvo compuesta por 125 docentes de posgrado de Pedagogía, de cuatro universidades, distribuidas en: U. Lleida n=75, U. Tarapacá n=12; U.A.S.B. n=10, U. Tolima n=28 (tabla 1).

**Tabla 1:** Distribución de la muestra

Distribución de la muestra por universidades	Masters y/o maestrías en educación	Total de profesorado implicado	Muestra
Universidad de Lleida	9	93	75
Universidad del Tolima	4	71	28
Universidad de la UTA	1	14	12
Universidad Andina Simón Bolívar	1	10	10

Se dispone de un total de 125 participantes  
 Elaboración propia mediante IBM SPSS Statistics 2

De los cuales un 60% son de la Universidad de Lleida (fig. 1). El resto se reparte entre 3 centros latinoamericanos: U. de Tolima (22.4%), U. de Tarapacá (9.6%) y U. Andina Simón Bolívar (8%).



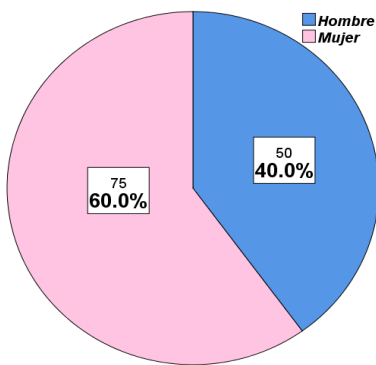
**Figura 1:** Diagrama de barra. Composición de la muestra según UNIVERSIDAD  
 Elaboración propia mediante IBM SPSS Statistics 2

Por sexo, hay más mujeres que hombres: 60% vs 40% (fig. 2). Las mujeres son mayoría en todas las Universidades (65.3%, 60% y 60.7%)

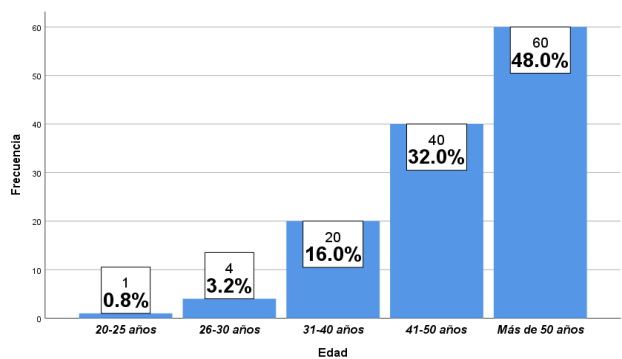
excepto en la de Tarapacá, de donde se tiene más participantes de hombres (75%).

Por edad, cerca de la mitad de la muestra son mayores de 50 años (un 48%; 60 casos). Tras ellos, el intervalo más frecuente se encuentra entre 41-50 años (un 32%). Por tanto, un 20% es menor de 40 años y apenas un 4% no llega a los 31 años (fig. 3). El grupo de mayores de 50 años es el más habitual en todas las universidades (48%, 50% y 60.7%) excepto en la U. Andina Simón Bolívar, donde los participantes están, casi todos, entre 41-50 años (50%) y 31-40 años (40%).

**Figura 2:** Diagrama de sectores. Composición de la muestra según SEXO.



**Figura 3:** Diagrama de barras. Composición de la muestra según EDAD.



Elaboración propia mediante IBM SPSS Statistics 25

Un 52% de estos profesores participantes tienen contrato a tiempo completo (65 casos) y, por tanto, el restante 48% lo tienen a tiempo parcial (60 casos). El tiempo completo es algo más frecuente en la U. de Lleida (57.3%); mientras que el tiempo parcial, lo es en las tres latinoamericanas (58.3%, 60% y 53.6%).

### Instrumento

La recolección de datos se realizó a partir de la elaboración de un cuestionario creado ad-hoc, considerando tres etapas en su diseño. La primera etapa consistió en entrevistar a 125 docentes, con el propósito de obtener insumos que permitieron establecer dimensiones asociadas a la evaluación de enseñanza online. Se construyó un cuestionario ad hoc que estaba compuesto por un total de 22 preguntas. De las cuales: 6 son de respuesta múltiple y generan, entre todas, un total de 44 variables dicotómicas; 4 son de respuesta alternativa; por tanto, son 4 variables categóricas; 1 tiene 14 propuestas a valorar en escala Likert (14 variables cuantitativas).

Por otra parte, con las 11 preguntas de respuesta cerrada que generan en total 62 variables, se ha estimado el grado de fiabilidad de los participantes al responder a esta parte del cuestionario. Se ha empleado el clásico

Coeficiente de fiabilidad “Alfa” de Cronbach, resultando en valor de 0.67 (con IC al 95%: 0.55 – 0.77) que podemos considerar entre aceptable y buena.

### **Procedimiento**

Para la aplicación del instrumento se contactó a cuatro universidades (3 latinoamericanas y 1 europea) que imparten posgrado en educación. Seguidamente, se contactó a docentes de posgrado de las carreras de pedagogías que aceptaran ser parte de esta investigación. A quienes manifestaron la intención de participar, se les envió un correo electrónico con el instrumento y el consentimiento informado, explicitando que su participación es voluntaria y anónima.

### **Análisis de los datos**

El análisis de los datos se realizó con el programa estadístico SPSS AMOS 26. En primera instancia se obtuvieron estadísticos descriptivos mediante la distribución de frecuencias de las respuestas entregadas por los entrevistados.

Las técnicas y test estadísticos empleados fueron:

La descriptiva de variables cualitativas con tablas de frecuencias y porcentajes. Para el cruce de dos de estas variables se han empleado tablas de contingencia.

Las variables de tipo cuantitativo han sido exploradas con el objetivo principal de verificar su ajuste, o no, a la campana normal de Gauss. Para esta exploración se han empleado: (a) gráficos Q-Q normal, (b) índices de asimetría y curtosis, y (c) el Test de Kolmogorov-Smirnov de bondad de ajuste a la normalidad, donde solo un desvío muy grave ( $p < .01$ ), nos hará considerar que la variable no se distribuye normalmente. A la par se ha empleado el gráfico de caja (box plot) para determinar la existencia o no de algún valor atípico debido a su lejanía con respecto a los demás de la muestra (los denominados outlier de tipo far out).

Las variables cuantitativas han sido descritas mediante las herramientas habituales (a) de centralidad: media y mediana; y (b) de variabilidad: rango observado, desviación estándar y amplitud intercuartil.

La fiabilidad del cuestionario se evaluó mediante el Coeficiente “Alfa” de Cronbach de consistencia interna. Un valor superior a .60 indica fiabilidad aceptable, en tanto que si es superior a .80 ya es buena o muy buena ( $> .90$ ).

Para el contraste de la significación de las medias de la misma muestra de sujetos (medidas repetidas / muestras relacionadas) se utilizaron los test paramétricos de Student MR y el Anova con MR en 1 factor cuando las variables se distribuían conforme a la normalidad estadística; y las alternativas no-paramétricas de Wilcoxon y de Friedman cuando no se distribuían según la normalidad estadística.

Para el contraste entre medias de grupos de sujetos distintos (independientes entre sí) se emplearon los test de: Student y Anova de 1 factor, cuando las variables fueron normales y sus respectivas alternativas no-paramétricas (Mann-Whitney y Kruskal-Wallis) cuando no se distribuyeron normalmente.

Se utilizó el Test Chi-cuadrado de independencia para el cruce entre dos variables categóricas que aunque es un test para determinar la existencia/ausencia de relación entre este tipo de variables, de la existencia de la misma se puede inferir la existencia de diferencias significativas en la variable de respuesta entre las categorías del factor explicativo utilizando los valores de los residuos estandarizados corregidos (similares a las Z de la normal, donde el indicativo de significación es que los residuos sean  $\geq 2$ ).

Se calculó el tamaño del efecto para expresar la magnitud de las diferencias entre unas y otras muestras. Este tamaño del efecto se expresó en R2 (escala: 0-1) para que pueda ser comparado entre distintos tipos de datos en las variables y entre distintos tipos de test estadísticos y de estudios. Cuando se compararon medias, R2 se calculó desde el valor “d” de Cohen. Cuando las variables fueron categóricas, R2 se calculó desde el coeficiente V de Cramer, similar al de Pearson, pero específico para este tipo de datos.

En todas estas pruebas estadísticas inferenciales, se considera significación cuando  $p < .05$  (n.c. 5% habitual) y alta significación cuando  $p < .01$  (n.c. 1%). Se puede considerar casi significación, o tendencia hacia ella, cuando  $p < .10$  (<10%).

En los análisis realizados se emplea el término “tamaño del efecto”. El tamaño del efecto es un indicador de la magnitud de los cambios observados en las variables que se miden (VD) debidos a la influencia (el efecto) de la V.I. explicativas o que se manipula. Es un valor que se expresa en escala d de Cohen (diferencia tipificada) o en escala R-cuadrado (proporción de varianza explicada; por 100 = %). En los Test Chi-cuadrado el tamaño del efecto R2 se ha estimado como el cuadrado del Índice W de Cramer, estadístico especialmente descrito para este tipo de cruces y similar al coeficiente de Pearson.

Por otra parte, dado que la muestra es de 125 podría ser una limitación por su tamaño, sin embargo, hay que tener en cuenta que el tamaño del efecto moderado expresa diferencias que son reales y que se pueden detectar hasta con muestras tan pequeñas como  $50 < N < 100$ . El tamaño del efecto pequeño es indicativo de que puede haber algo, pero para detectarlas con cierta seguridad se necesitarían muestras de alrededor de  $N=500$ . El tamaño grande o muy grande evidentemente son diferencias que existen con elevado grado de confianza y que se detectan casi a “simple vista” y hasta con muestras muy pequeñas.

El N por sí solo, ayuda a la presencia o ausencia de significación. Con N muy elevados (de 800-1000-3000-5000-etc...) aparecen significaciones que pueden NO ser reales (y no tengan sentido teórico).

Con N pequeños (de <100 ó <120) es difícil encontrar significaciones, salvo que las relaciones/diferencias, sean muy potentes (muy evidentes) y ya se ven como se menciona arriba “a simple vista”. Por ello, ahí es donde el tamaño del efecto es de ayuda:

Tamaños del efecto pequeños (<2%) con significaciones (al menos  $p<.05$ ) - (a) en N pequeño: indican diferencias que existen, pero son pequeñas/leves – (b) en N grande indican que son diferencias o relaciones que son despreciables.

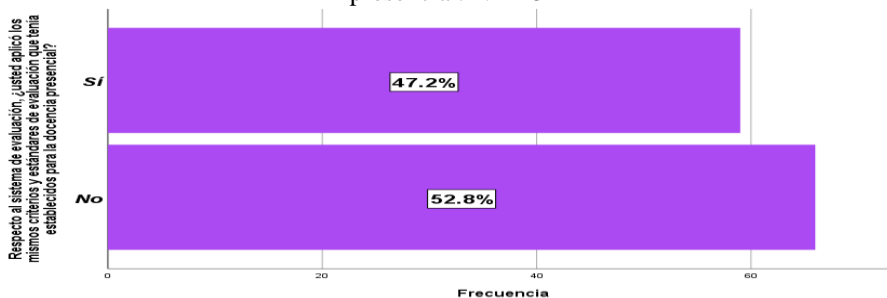
Efectos moderados (>3%; >4%; >5%) o ya elevados (>10%) y que acompañan a una significación (de al menos  $p<.05$ ) indican diferencias o relaciones que existen y que ya son de magnitud/intensidad moderadas o altas; con independencia del N.

Efectos moderados o elevados, pero que aparecen en test sin significación ( $p>.05$ ) son indicios de relación/diferencia; y entonces lo que ocurre es que la significación no se alcanzó porque no había N suficiente para llegar hasta ella.

## Resultados

Criterios y tipología de Evaluación. Casi la mitad de la muestra total, un 47.2% (59 casos), mantiene los mismos criterios de evaluación que tenía en pandemia. Por tanto, una ligera mayoría del 52.8% (66 casos) los modificaron (fig.4), evidenciando la poca preparación de los docentes en el manejo de las TIC para innovar sus procesos de enseñanza-aprendizaje, especialmente en la forma de evaluar.

**Figura 4:** Se aplican los mismos estándares de evaluación que tenía establecidos para la docencia presencial. N=125



Elaboración propia mediante IBM SPSS Statistics 25

Comparado entre centros (tabla 2) no se ha llegado a la significación estadística ( $p>.05$ ) aunque el p-valor (cercano a .10) y sobre todo el tamaño

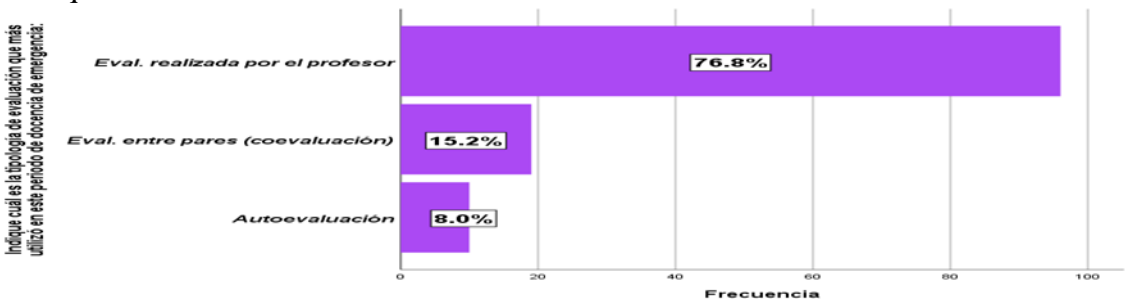


del efecto (moderado: .048) pueden estar señalando en el sentido en el que apuntan los datos: menos modificación en Lleida (56% mantienen criterios) y más cambios en las demás, en especial en la U. de Tolima (67.9% los hizo).

**Tabla 2:** Aplicación de los mismos estándares de evaluación establecidos para la docencia presencial, en función de la Universidad. N=125 profesores

	TOTAL	Universidad				Test Chi-cuadrado		Tamaño del efecto R2
		U.Lleida (n=75)	U.Tarapacá (n=12)	U.A.S. (n=10)	U.Tolima (n=28)	Valor	P valor	
Aplica los mismos criterios de evaluación ya establecidos	47.2%	56.0%	33.3%	40.0%	32.1%	6.01 NS	.111	.048
N.S. = NO significativo								
Elaboración propia mediante IBM SPSS Statistics 25								

Al respecto de la tipología de evaluación (fig. 5) sin duda la más utilizada es la evaluación realizada por el propio docente: 76.8%. Pero cuando se contrastó entre los centros se pudo comprobar (tabla 3) que había diferencia muy significativas ( $p < .01$ ) y con un efecto moderado-notable (.080) debido a que esta forma de evaluación es la más utilizada en tres de los centros (entre un 75% y un 88%) con la excepción de la U. de Tolima donde la usaron menos de la mitad de los participantes en la encuesta (46.4%). En este centro, la coevaluación entre pares e incluso la autoevaluación son las más utilizadas que en todos los demás.



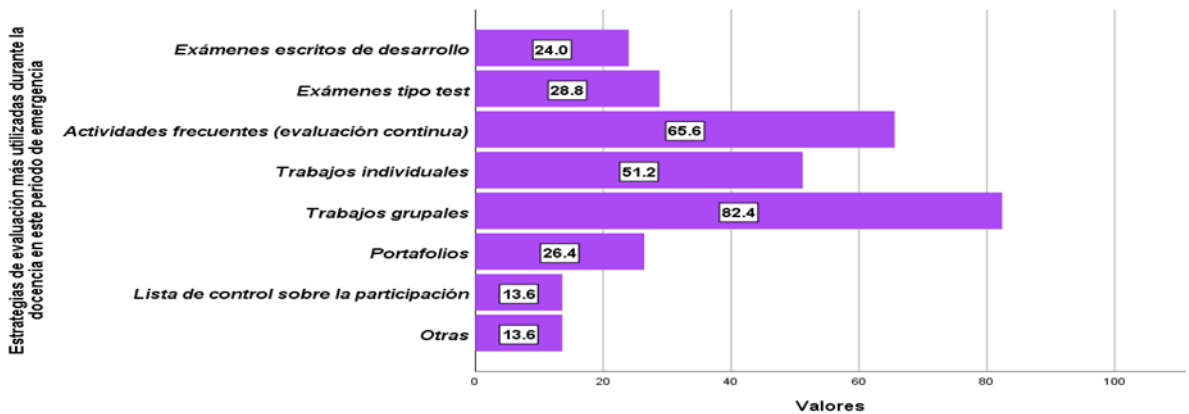
**Figura 5:** Tipología de evaluación más utilizada en la docencia online. N=125  
 Elaboración propia mediante IBM SPSS Statistics 25

**Tabla 3:** Tipología de evaluación más utilizada en la docencia online, en función de la Universidad. N=125 profesores.

	TOTAL	Universidad				Test Chi-cuadrado		Tamaño del efecto R2
		U.Lleida (n=75)	U.Tarapacá (n=12)	U.A.S. (n=10)	U.Tolima (n=28)	Valor	P valor	
Tipología de evaluación más utilizada						20.06**	.003	.080
Por el docente	76.8%	88.0%	75.0%	80.7%	46.4%			
Coevaluación entre pares	15.2%	8.0%	16.7%	10.0%	35.7%			
Autoevaluación	8.0%	4.0%	8.3%	10.0%	17.9%			
** = Altamente significativo								
Elaboración propia mediante IBM SPSS Statistics 25								

Estrategias de evaluación. La figura 6 nos muestra las estrategias de evaluación más utilizadas.

Se observa que los trabajos grupales (82.4%) junto a las actividades frecuentes destinadas a realizar una evaluación continua (65.6%) son las más empleadas. Los trabajos de carácter individual completan el trío más utilizado (51.2%).



**Figura 6:** Estrategias de evaluación más utilizadas durante este periodo de docencia de emergencia. N=125

Elaboración propia mediante IBM SPSS Statistics 25

En la comparación entre los centros docentes (tabla 4) se encontró que en general hay pocas diferencias. Cabe mencionar que:

Existen diferencias muy significativas ( $p < .01$ ) con efecto moderado-alto (.104) en el uso de portafolios que es más habitual en la U. Andina (50%) y en la de Tolima (46.4%) frente a las otras dos (18.7% y 8.3%).

Aparece una casi significación ( $p < .10$ ) con efecto moderado (.057) en el uso de trabajos individuales, mucho más frecuente en Tolima (71.4%) que en las demás (entre un 30% y un 48%).

También con un  $p$ -valor  $< .20$  y un tamaño del efecto moderado (.044) podría haber una tendencia a un mayor uso de los exámenes test en Lleida (36%) en comparación con las demás, especialmente con Tarapacá (8.3% solo).

En forma solamente descriptiva, podemos decir que lo más utilizado es (a) en la U. de Lleida: los trabajos grupales y la evaluación continua; (b) en Tarapacá: los trabajos grupales; (c) en la U. Andina: también los trabajos grupales, pero junto a la evaluación continua; y (d) en la U. de Tolima: las tres citadas como las más frecuentes en la muestra completa. Es decir que varían los valores de los porcentajes, pero no mucho las estrategias.

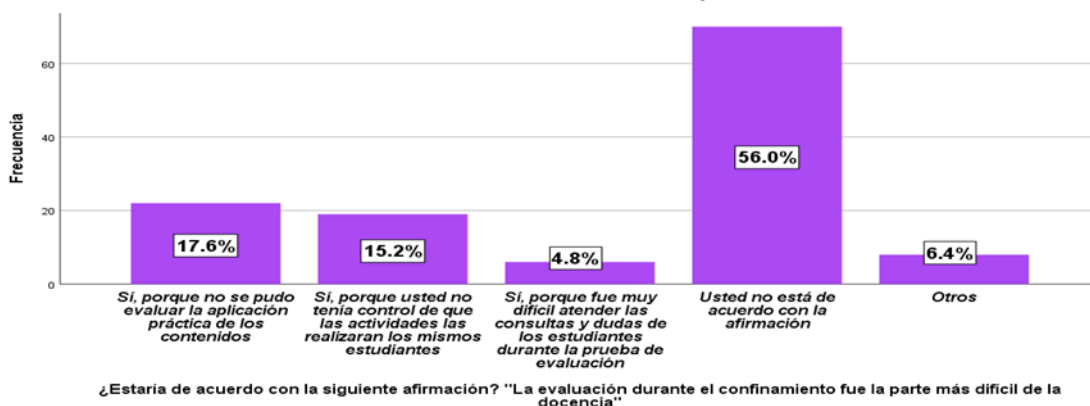
**Tabla 4:** Estrategias de evaluación más utilizadas, en función de la Universidad. N=125 profesores

Estrategias de evaluación:	TOTAL	Universidad				Test Chi-cuadrado		Tamaño del efecto R2
		U. Lleida (n=75)	U. Tarapacá (n=12)	U.A.S. (n=10)	U. Tolima (n=28)	Valor	P valor	
Exámenes escritos de desarrollo	24.0%	29.3%	8.3%	20.0%	17.9%	3.45 NS	.327	.028
Exámenes tipo test	28.8%	36.0%	8.3%	20.0%	21.4%	5.47 NS	.141	.044
Actividades frecuentes (eva. continua)	65.6%	64.0%	58.3%	70.0%	71.4%	0.87 NS	.832	.006
Trabajos individuales	51.2%	48.0%	41.7%	30.0%	71.4%	7.13 †	.068	.057
Trabajos grupales	82.4%	80.0%	91.7%	80.0%	85.7%	1.26 NS	.739	.010
Portafolios	26.4%	18.7%	8.3%	50.0%	46.4%	12.97**	.005	.104
Lista de control sobre la participación	13.6%	13.3%	16.7%	0.0%	17.9%	2.11 NS	.551	.017
Otras estrategias	13.6%	13.3%	25.0%	0.0%	14.3%	2.92 NS	.405	.023
N.S. = NO significativo † = Casi significativo ** = Altamente significativo								
Elaboración propia mediante IBM SPSS Statistics 25								

Dificultad de la evaluación. Un 56% de los participantes piensan que la evaluación no es el aspecto más complicado al realizar docencia online (fig. 7). Entre los que sí están de acuerdo con la afirmación de que evaluar es lo más difícil: un 17.6% lo dice porque no pudo evaluar la parte práctica de los contenidos, un 15.2% porque el docente no tiene control sobre las actividades

de los estudiantes y un 4.8% porque es complicado atender las consultas y las dudas durante la prueba de evaluación.

**Figura 7:** Acuerdo con la afirmación: “La evaluación en la docencia online es la parte más difícil de la docencia”. N=125



Elaboración propia mediante IBM SPSS Statistics 25

En relación a la carga docente y como incluye en la percepción de la evaluación: cómo se puede apreciar en la figura 8, son muchas y muy variadas las respuestas sobre aquel aspecto de su labor docente que es el que más tiempo de trabajo ocupó a estos docentes. Por encima del 50% aparece: replantear las actividades y corregir los trabajos de los estudiantes (ambas con un 53.6%). Y cerca de ese 50% se han quedado: realizar asesorías/tutorías con los estudiantes (48.8%) y buscar nuevos materiales (46.4%).

En el contraste de estas respuestas entre los centros educativos participantes (tabla 18), se ha encontrado que existen diferencias significativas:

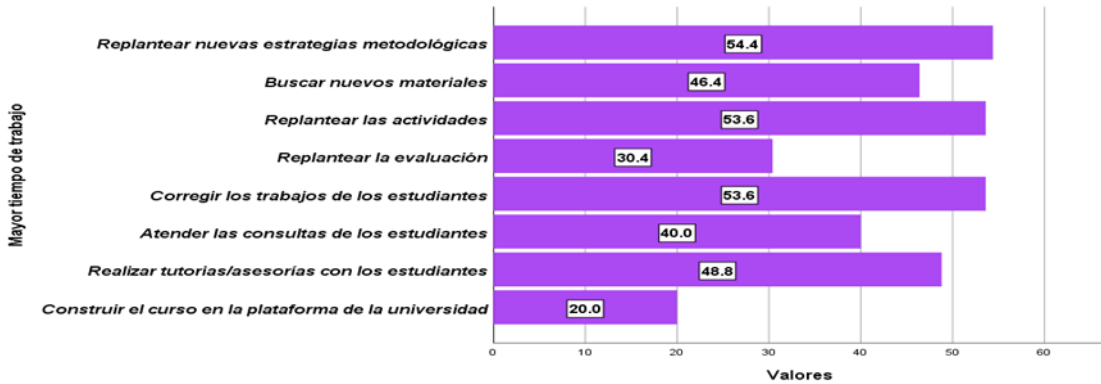
En el tiempo usado para la construcción del curso en la plataforma virtual de la universidad ( $p < .001$  y tamaño del efecto grande: .175), que fue mayor en la U. Andina (40%) y en Tolima (46.4%) frente a de las otras dos: Lleida (10.7%) y Tarapacá (0%).

Y en el tiempo necesario para replantear la evaluación ( $p < .01$ ; y efecto moderado-alto: .097) que fue más elevado en la U. de Tolima (53.6%) que en las demás, pero en especial con respecto a la U. Andina (0%).

Además, se puede hablar de la casi significación ( $p < .01$ ) con efecto moderado (.086) en el tiempo empleado atender las consultas de los estudiantes, que es más elevado en Tolima (53.6%) y en Lleida (41.3%) frente a las otras dos (16.7% y 20%).

No hay significación ( $p > .05$ ) pero el  $p$ -valor  $< .20$  junto a un efecto moderado (.049) pueden ser un indicio de diferencia en el tiempo empleado en replantear todas las actividades. Los datos podrían estar señalando que es

más carga en Tolima (64.3%) y en Lleida (56%) frente a las demás, especialmente con respecto a Tarapacá (20%).



**Figura 8:** Carga de trabajo: Tareas que supusieron mayor tiempo de trabajo. N=125  
 Elaboración propia mediante IBM SPSS Statistics 25

**Tabla 5:** Carga laboral: ocupaciones que les llevan mayor tiempo de trabajo, en función de la Universidad. N=125 profesores

Mayor tiempo de trabajo en:	TOTAL	Universidad				Test Chi-cuadrado		Tamaño del efecto R2
		U.Lleida (n=75)	U.Tarapacá (n=12)	U.A.S.B. (n=10)	U.Tolima (n=28)	Valor	P valor	
Replantear nuevas estrategias metodológicas	54.4%	52.0%	50.0%	40.0%	67.9%	3.15 NS	.369	.025
Buscar nuevos materiales	46.4%	42.7%	58.3%	30.0%	57.1%	3.49 NS	.322	.028
Replantear las actividades	53.6%	56.0%	25.0%	40.0%	64.3%	6.15 NS	.105	.049
Replantear la evaluación	30.4%	26.7%	25.0%	0.0%	53.6%	12.13**	.007	.097
Corregir los trabajos de los estudiantes	53.6%	53.3%	50.0%	50.0%	57.1%	0.26 NS	.698	.002
Atender a las consultas de los estudiantes	40.0%	41.3%	16.7%	20.0%	53.6%	6.59 †	.086	.053
Realizar tutorías/asesorías con los estudiantes	48.8%	48.0%	41.7%	40.0%	57.1%	1.35 NS	.716	.001
Construir el curso en la plataforma de la Univ.	20.0%	10.7%	0.0%	40.0%	46.4%	21.81**	.000	.175

N.S. = NO significativo † = Casi significativo \*\* = Altamente significativo

Elaboración propia mediante IBM SPSS Statistics 25

Este conjunto de ítems, con independencia del resto del cuestionario, tiene una muy elevada fiabilidad puesto que el coeficiente “Alfa” de Cronbach que se ha obtenido es: .92 (con IC al 95% de entre: .90 y .94). El índice de fiabilidad de cada uno de los ítems es, además, entre elevado y muy elevado (ver en tabla 6).

A continuación, se empleó el procedimiento de A.F.E. para determinar la unidimensionalidad de estos ítems y validarlos como escala de evaluación de la ansiedad de los docentes en esta situación de emergencia. Se excluyó al ítem nº 15, puesto que no valora ningún reactivo concreto. El resultado obtenido mediante el método de Ejes Principales (tabla 6) nos permite concluir que efectivamente estos 14 ítems presentan peso factoriales elevados en una única dimensión (entre .54 y .80) de la que explican en total un 59.8% de la variabilidad.

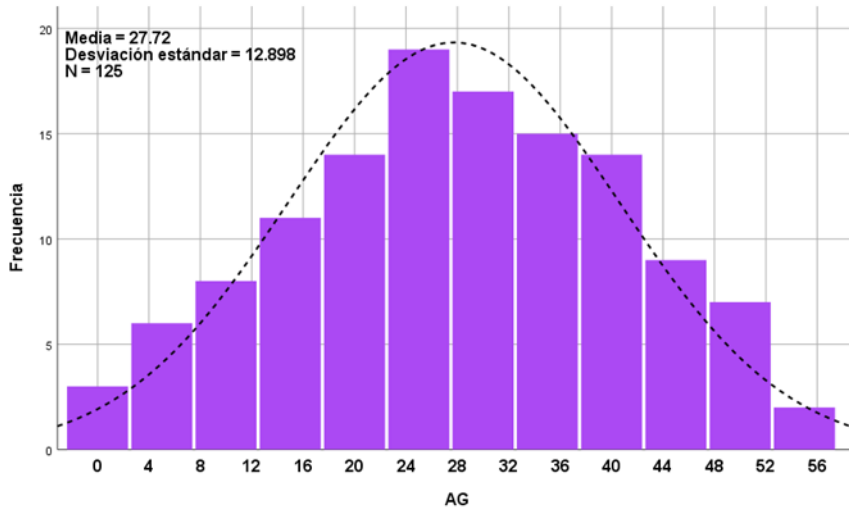
**Tabla 6:** Fiabilidad y unidimensionalidad de los ítems de ansiedad. N=125 profesores.

KMO=.90 Bartlett: P-valor=.00000	Análisis Factorial		Fiabilidad
	Comunalidad	Carga Factorial	
1.- Programación	.363	.60	.54
2.- Clases teóricas	.556	.74	.69
3.- Prácticas	.543	.74	.68
4.- Comunicación	.467	.68	.62
5.- Evaluación	.583	.76	.71
6.- Tutorías	.531	.73	.69
7.- Material	.607	.78	.73
8.- Dar feedback	.496	.70	.64
9.- Nuevas tecnologías	.395	.54	.48
10.- Necesidades S-E	.348	.59	.54
11.- Tiempo en línea	.514	.72	.66
12.- Dinamización	.636	.80	.75
13.- Recibir feedback	.491	.70	.64
14.- Participación	.544	.74	.68

Elaboración propia mediante IBM SPSS Statistics 25

El validar a estos ítems como escala de evaluación de la ansiedad bajo la situación de docencia online, nos permite crear una variable de puntuación total de Ansiedad. Las puntuaciones brutas de esta variable se han obtenido mediante el procedimiento habitual en escalas Likert de acumulación de puntos; es decir: sumatorio de los valores numéricos de las respuestas a todos los ítems. Por tanto, el rango de valores posibles es: 0 a 56. La figura 10 representa la distribución de esta variable en la muestra total de participantes. Como se observa la variable ha presentado valores empíricos en el rango completo 0-56 con mediana en 28 puntos y distribución que se acomoda a una campana normal de Gauss, de la que no se desvía significativamente (Test KS de bondad de ajuste: Valor=0.06; p-valor exacto=.735). La media es de 27.7 puntos (IC al 95%: 25.4 – 30.0) con una desviación estándar de ±12.9 puntos.

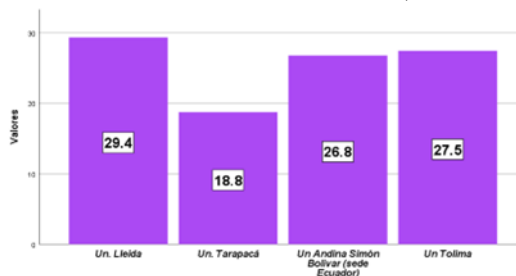
**Figura 10:** Puntuación total en la variable Ansiedad General ante las situaciones asociadas al desarrollo de docencia en línea. N=125



Elaboración propia mediante IBM SPSS Statistics 25

Se compararon los valores medios de las cuatro universidades en esta puntuación total de Ansiedad, resultado que existe una casi significación estadística con  $p < .10$  (Anova:  $F=2.45$   $p\text{-valor}=.067$ ) que se explica porque el valor medio de los profesores de la U. de Tarapacá es menor que los valores medios de los otros tres centros universitarios: 18.8 puntos vs entre 26.8 y 29.4 puntos (fig. 11). El tamaño del efecto. Moderado: .057, puede ser tomado como un indicio suficiente para poder concluir que el grado de ansiedad, general, es menor en los profesionales de Tolima con respecto a todos los demás.

**Figura 11:** Media de la puntuación total en la variable Ansiedad General ante las situaciones asociadas al desarrollo de la docencia online, en función de la Universidad.



Elaboración propia mediante IBM SPSS Statistics 25

## Discusión y conclusiones

La pandemia de COVID-19 durante los años 2020 y 2021 supuso una transformación radical en los procesos educativos, afectando directamente la evaluación del aprendizaje en programas de educación en línea. La transición

forzosa de la docencia presencial a la virtual obligó a las universidades a adaptar sus plataformas digitales, desarrollar nuevas competencias y explorar métodos de evaluación adecuados para el contexto en línea (Balladares, 2021). En este sentido, la presente investigación aborda las percepciones de los docentes de posgrado sobre los procesos de evaluación en estos programas, revelando tanto desafíos como oportunidades.

Los resultados de este estudio, en línea con las hipótesis planteadas, indican que los docentes de posgrado en educación perciben con optimismo la flexibilidad y adaptabilidad de las evaluaciones en línea. La posibilidad de personalizar el seguimiento y adaptar las evaluaciones a las necesidades individuales de los estudiantes es valorada positivamente, coincidiendo con estudios previos que resaltan cómo la evaluación en línea promueve la retroalimentación continua, favoreciendo el aprendizaje autónomo y colaborativo (Sangrá, 2020). En este sentido, la flexibilidad inherente al entorno en línea se considera una ventaja significativa, ya que facilita la integración de diversos métodos de evaluación, como la coevaluación y la autoevaluación, que desplazan al docente del rol central y otorgan al estudiante mayor protagonismo (Yáñez, 2016).

Sin embargo, también se identificaron percepciones mixtas en cuanto a la equidad y la imparcialidad de los procesos evaluativos en línea. Si bien la evaluación colaborativa y continua ha ganado terreno, persisten preocupaciones sobre la objetividad de estos métodos. Este hallazgo es coherente con investigaciones previas que señalan las dificultades de replicar la evaluación práctica en un entorno virtual (Herrera et al., 2020). Los docentes encuestados destacaron la complejidad de evaluar ciertas competencias prácticas, una preocupación especialmente relevante en disciplinas que requieren interacción directa o habilidades técnicas. Además, los docentes señalaron la falta de control sobre las actividades de los estudiantes, lo cual añade un elemento de incertidumbre sobre la imparcialidad de las evaluaciones, y en algunos casos, genera ansiedad entre los docentes (Ramos-Pla et al., 2022).

Otro aspecto destacado en los resultados es la ansiedad experimentada por los docentes al enfrentarse a un aumento en las horas dedicadas a la atención en línea y la retroalimentación de los estudiantes. Este fenómeno fue más pronunciado en universidades como la Universidad de Tolima y la Universidad Andina, donde el tiempo adicional invertido en estas actividades aumentó el estrés docente, lo cual coincide con estudios que documentan el impacto psicológico de la enseñanza en línea sobre los docentes (Herrera et al., 2020). Sin embargo, universidades como la Universidad de Tarapacá reportaron menor ansiedad en sus docentes, lo que sugiere que factores institucionales, como el apoyo y las herramientas tecnológicas disponibles,



pueden influir en la percepción de los docentes respecto a la carga de trabajo y la calidad de las evaluaciones en línea.

El proceso de evaluación durante la pandemia también ha evidenciado una disrupción en las estrategias tradicionales, tal como lo menciona Sangrá (2020). La autoevaluación y coevaluación, prácticas que antes eran marginales, adquirieron protagonismo, destacando la importancia de la retroalimentación como un proceso continuo y colaborativo, en lugar de una calificación final. La evaluación, en este contexto, no es solo un medio para medir el aprendizaje, sino una herramienta de aprendizaje en sí misma. Las estrategias como foros de discusión, talleres virtuales y wikis ofrecen a los estudiantes oportunidades para interactuar, reflexionar y construir su conocimiento de manera más significativa, superando la evaluación basada en exámenes escritos tradicionales (Balladares, 2021).

Es interesante observar cómo la evaluación cualitativa, particularmente a través de portafolios y proyectos colaborativos, ha ganado fuerza frente a las prácticas cuantitativas. Sin embargo, persisten elementos de la evaluación tradicional, como la heteroevaluación a través de videollamadas, que recrean un ambiente similar al presencial. Esto indica que, aunque las prácticas de evaluación en línea han evolucionado, aún hay resistencia a dejar atrás completamente los métodos tradicionales (Ramos-Pla et al., 2022).

A partir de estos hallazgos, es crucial que los programas de educación en línea continúen resignificando sus estrategias de evaluación. Se requiere un enfoque que privilegie la retroalimentación continua, colaborativa y cualitativa sobre los exámenes cuantitativos, de manera que la evaluación se convierta en un proceso formativo más que sumativo. Este enfoque permitiría no solo una mayor personalización en la enseñanza, sino también un desarrollo más integral de las competencias de los estudiantes, favoreciendo aprendizajes transferibles y aplicables en contextos reales (Yáñez, 2016). Asimismo, es necesario que las instituciones brinden un mayor apoyo a sus docentes, tanto en términos de capacitación como de recursos tecnológicos, para mitigar la ansiedad y mejorar la efectividad de las evaluaciones.

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## **Influence of Product, Price, Promotion and Place on Banana Market Trend in Kilimanjaro-Tanzania**

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### **Abstract**

The study focuses on the influence of Product, Price, Promotion and Place on Banana Market trends in Kilimanjaro. Also, the study provides the market strategy to enhance the competitiveness of banana companies in the current market dynamics. Through quantitative research, this paper revealed the effectiveness of (4P) in the Banana marketing strategy and the significant links between place, price, products, promotion and the impact in increasing the market opportunity in the banana sector. Specifically, the study evaluates the performance of marketing strategy practices across various dimensions. The Marketing mix strategy was explored in terms of 4p. The study was conducted in Kilimanjaro targeting a sample of 575 banana growers from 52 wards. This study employed a cross-sectional survey approach to examine the Influence of Four (4P) in the banana value chain Kilimanjaro. Descriptive statistics and chi-square tests were used in data analysis and the results were presented in tables to underline the study's important conclusion and recommendations. The results show that 99.3% of banana growers have a great challenge with access to the market and poor price information. Moreover, 62.8% of producers rely on middlemen rather than delivering

bananas to private companies. Based on these findings, the private sectors are required to decentralize the business model and develop a marketing strategy by implementing the marketing mix in a way that will acquire and then sustain the competitive edge in the market. These will enhance the competitiveness of banana companies and lay a solid foundation for their sustainable success in the banana business.

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**Keywords:** Banana, Marketing, Farmers, Kilimanjaro, Market

## **Introduction**

Banana crops are rich in food starchy and the banana is an important cash crop in Tanzania and the Great Lakes region of East African countries. The East African countries include Tanzania, Uganda, Kenya, Rwanda and Burundi Nyombi., (2013). Banana-based farming, most specifically intercropped with other cash and domestic crops such as coffee, common bean and smallholder dairy cattle system, has played a significant role in sustaining smallholder farmers' livelihoods in the highland, Southern and like zone of Tanzania (Meya et al. (2023); see also (Tumaini et al. 2024). The widespread reports of declining Banana profits in some countries in East Africa including Tanzanian since the 1930s and the low yields today do raise serious food security concerns Tumaini et al. (2024). The banana private business investors known as Micro small and medium-sized enterprises (MSMEs) investing in banana business do contribute to achieving the 2030 Agenda for Sustainable Development Goals (SDGs) United Nations., (2024). Moreover, Private sector by investing in the Banana business MSMEs help reduce levels of poverty through job creation and economic growth, MSMEs are the key drivers of employment, decent jobs and entrepreneurship for women, youth and groups in vulnerable smallholder farmers' locality areas in United Nations., (2024).

Moreover, farmers small holders' farmers are the majority of the world's food producers and play critical roles in feeding the global population closing the gender gap as they ensure women are fully and effectively participating in the production at different levels in the value chain United Nations (2024). Despite Bananas having significant contributions to food security in countries like the Philippines, Tanzania, Uganda, Kenya, India, China, Indonesia and Brazil and another 150 countries contributing to global banana production Filipenco, (2023. Farmers are challenged with the domestic banana market which consists of several marketing channels). Such complex characteristics of marketing channels negatively affect the growth of banana sectors in developing countries including Tanzania Lodovice, & Lee, (2024). Previous studies showed that the price dispersion and response depend on varieties of bananas and market levels from farmgate, wholesale and retail

Lodovice, & Lee, (2024). It is suggested that banana market stakeholders need to develop different strategies to improve the efficiency of the domestic banana market. To improve the complex distribution structure, the government needs to design medium- and long-term projects Lodovice, & Lee, (2024).

On the other hand, the value chain experiences various challenges that threaten the sustainability of banana production and consumption in Tanzania George, (2024). These include pests and diseases such as Fusarium wilt (Panama disease) and Banana Xanthomonas Wilt (BXW), which can devastate banana plantations and reduce yields George, (2024). Moreover, inadequate infrastructure, post-harvest losses, and Banana growers have been challenged by the unreliable banana market and price and some important basic economic concepts like the relationship with buyers and as well as middlemen growth have increased rapidly Mangarin, (2023). This research applies the 4Ps as the assessment and measuring tool to see how the marketing mix model is currently running, namely by applying the 4Ps elements contained in the marketing mix model, Place, Price, Promotion and Product this marketing mix model can quickly describe how this business runs and offer the recommendation for investors and government in general (Mangarin, 2023)

### **Empirical and Theoretical Literature Review**

Changes in the marketing environment have generated a need to reconsider the managerial perspectives on marketing in the business Elhajjar, (2024). Managers around the globe are recognising the increasing necessity for their companies and organisations to develop the skills, aptitudes and knowledge to compete effectively in international markets Roffik, et al (2024); Quester, (1999). The need for managers to develop the skills to respond to these pressures affects companies of all sizes. In the following sections, we will define international marketing and examine if it is important or necessary to become more centralised or decentralised to maintain an effective marketing strategy. To generate growth and excellence, companies need to develop and then implement their marketing mix models in a way that will acquire and sustain their competitive edge in the market (Ravikant, 2007). Marketing Mix Theory became popularized after Neil H. Borden published his 1964 article, The Concept of the Marketing Mix These 4P's are the parameters that the marketing manager can control, subject to the internal and external constraints of the marketing environment. The goal is to make decisions that centre the four P's on the customers in the target market to create perceived value and generate a positive response Langat, (2016). The four 4Ps of marketing: product, price, placement, and promotion are all affected as a company moves internationally. New product and service launches are one of the most challenging for marketers because they require the target audience to go through every stage of the purchase decision sequence: from awareness

and interest, to understanding, trial and, ultimately, brand preference. The challenge is even greater for new products because it requires a greater emphasis on educating not only end users, but also internal audiences and the sales force, those in the channel of distribution, and influencers (Johnson, 2002).

The Product is the central point on which marketing energy must focus the appearance of the product in line with the requirements of the market and the function of the product and products must address the needs of potential customers as identified through market survey (Marshall, 2007). A global company can create a single product and only have to twist elements for different markets. For example, beverage company Coca-Cola applied two formulas (one with sugar, and one with corn syrup) for all markets. The product packaging in every country incorporates the contour bottle design and the dynamic ribbon in some way, shape or form. However, the bottle can also include the country's native language and is the same size as other beverage bottles or cans in that country (Coca-Cola, 2010).

The Price will always vary from market to market. Price is affected by many variables: cost of product development (produced locally or imported), cost of ingredients cost of delivery transportation and tariffs. Getting the price right involves examining customers' perceptions and rival products as well as manufacturing costs. Promotion involves engaging in a range of activities in promotion for example a competition, or product tasting Safitri, et al (2024). Placement (place) refers to how the product is distributed by producers in the case of the current study we mean banana farmers, on how the produce, is packed and transported from farm to market or any intended buyers. It can be ward to-ward, district to district or country-by-country decision influenced by how the competition is being offered to the target market. Using Coca-Cola as an example again, not all cultures use vending machines. Placement decisions must also consider the product's position in the marketplace place involves using the best possible channels of delivering the service such as leading supermarket chains (Svend, 2007).

Another aspect of the marketing mix is Promotion: The global corporation seeks to reduce costs by minimizing redundancies in personnel and working to maximise the speed of implementation and speak with one voice. If the goal of a global company is to communicate the message worldwide, then delivering that message in a relevant, engaging, and cost-effective way is the challenge. The use of social media not only focuses on promotion but also on increasing interaction with prospective the key is testing advertising ideas using a marketing research system proven to provide results that can be compared across countries Putra, (2024). Therefore, the question that bothers the sector's players is how to build brand loyalty to create

understanding and a level of confidence that will promote sustainable growth and profitability for all actors in the chain (Quayson et al., 2024).

The arguments however for standardisation suggest that if you go through the process of adapting the product to local markets it does little but add to the overall cost of producing the product and weakens the brand on the global scale (Beise, 2001). Today's global world, in which consumers travel more, watch satellite television, communicate and shop internationally over the internet, is now becoming smaller. Moreover, there is little need to adapt products to local markets. Brands such as Coca-Cola, MTV, Nike and Levis are all successful global brands with a standardised approach to their marketing mix; all these products are targeted at similar groups globally (Beise, 2001).

For the company to act locally the benefit is gained based on targeting the volume, value-for-money segment, supported by aggressive localisation to get costs down Li et al., 2002. It involves operating similarly to the way the successful local competitors are operating. For example in the PC business, Dell stands out as the one foreign maker of PCs that seems to be holding its own in China by following this strategy IIS & Webb,(2003) & Elder,2004). Hewlett-Packard seems to be heading in this direction. In mobile phone handsets, US producer UT Starcom which has aggressively targeted the market for PHS handsets China being the world's largest market also seems to have built a sustainable competitive position by focusing on China's local, low-end consumer demand. There is a need for the company to act locally this will enable it to bring the product costs down by about half, which then puts them in a much stronger position to compete with the rapidly growing local producers. It also found restaurant satisfaction with wholesale distributors is an important purchasing factor in local food purchasing decisions Roy, (2024). In the light of empirical findings, theoretical and practical implications are discussed. As suggested by Li, (2002) the key elements of localisations-based cost reduction are as follows: By assembling imported parts locally, tariff costs can be reduced by about 20%, the cost saving can be achieved by sourcing raw materials locally, A higher level of savings can be achieved by developing truly local supplier Simon, (2001).To improve the welfare of smallholder farmers, multiple countries (e.g., Ethiopia and India) have launched online agri-platforms to transform traditional markets.

However, there is still mixed evidence regarding the impact of these platforms and, more generally, how they can be leveraged to enable more efficient agricultural supply chains and markets Levi et al., (2024). Agribusiness facilitating market access for farmers is a key strategy for driving rural industrial rejuvenation in China Li, & Xu, (2024). Moreover, in the manufacturing & Service Operations Management. Local designers with knowledge of the domestic market are more capable of adapting an existing

product to suit local tastes and budgets by designing out unnecessary features which involve added cost. In addition, local engineers have a greater working knowledge of domestic industry capabilities, allowing product designs to utilise locally sourced components Shimbun, (2003). Employing local management, rather than experts, may lead to some further cost reduction Hewitt associate, (2002). These bundles of information provide evidence to convince the agribusiness sector in Tanzania to shift and invest the business closer to producers to reduce unnecessary costs that affect farmers' products, prices, quality and income.

The role of marketing is to manage the process and be responsible for identifying, anticipating and satisfying customer requirements profitably and innovative marketing strategies in the agribusiness sector can be effective in increasing consumer understanding about product quality, added value and sustainable agricultural practices Waluyo, (2024). Thus, marketing involves: focusing on the needs and wants of customers, identifying the best method of satisfying those needs and wants, orienting the company towards the process of providing that satisfaction, and meeting organisational objectives Peter, (2007). Private partners pose less of a problem since objectives are generally more well-matched. There is more of a tendency to allow one partner to control the operation at the same time to prevent internal competition at one extreme, a Private Banana company are opting to centralise production to reduce costs. At the other extreme, a company may have products, such as soft drinks, where transportation costs are too high to justify taking advantage of the scale of economy in production. In between these two extremes are products for which multiple production locations are necessary, but for which there is product transaction potential when costs move differently among the countries, due to such factors as inflation rates or an exchange rate re-alignment.

There is also the potential for price competition among these subsidiaries when there is excess capacity. Several companies have instituted regional control to prevent sales shifts which could be disruptive to their production facilities (Williamson, 1965). Furthermore, Smallholder banana farmers grapple with declining farm productivity and low market prices in a fragmented, broker-dominated market (Murigi, & Ogada, 2024). That company is moving more toward centralising its operation so that to adjust the profit margins which will compensate for the cost changes among countries. Selecting the best marketing communication channel for a medium-sized agricultural company is an important area to consider. The current research will fill the gap offered by Nedeljković, et al (2024). The recent article titled, the Selection of Marketing Communication Channels in Agribusiness article offers theoretical and practical recommendations to improve the marketing mix targeting the banana farmers in Kilimanjaro.

## Methods

The sample size of 575 was selected through a purposive sampling from 52 wards. This study employed a cross-sectional survey approach to examine the Influence of Four (4P) in the banana value chain. A one-day training session and a three-day pilot study were carried out before the survey to help improve the questionnaire and guarantee that enumerators were adequately ready. Fifteen trained enumerators using the KOBO tool collected data; their 100% completion rate resulted from the survey's relevance and community awareness. With changes made depending on pilot comments, such as concentrating sales data on the high/peak season and removing uneven seedling costs, the questionnaire focuses on farming techniques, market access, and economic considerations. The major obstacles noted include inappropriate storage, post-harvest handling problems, and insufficient infrastructure, all of which influence product losses.

Descriptive statistics and chi-square tests were used in data analysis; the results were presented in tables to underline important conclusions and recommendations. For Kilimanjaro's food security and economy, the banana value chain is vital. With an eye on the demographic and household of banana growers, transportation issues, and value chain challenges, this study seeks to analyze the commercial viability of the banana value chain. The knowledge acquired from this study should guide policies and other stakeholders to improve the viability and profitability of banana growing in the area.

**Table 1:** Demographic and household distribution and Banana activity (n=575)

Variable	Category	n	%
District	Rombo	342	59.5
	Moshi	171	29.7
	Moshi DC	62	10.8
Age	18-35	29	5.0
	36-60	334	58.1
	61-100	212	36.9
Gender	Male	373	64.9
	Female	202	35.1
People live in households (including children)	1-4	315	54.8
	≥5	260	45.2
People engaged in banana farming	1-3	502	87.3
	≥4	73	12.7
All work together to produce bananas on the same piece of land	Yes	575	100.0
Rent or own the land on which produce bananas	Rent	5	0.9
	Own	570	99.1
Transport process of bananas			
Transport bananas from the farm to the point-of-sale largest commercial buyer	Yes	214	37.2

Means of transportation used to transport bananas during the peak season to the point of sale of the largest commercial buyer	No	361	62.8
	Walk	105	18.3
Trips needed to make on average to transport bananas from the farm to the point of sale of the largest commercial buyer	Cycle	353	61.4
	Small van	90	15.7
	Small truck	27	4.7
	1-4	317	55.1
Responsible for transporting/procuring bananas from the farm	5-8	153	26.6
	≥9	105	18.3
	Middlemen	322	56.0
Pay or share costs for transportation	Brokers	151	26.3
	Buyers/Own	102	17.7
	Yes	5	0.9
Reason for not selling bananas to Private Banana Company	No	570	99.1
	Unaware of Private Banana Company	571	99.3
	Sold to Private Banana Company before but discontinued.	4	0.7

Source: Research Data, 2024

### Residential and Demographic Distribution

The study exposes a varied demographic scene among Kilimanjaro's banana growers. Rombo is the main area producing bananas; 59.5% of responses were from Rombo District, 29.7% from Moshi, and 10.8% from Moshi DC. Reflecting an experienced workforce, the age distribution shows that 58.1% of farmers are between 36 and 60 years old; 36.9% are 61 years or older, suggesting a substantial number of elderly, maybe less physically active people involved in farming. The fact that all respondents cooperate on the same land and the male dominance (64.9%) point to a gendered division of work and a strong feeling of community inside farming operations. The ownership of land (99.1%) emphasises the stability and dedication of the farming households.

The banana value chain is challenged by transportation choices and logistics. Only 37.2% transport to larger commercial buyers. A considerable number of producers (62.8%) rely on middlemen rather than delivering bananas to the main commercial client. The means of mobility using bicycles is (61.4%) and walking is (18.3%) and it shows a dependence on less effective strategies, therefore aggravating post-harvest losses and lowering market access efficiency. The great frequency of journeys needed 55.1% making one to four trips adds to these problems. The low use of small trucks (4.7%) points



to a main obstacle being an insufficient transportation system. Using better access to motorised vehicles and enhancement of road networks, among other transportation choices, one can greatly minimise spoilage and increase market efficiency.

With 56% of farmers depending on middlemen and 26.3% on brokers for marketing their produce, intermediaries become rather important in the banana value chain. Since these middlemen take a large portion of the income, farmers' profit margins are often lowered from this great reliance on them. Using cooperative structures and direct marketing channels, farmers could be able to avoid middlemen, therefore preserving a larger portion of their income and maybe improving their profitability.

The results show that 99.3% of banana growers have a great degree of unawareness regarding Private Banana Company market implying that many of them are losing out on maybe profitable market prospects. This unawareness reduces farmers' access to better prices and market contacts. Given just 0.7% of respondents had past encounters with Private Banana Company, marketing mix promotion, company positioning and educational initiatives are needed. Improving farmers' understanding of market possibilities and organisations like Private Banana Company would enable effectively negotiate the market, increase their economic performance, and assist the expansion of the banana industry in the region.

Maintaining banana quality and lowering losses depend on post-harvest handling methods. The survey found several important problems including rotting, physical damage, and poor handling techniques brought on by bad sanitation, temperature control, and packing. The perishable character of green bananas and inadequate infrastructure for managing them aggravate these issues. The effects on farmers' livelihoods are that bad handling methods cause market value to drop and economic losses. Minimising losses and raising banana quality depend on using improved post-harvest management strategies, increased sanitation standards, and efficient farmer handling and packaging techniques training (Table 4.1).

### **Demographic and household distribution by District**

The age distribution reported considerable variations between districts ( $\chi^2= 14.188$ ,  $p = 0.007$ ). In Moshi, 51.7% are between 18 and 35 years old, in Rombo most of the farmers are older 67.5% are between 61 and 100 years. Though Moshi DC indicates a concentration of younger farmers, her distribution is rather balanced. This implies that farming methods and problems might be influenced by age demographics. Although Rombo's older farmers may have more experience, they can also have physical restrictions unlike those of younger farmers in Moshi. By customising support programs

to meet age-specific needs such as agricultural methods for younger generations or physical aid for elderly farmers, one improves general output.

Gender distribution among the districts indicates a non-significant chi-square value ( $\chi^2 = 3.872$ ,  $p = 0.144$ ), thereby no appreciable gender-based variations in banana cultivation activity. Rombo (62.2%) shows a higher proportion of male farmers than Moshi (28.4%) and Moshi DC (9.4%), nonetheless. The distribution points to the possible influence of gender roles on farming dynamics even if the statistical test shows no change. Investigating gender-specific issues and possibilities to assist in correcting any underlying inequalities and provide fair support for farmers, male and female alike.

Rombo has a higher share of households with 1–4 individuals (62.2%), while Moshi municipal and Moshi DC have a less balanced distribution according to household size data ( $\chi^2 = 4.107$ ,  $p = 0.128$ ). The non-significant chi-square value suggests that district household size does not change appreciably. Rombo's bigger households, however, affect the labour availability for banana growing. Programs aimed at meeting labour demands or supporting bigger homes could assist in maximising farming activities and output.

Across districts, the number of persons involved in banana growing shows variance ( $\chi^2 = 17.562$ ,  $p < 0.001$ ). Whereas Moshi has a higher percentage of farmers with 4 or more individuals active, Rombo, 62.7% of farmers have 1-3 people involved. This implies that Moshi might feature bigger, more labour-intensive operations while Rombo's banana growing is more likely to be a small-scale business. With tactics for both small-scale and larger-scale farms, customising support depending on the degree of farming activities could enhance efficiency and productivity.

Data on land tenure ( $\chi^2 = 3.272$ ,  $p = 0.195$ ) shows no appreciable variation in district ownership or rental of land. Of the farmers, most own the land they work on (59.8% in Rombo, 29.5% in Moshi, and 10.7% in Moshi DC). The data indicates that Rombo has the most land ownership, even if the statistical relevance is not significant. Rombo's more stable land ownership could help to create a safer farming environment than in Moshi and Moshi DC, where rental agreements are more frequent. Providing support for people renting land and guaranteeing safe land ownership will help to enhance farming activities and banana industry investment.

**Table 2:** Demographic and household distribution by District\*Significant; \*\* Very significant

Demographic household	and	Rombo n(%)	Moshi n(%)	Moshi DC n(%)	X <sup>2</sup> (p-value)
<b>Age (Years)</b>					14.188(0.007) *
18-35		12(41.4)	15(51.7)	2(6.9)	
36-60		187(56.0)	107(32.0)	40(12.0)	
61-100		143(67.5)	49(23.1)	20(9.4)	
<b>Gender</b>					3.872(0.144)
Male		232(62.2)	106(28.4)	35(9.4)	
Female		110(54.5)	65(32.2)	27(13.4)	
<b>People live in households (including children)</b>					4.107(0.128)
1-4		196(62.2)	92(29.2)	27(8.6)	
≥5		146(56.2)	79(30.4)	35(13.5)	
<b>People engaged in banana farming</b>					17.562(<0.001) **
1-3		315(62.7)	137(27.3)	50(10.0)	
≥4		27(37.0)	34(46.6)	12(16.4)	
<b>Rent or own the land on which produce bananas</b>					3.272(0.195)
Rent		1(20.0)	3(60.0)	1(20.0)	
Own		341(59.8)	168(29.5)	61(10.7)	

Source: Research Data, 2024

### Banana activity processes by District

Analysis of banana transportation to the biggest commercial buyer exposes geographical differences. Compared to 20.6% in Moshi municipal and 11.7% in Moshi DC ( $\chi^2 = 13.839$ ,  $p = 0.001$ ), 67.8% of Rombo's farmers straightforwardly get their bananas to the point of sale. Rombo farmers have more direct access to markets, which could be the result of more effective local market systems or improved infrastructure. Farmers in Moshi municipal and Moshi DC, on the other hand, have more difficulties and most likely pay more for transportation and suffer less profitability. The chi-square value implies that by lowering reliance on middlemen and thereby cutting transportation costs, enhancing market access in Moshi municipal and Moshi DC could increase the commercial feasibility of banana production.

Furthermore, the difference among districts is the means of transportation utilised to carry bananas. While in Moshi just 25.5% of farmers use bicycles, in Rombo 65.7% of farmers use bicycles; in Moshi DC the proportion reduces to 8.8% ( $\chi^2 = 20.151$ ,  $p = 0.003$ ). Walking is more common in Moshi municipal (38.1%), and Moshi DC (12.4%), than in Rombo (49.5%), and small vans and trucks are less used in Rombo (53.3% and 37.0%,

respectively). These variances imply Rombo gains from improved transportation choices, which could cut the time and expenses involved in delivering products to market. In Moshi and Moshi DC, where reliance on less effective approaches is greater, improving transport infrastructure could help to reduce spoilage and increase market competitiveness.

Different districts demand different frequencies of trips needed to move bananas. Whereas in Moshi only 29.7% of farmers make 1-4 excursions, in Rombo 61.2% of farmers make these journeys ( $\chi^2 = 14.544$ ,  $p = 0.006$ ). In Moshi DC just 9.1% of farmers do. This suggests Rombo farmers might have closer proximity to markets or higher logistical efficiency, therefore lowering the requirement for several visits. Farmers in Moshi and Moshi DC, on the other hand, frequently deal with more logistical challenges that could result in lower profitability and maybe higher transportation expenses. Simplifying transportation logistics would help to solve these issues, therefore banana cultivation would become more feasible in Moshi and Moshi DC.

Rombo has 58.4% of farmers depending on bananas, compared to 31.1% in Moshi and 10.6% in Moshi DC ( $\chi^2 = 2.139$ ,  $p = 0.710$ ), therefore middlemen have the most responsibility for transporting bananas. Though the difference is not statistically significant, the way that transport expenses are distributed indicates clear variance. While 80% of Moshi farmers and 20% of Moshi DC farmers pay or share transportation costs, just 0% of Rombo farmers do ( $\chi^2 = 7.682$ ,  $p = 0.021$ ). This implies that Rombo farmers will gain from reduced transit expenses when compared to those in Moshi, where farmers incur a major financial load. Dealing with the differences in cost-sharing policies can help Moshi's farmers have better financial results.

With 59.9% of Rombo farmers, 29.4% of Moshi farmers, and 10.7% of Moshi DC farmers reporting they are unfamiliar of Private Banana Company ( $\chi^2 = 5.926$ ,  $p = 0.052$ ), awareness of Private Banana Company differs greatly within districts. Rombo farmers' lack of knowledge can restrict their market prospects and thereby influence their profitability. More market possibilities and maybe higher pricing for farmers could come from raising awareness and enabling better access to Private Banana Company, especially in Rombo where present involvement is low. All things considered, the results emphasise geographical variations in banana market access and transportation. Targeted upgrades in transport infrastructure, cost-sharing policies, and market awareness could increase the profitability and efficiency of banana cultivation in Kilimanjaro, so addressing the issues experienced by farmers in various districts (Table 3).

**Table 3: Banana activity processes by District\*Significant; \*\* Very significant**

Banana activity processes	Rombo n(%)	Moshi municipal n(%)	Moshi DC n(%)	X <sup>2</sup> (p-value)
<b>Transport bananas from the farm to the point-of-sale largest commercial buyer</b>				13.839(0.001) *
Yes	145(67.8)	44(20.6)	25(11.7)	
No	197(54.6)	127(35.2)	37(10.2)	
<b>Means of transportation used to transport bananas during the peak season to the point of sale of the largest commercial buyer</b>				20.151(0.003) *
Walk	52(49.5)	40(38.1)	13(12.4)	
Cycle	232(65.7)	90(25.5)	31(8.8)	
Small van	48(53.3)	31(34.4)	11(12.2)	
Small truck	10(37.0)	10(37.0)	7(25.9)	
<b>Trips needed to make on average to transport bananas from the farm to the point of sale of the largest commercial buyer</b>				14.544(0.006) *
1-4	194(61.2)	94(29.7)	29(9.1)	
5-8	101(66.0)	34(22.2)	18(11.8)	
≥9	47(44.8)	43(41.0)	15(14.3)	
<b>Responsible for transporting/procuring bananas from the farm</b>				2.139(0.710)
Middlemen	188(58.4)	100(31.1)	34(10.6)	
Brokers	96(63.6)	38(25.2)	17(11.3)	
Buyers/Own	58(56.9)	33(32.4)	11(10.8)	
<b>Pay or share costs for transportation</b>				7.682(0.021) *
Yes	0(0.0)	4(80.0)	1(20.0)	
No	342(60.0)	167(29.3)	61(10.7)	
<b>Reason for not selling bananas to Private Banana Company</b>				5.926(0.052) *
Unaware of Private Banana Company	342(59.9)	168(29.4)	61(10.7)	
Receive better prices by selling to other off takers	0(0.0)	0(0.0)	0(0.0)	
Sold to Private Banana Company before but discontinued.	0(0.0)	3(75.0)	1(25.0)	

Source: Research Data, 2024

### **Banana volume sales and market distribution in Rombo**

With an average home size of 4.27 individuals (median 4, IQR 3-6), Rombo suggests that banana cultivation is a group effort involving several house members. Banana cultivation averages 2.02 (median 2, IQR 1-2), suggesting a degree of family participation in farming operations. Although farmers vary greatly in the average land size used for banana growing median of 0.75 acres, IQR 0.5–1 this indicates a range of modest to large-scale farming operations. Reflecting the different ranges of banana output, the average number of banana trees grown is 207.84 (median 150, IQR 100-250). These demographic elements together draw attention to how household size and land area shape Rombo's banana growing methods and output levels.

Seasonal variations in the volume of bananas grown and sold are evident. The average amount sold between January and April, the high season, is 14.62 kg (median 2 kg, IQR 1-3), indicating a production peak. During the low season, from May to October, the average amount sold is 8.77 kg (median 1 kg, IQR 1-2), suggesting lower production. With similar low production levels, the median season (November to December) average volume sold is 8.22 kg (median 1 kg, IQR 1-2). With higher output during peak seasons and reduced during off-seasons, this seasonal fluctuation reflects the effect of climatic and market elements on banana sales.

With an average need of 9759.94 kg (median 600 kg, IQR 2725-12000) and prices per unit of 819.39 TZS (median 50 TZS), fertiliser costs constitute a significant part of banana production expenses. While harvesting expenses average 30520.11 TZS (median 25000 TZS, IQR 25000-60000), labour costs for applying fertilisers and pesticides average 46672.71 TZS. Average maintenance labour expenditures are 35776.22 TZS (median 30000 TZS, IQR 20000–50000). These numbers show the large financial outlay needed for labour and supplies, which greatly affects general sustainability and profitability in banana growing.

Sales to various market segments expose different economic dynamics. Prices average 333.23 TZS per kg (median 200 TZS, IQR 42.5-200), whereas the average quantity of bananas sold to neighbours during the high season is 150.72 kg (median 65 kg, IQR 42.5-200). At 397.28 TZS per kg (median 250 TZS, IQR 200–300), sales to intermediaries average 3508.04 kg (median 800 kg, IQR 450–3200). Prices average 1429.81 TZS per kg (median 250 TZS, IQR 200-300); sales to local markets average 2192.37 kg (median 600 kg, IQR 300-2940). Variations in prices and volume sold across several market channels point to distinct market possibilities and financial constraints farmers must face.

With an average of 89.11 kg (median 50 kg, IQR 30-80) of bananas impacted by diseases or theft, post-harvest losses are a serious problem. At the farm gate, an average of 162.7 kg (median 45 kg, IQR 30-120) is spoilt; 127.82

kg (median 50 kg, IQR 40-120) stay unsold on the market. During the high season average, the estimated total banana sales come to 233345.17 TZS (median 80000 TZS, IQR 80-300000). Per journey, the cost of transportation averages 3517.29 TZS (median 4000 TZS, IQR 2000–5000.). These numbers show losses at the market and manufacturing stages, which emphasises the need for better post-harvest management and effective transportation methods to increase profitability.

**Table 4:** Banana volume sales and market distribution in Rombo

Rombo-Banana volume sales and market distribution	Rombo		
	Mean (SD)	Median (IQR)	Min-Max
People live in households (including children)	4.27(1.87)	4(3 - 6)	(1 - 10)
People engaged in banana farming	2.02(0.99)	2(1 - 2)	(1 - 6)
The land size used to farm bananas(acres)	0.94(0.89)	0.75(0.5 - 1)	( - 13)
The number of banana trees that have been planted on the land	207.84(229.89)	150(100 - 250)	(1 - 3000)
High season (January to April)	14.62(45.23)	2(1 - 3)	( - 600)
Low season (May to October)	8.77(25.63)	1(1 - 2)	(1 - 300)
Medium season (November to December)	8.22(17.3)	1(1 - 2)	(1 - 120)
Number of fertilizers required (in KGS)	9759.94(12237.79)	6000(2725 - 12000)	(25 - 85000)
Cost per unit of fertilizer (in TZS)	819.39(4673.46)	50(50 - 500)	(20 - 50000)
Labour costs for applying fertilizers and pesticides (in TZS)	46672.71(32929.35)	40000(25000 - 60000)	(60 - 210000)
Labour costs for harvesting (in TZS)	30520.11(24892.27)	25000(15000 - 41250)	(500 - 200000)
Labour costs for maintenance activities ie weeding (in TZS)	35776.22(21188.35)	30000(20000 - 50000)	(7000 - 150000)
Water supply (if not rain-fed) (in TZS)	14000()	14000(14000 - 14000)	(14000 - 14000)
The total produce harvested in the last high season consumed within the household (in KGS)	249.71(466.39)	150(80 - 300)	(16 - 7000)
Kgs sell to neighbours in the High season	150.72(225.08)	65(42.5 - 200)	(1 - 2000)
The Price in TZs per kg - when selling to neighbours	333.23(858.15)	200(200 - 250)	(25 - 10000)
Kgs sell to middlemen in the High season	3508.04(21416.43)	800(450 - 3200)	(3 - 320000)
The Price in TZs per kg - when selling to middlemen	397.28(1210.78)	250(200 - 300)	(15 - 15000)
Kgs sell to primary markets (local markets) in the high season	2192.37(3502.99)	600(300 - 2940)	(6 - 21200)

The Price in TZs per kg - When selling to local markets	1429.81(13135.19)	250(200 - 300)	(11 - 171000)
Kgs stolen or affected by diseases in the high season	89.11(171.26)	50(30 - 80)	(2 - 1600)
An approximate proportion of bananas that are spoilt at the farm gate (in kgs)	162.7(271.61)	45(30 - 120)	(8 - 1600)
An approximate proportion of bananas that remain unsold in the market (in kgs)	127.82(156.35)	50(40 - 150)	(8 - 500)
An estimate of total banana sales in the last high season.	233345.17(389677.28)	80000(80 - 300000)	(5 - 2480000)
The cost of transportation per trip (in TZS)	3517.29(2526.09)	4000(2000 - 5000)	(100 - 25000)
Amount paid per trip during the peak season (in TZS)			

Source: Research Data, 2024

### Banana volume sales and market distribution in Moshi municipal

The statistics on banana volume sales and market distribution in Moshi municipal point out important features of the local banana agricultural industry. With an average household size of 4.46 (median 4, IQR 3 - 6), Rombo's household is like others but with more variance. This demographic element is very important since it affects household support for activities related to banana growing as well as labour availability. With an average of 2.54 (median 2, IQR 2 - 3), the number of persons involved in banana farming shows a modest degree of labour involvement, which affects the scale of production and efficiency in managing banana farming activities.

Moshi' municipal average 1.15 acres (median 1, IQR 0.5 - 1.5) for banana farming is rather more than Rombo's. This suggests that Moshi municipal farmers could have more acreage available for banana farming, thus enabling a larger scale of output. Reflecting a marked investment in banana farming, the average number of banana trees planted is 262.92 (median 200, IQR 120 - 350). This is important since the possible income from banana farming depends on the number of trees directly. Regarding seasonal production, the high season (January to April) generates an average of 38.18 kg (median 2, IQR 1 - 32), the low season (May to October) produces 19.56 kg (median 1, IQR 1 - 32), and the medium season (November to December) produces 24.78 kg (median 1, IQR 1 - 40). The significant variation in production across seasons emphasises the fluctuation in banana availability and implies that growers must deal with rather different income swings all year long. The high season reveals a peak that might be used to balance revenue over the year using improved market techniques.



Reflecting the investment needed for optimal output, economic factors include the average 7212.67 kg, median 3600, IQR 1500 - 9000) and related costs (cost per unit of fertiliser is 10342.17 TZS) show. Further taxing the economic sustainability of banana cultivation are the high labour costs including applying fertilisers (average 62971.83 TZS, median 30000, IQR 15000 - 60000) and harvesting (average 83316.67 TZS, median 25000, IQR 15000 - 55000). These large expenses could affect the general profitability and draw attention to the requirement for good cost control techniques.

At last, the average quantity of bananas sold to several markets exposes interesting variations. Farmers market 6337.77 kg to intermediaries (median 1140, IQR 400 - 4000) and 236.9 kg to neighbours (median 70, IQR 30 - 325). Comparatively, to neighbours, the higher average sales to intermediaries imply that middlemen are quite important in the distribution network, maybe providing better market access or prices despite certain difficulties. With an average of 434.51 TZS/kg when selling to neighbours (median 250, IQR 200 - 500) and 308.14 TZS/kg when selling to intermediaries (median 250, IQR 200 - 500), the prices obtained vary greatly between markets and indicate the need of better price negotiating and market strategy optimisation.

**Table 5:** Banana volume sales and market distribution in Moshi

Moshi -Banana volume sales and market distribution	Moshi		
	Mean (SD)	Median (IQR)	Min-Max
People live in households (including children)	4.46(1.95)	4(3 - 6)	(1 - 10)
People engaged in banana farming	2.54(1.24)	2(2 - 3)	(1 - 8)
The land size used to farm bananas(acres)	1.15(0.69)	1(0.5 - 1.5)	(0.25 - 4)
The number of banana trees that have been planted on the land	262.92(222.32)	200(120 - 350)	(30 - 1500)
High season (January to April)	38.18(71.17)	2(1 - 32)	(1 - 400)
Low season (May to October)	19.56(41.71)	1(1 - 24)	(1 - 360)
Medium season (November to December)	24.78(35.27)	1(1 - 40)	(1 - 150)
Number of fertilizers required (in KGS)	7212.67(9714.7)	3600(1500 - 9000)	(3 - 63000)
Cost per unit of fertilizer (in TZS)	10342.17(74075.2)	500(500 - 1000)	(10 - 800000)
Labour costs for applying fertilizers and pesticides (in TZS)	62971.83(113116.75)	30000(15000 - 60000)	(4000 - 800000)
Labour costs for harvesting (in TZS)	83316.67(167966.87)	25000(15000 - 55000)	(500 - 800000)
Labour costs for maintenance activities ie weeding (in TZS)	57397.44(64846.94)	45000(30000 - 60000)	(5000 - 360000)
Water supply (if not rain-fed) (in TZS)	50000(10000)	50000(40000 - )	(40000 - 60000)

The total produce harvested in the last high season consumed within the household (in KGS)	264.82(282.81)	192(90 - 320)	(4 - 1800)
Kgs sell to neighbours in the High season	236.9(316.25)	70(30 - 325)	(1 - 1200)
The Price in TZs per kg - when selling to neighbours	434.51(696.32)	250(200 - 500)	(30 - 5000)
Kgs sell to middlemen in the High season	6337.77(24857.57)	1140(400 - 4000)	(45 - 240000)
The Price in TZs per kg - when selling to middlemen	308.14(392.63)	250(200 - 300)	(100 - 4000)
Kgs sell to primary markets (local markets) in the high season	2911.71(4004.65)	1240(337.5 - 3915)	(90 - 21150)
The Price in TZs per kg - When selling to local markets	369.79(463.72)	300(250 - 300)	(50 - 4000)
Kgs stolen or affected by diseases in the high season	301.45(460.83)	120(40 - 400)	(3 - 2500)
An approximate proportion of bananas that are spoilt at the farm gate (in kgs)	383.82(322.35)	350(100 - 560)	(2 - 1240)
An approximate proportion of bananas that remain unsold in the market (in kgs)	162.5(165.4)	105(45 - 337.5)	(40 - 400)
An estimate of total banana sales in the last high season.	275632.95(667695.5)	70000(181.25 - 300000)	(23 - 7200000)
The cost of transportation per trip (in TZS)	2317.14(2300.57)	2000(1000 - 2000)	(200 - 10000)
Amount paid per trip during the peak season (in TZS)	2375(1796.99)	1750(1125 - 4250)	(1000 - 5000)

Source: Research Data, 2024

### Banana volume sales and market distribution in Moshi MC

Banana volume sales and market dispersion across two separate administrative areas are compared using data from Moshi municipal (MC) and Moshi district council (DC). Comparatively to Moshi DC, the average household size in Moshi MC is 4.84 (median 5, IQR 4 – 6). This suggests that Moshi MC homes would have greater resources for agricultural operations, therefore influencing labour availability and family support for banana output. With Moshi MC at 2.5 (median 2, IQR 2 - 3) and Moshi DC at 2.02 (median 2, IQR 1 - 2), both regions indicate a comparable degree of labour engagement in banana farming. Regarding acreage used for banana cultivation, Moshi MC's mean of 1.17 acres (median 1, IQR 0.5 - 1.5) like Moshi DC's mean of 1.15 acres (median 1, IQR 0.5 – 1.5). This implies that both areas have equivalent territory accessible for banana farming, which enables identical production sizes. Moshi MC has a greater average number of banana trees planted (378.55, median 265, IQR 150 - 442.5) than Moshi DC (262.92, median 200,

IQR 120 - 350), thereby suggesting a perhaps bigger investment in banana farming in Moshi MC.

Additionally, the difference between the two regions is seasonal output. High season production averaged 15.48 kg (median 2, IQR 1 - 2) in Moshi MC, below the 38.18 kg (median 2, IQR 1 - 2) in Moshi DC. This captures a variation in banana availability during the high season. While in Moshi DC, it is 24.78 kg (median 1, IQR 1 - 40), the low season production in Moshi MC is 12 kg (median 1, IQR 1 - 2). Media season production in Moshi MC averages 3.05 kg. This suggests that compared to Moshi MC, Moshi DC produces more consistently throughout seasons. Furthermore, considerable variations are found in economic aspects. Reflecting greater fertiliser use in Moshi MC, the average number of fertilisers needed in Moshi MC averages 8607.58 kg (median 4500, IQR 500 - 9300) compared to 7212.67 kg in Moshi DC. With Moshi MC at 3850.47 TZS (median 1000, IQR 500 - 1500) the cost per unit of fertiliser is much greater than in Moshi DC's 10342.17 TZS (median 500, IQR 500 - 1500). This disparity draws attention to the higher financial expenses indicator Moshi MC farmers bear on fertiliser expenses.

Concerning market dynamics, Moshi MC reveals 6386.14 kg to middlemen (median 1200, IQR 450 - 3700) and an average of 155.15 kg sold to neighbours (median 65, IQR 30 - 210). By contrast, Moshi DC averages 3508.04 kg to middlemen (median 800, IQR 450 - 3200) and 150.72 kg sold to neighbours (median 65, IQR 42.5 - 200). Higher average sales to middlemen in Moshi MC point to a more dominating middleman's role in this context than in Moshi DC. Furthermore, demonstrating superior pricing or market circumstances in Moshi MC (435.54 TZS, median 250, IQR 200 - 300) is the average price per kg when selling to local markets compared to Moshi DC (1429.81 TZS, median 250, IQR 200 - 300). With variances in household size, land use, and economic costs, the data shows Moshi MC sees higher banana output and market activity than Moshi DC. The seasonal fluctuations and market dynamics imply that Moshi MC might have a more complicated and maybe more profitable banana-growing environment, but also suffers greater expenses, particularly about fertilisers.

**Table 6:** Banana volume sales and market distribution in Moshi MC

Moshi MC-Banana volume sales and market distribution	Moshi DC		
	Mean (SD)	Median (IQR)	Min-Max
People live in households (including children)	4.84(1.74)	5(4 - 6)	(1 - 10)
People engaged in banana farming	2.5(1.35)	2(2 - 3)	(1 - 7)
The land size used to farm bananas(acres)	1.17(0.7)	1(0.5 - 1.5)	(0.25 - 3)
The number of banana trees that have been planted on the land	378.55(304.15)	265(150 - 442.5)	(75 - 1300)
High season (January to April)	15.48(52.33)	2(1 - 2)	(1 - 300)

Low season (May to October)	12(31.33)	1(1 - 2)	(1 - 150)
Medium season (November to December)	3.05(7.02)	1(1 - 1)	(1 - 32)
Number of fertilizers required (in KGS)	8607.58(12520.43)	4500(500 - 9300)	(50 - 52500)
Cost per unit of fertilizer (in TZS)	3850.47(14523.53)	1000(500 - 1500)	(20 - 73500)
Labour costs for applying fertilizers and pesticides (in TZS)	33526.32(25827.64)	30000(19500 - 42500)	(2000 - 150000)
Labour costs for harvesting (in TZS)	56727.27(49395.57)	50000(23750 - 60000)	(15000 - 200000)
Labour costs for maintenance activities ie weeding (in TZS)	49195.12(37287.54)	35000(30000 - 60000)	(10000 - 200000)
Water supply (if not rain-fed) (in TZS)	27750(7794.23)	30000(30000 - 30000)	(3000 - 30000)
The total produce harvested in the last high season consumed within the household (in KGS)	10118.62(66185.7)	165(60 - 327.5)	(20 - 500000)
Kgs sell to neighbours in the High season	155.15(188.93)	65(30 - 210)	(15 - 800)
The Price in TZs per kg - when selling to neighbours	268.75(121.42)	225(200 - 300)	(100 - 500)
Kgs sell to middlemen in the High season	6386.14(27569.47)	1200(450 - 3700)	(8 - 180000)
The Price in TZs per kg - when selling to middlemen	414.78(700.6)	250(150 - 400)	(15 - 4000)
Kgs sell to primary markets (local markets) in the high season	3336.11(6267.58)	800(200-2500)	(75 - 22800)
The Price in TZs per kg - When selling to local markets	435.54(865.31)	250(200 - 300)	(50 - 4800)
Kgs stolen or affected by diseases in the high season	451.96(441.81)	300(200 - 500)	(30 - 1600)
An approximate proportion of bananas that are spoilt at the farm gate (in kgs)	684.29(1027.4)	400(200 - 720)	(50 - 5500)
An approximate proportion of bananas that remain unsold in the market (in kgs)	90(14.14)	90(80 -100)	(80 - 100)
An estimate of total banana sales in the last high season.	246196.32(421779.19)	60000(1700 - 280000)	(64 - 2400000)
The cost of transportation per trip (in TZS)	4955.56(5602.02)	3000(1375 - 6000)	(200 - 15000)
Amount paid per trip during the peak season (in TZS)	15000()	15000(15000 - 15000)	(15000 - 15000)

Source: Research Data, 2024

## Discussion

The study offers an investigation of banana market and the 4p practices in different districts, therefore underlining the differences in farming circumstances, market dynamics, and the influence of agricultural inputs. This

study offers important new perspectives on the possibilities and difficulties banana growers experience by looking at important factors such as transportation, input prices, and market access. The results provide a knowledge of how several elements of the 4p impact the banana market system and the study offers the recommendations for possible market developments in the banana sector. Rombo (59.5%) is the most often used district for banana growing, well above Moshi (29.7%) and Moshi DC (10.8%). This concentration in Rombo emphasises its significance as a major centre of banana production and implies that to maximise output, resources and actions should be concentrated. Furthermore, farmers 58.1% fall between the ages of 36 and 60, suggesting a seasoned workforce that might gain from programs meant to involve younger farmers to guarantee future sustainability. The great percentage of elderly farmers highlights the need for knowledge transfer and young participation to sustain sector development.

According to the results, each household member grows bananas (100%), and most of them live in homes ranging from one to four persons (54.8%). This group participation points to a substantial dependence on family labour, which is necessary for operational effectiveness. This reliance, however, might restrict production scale. Although long-term planning benefits from stability in land tenure indicated by the high land ownership rate (99.1%), this emphasises the need for better mechanisation to maximise land usage.

With insufficient percentage using compact vans for transporting banana bunches (15.7%) and trucks (4.7%), transport choices depend on less efficient modes: walking (18.3%) and cycling (61.4%). This implies that the main obstacle to effective market access is probably an insufficient transportation system. Distribution efficiency is further complicated by the fact that 62.8% of farmers depend on middlemen and do not personally handle bananas. Direct market access support and improved transport infrastructure help to greatly increase operational efficiency and lower expenses. Since most farmers (99.1%) do not pay for transportation directly, middlemen usually cover these expenses. This configuration possibly affects farmers' market access and profit margins. Unawareness of Private Banana Company (99.3%) and low interaction with other sales channels suggest lost market prospects. Direct sales and improved market understanding could give farmers easier access to markets and maybe larger profits. Improving the economic feasibility and sustainability of banana cultivation in the area depends on filling in these voids.

The household depicts regional differences highlighting fundamental differences in banana cultivation methods. Rombo has a far greater number of senior farmers (61–100 years) at 67.5%, compared to Moshi (23.1%) and Moshi DC (9.4%), according to the age distribution, which shows a clear

variation throughout districts. This implies Rombo mostly depends on a senior workforce, which could affect the acceptance of new technologies and agricultural methods. Moshi (51.7%) clearly shows the younger age group (18–35 years) more than Rombo (41.4%) and Moshi DC (6.9%), thereby indicating a possible area for focused training and capacity-building activities in Rombo to guarantee sustainability and modernising of practices.

The study found clear geographical differences in banana farming methods and how they affect profitability and output over Rombo, Moshi, and Moshi DC. The noted variations in land area and banana tree density point to more general structural variations in farming methods among these areas. Rombo struggles to scale up output given his lowest mean land size (0.94 acres) and fewest banana trees (207.84 trees). Often, this limitation results in lower economies of scale and more per-unit production costs. On the other hand, Moshi and Moshi DC gain from more extensive farming activities that usually improve productivity and operational efficiency since their average land sizes and greater tree densities call for more Rombo's smaller scale of operations points to a need for targeted interventions to expand the area under use or raise tree planting density to raise general production capacity and competitiveness.

Determining the profitability of banana growing mostly relies on market access and transportation. Rombo averages 3,509.29 TZS, while Moshi (2,317.14 TZS) and Moshi DC (4,955.56 TZS) have different travel expenses, which highlights the logistical difficulties farmers experience. Rombo's greater transportation expenses could result from less effective transportation infrastructure or more expensive fuels, therefore compromising the economic feasibility of banana growing. Rombo's transport system's high expenses and possible inefficiencies could help to explain less market competitiveness and profitability. On the other hand, especially in Rombo, the noted high degrees of spoiling and unsold goods could point to errors in market access or post-harvest management techniques, therefore affecting farmers' revenue. Different market conditions and price realisations are also reflected in the variances in banana sales and pricing throughout districts. Rombo's mean sales income (233,345.17 TZS) is lower than Moshi's (275,632.95 TZS) and Moshi DC's (246,196.32 TZS), therefore underlining differences in market access and income generating. Rombo's decreased sales income along with more spoilage and unsold produce point to possible difficulties for farmers trying to reach profitable markets and get better pricing for their goods. Overall, the results imply that to increase the sustainability and financial viability of banana growing in these areas, a strategy including improved infrastructure, better resource management, and targeted support for farmers is needed.

## **Summary**

Examining methods of banana production in Rombo, Moshi, and Moshi DC reveals geographical variations in land utilisation, output, and financial results. Rombo struggles to properly scale production and control labour and input costs given smaller land areas and fewer banana trees. Conversely, Moshi and Moshi DC gain from more efficient production using bigger land areas and higher banana tree densities. However, market access problems and transportation expenses influence profitability in every area; Rombo has more expenses than Moshi and Moshi DC, therefore reducing sales income. These results mirror more general difficulties in agricultural viability and efficiency within the banana-growing industries in these areas.

## **Conclusion and recommendation**

The various market challenges observed in Kilimanjaro highlight the need for further interventions. The middlemen's banana business controls and the cost of transportation draw attention to the necessity of providing reliable infrastructure and investing in providing agricultural inputs. Moshi and Moshi DC still deal with labour expenses market access even if they perform better in sales and productivity. The results show generally that the economic viability of banana growing in these areas depends critically on bettering agricultural methods, maximising input utilisation, and boosting market access. In the banana market, reliable off-takers and formal buyers are required to meet market demand, especially in persuading the banana market competition. For example, in the grains market, the Tanzanian government has initiated the second phase of its maize purchasing program, offering a rate of Tsh 700 (US\$2.90) per kilogram. This price significantly surpasses the current market rate of Tsh 500, representing a substantial boost for maize farmers. In connection with government initiatives in other crops and previous studies in the banana sectors considering the example from the ginat producers such as Asia and southern America, there are relevant considerations: referring to policies to increase a reliable market for bananas in Kilimanjaro. There is a need for the Tanzania government to develop banana agribusiness policies, including pricing, trade and investment policies to support the value chain actors.

## **The research strength**

This study presents an insightful analysis of regional differences in banana cultivation methods. The strong dataset provides knowledge on land usage, productivity, input costs, and market dynamics, therefore enabling a sophisticated knowledge of the elements influencing banana cultivation. Using statistical studies including chi-square tests and descriptive statistics, the results gain credibility and underline variations among districts.

Furthermore, the study's emphasis on pragmatic farming issues including market access and transportation provides useful information for enhancing the banana industry economic results and practices.

### **Study limitation**

The analysis ignores outside elements like policy changes or climate change that could affect banana output and methods of cultivation. Furthermore, restricting the generalisability of the results to other areas with various agricultural settings is the concentration on just three districts.

### **Policy implication in agriculture**

The results have a major impact on policies and agricultural methods. Through the identification of the difficulties experienced by banana growers in various districts, stakeholders can customise treatments to properly meet regional needs. For Rombo, for instance, better transportation facilities and support for scaled-down manufacturing increase general market access and production. This is because reducing logistics expenses, lowering post-harvest losses, and finally increasing the profitability of banana production.

### **Recommendation for Further Research**

Future studies should consider a mixed-methods approach combining quantitative data with qualitative insights from farmer interviews and focus groups, therefore strengthening the present work. This strategy would provide a closer knowledge of the possibilities and difficulties in banana production. Furthermore, investigating how digital platforms and precision agriculture two technology developments improve market access and production could provide farmers with some suggestions. Dealing with the issues and enhancing the general sustainability of banana growing methods would depend on involving local agricultural extension services and legislators to carry out and assess focused actions.

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# The Role of Individual Performance in the Effect of ICT Appropriation on Educational Performance of Students in Public Universities in the Casablanca-Settat Region, Morocco

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## Abstract

Over the past two decades, Moroccan higher education institutions have significantly invested in information and communication technologies (ICT). The integration of ICT in education (ICTE) and learning has led to major changes, including the implementation of digital strategies and

programs that have enriched the educational system. Notable progress has been made, such as providing most institutions with computer equipment and expanded internet access, especially in universities. Despite these advancements, questions remain about the true impact of these technologies on student performance and the overall effectiveness of the educational system. While researchers have explored this issue both theoretically and empirically, they face challenges, including the complex observation of students' individual performance and the rapid evolution of ICT, which makes isolating their effects difficult. This study aims to examine the impact of students' appropriation of ICT on educational performance in public universities in the Casablanca-Settat region and to explore the role of individual performance in this relationship. Using structural equation modeling (SEM) with SMART PLS 4.0 software, data from 185 students revealed a significant positive relationship between ICT appropriation and educational performance, with individual performance serving as a mediator. By employing mediation analysis, as outlined by Baron and Kenny (1986) and MacKinnon et al. (2007, 2012), the study investigated how individual performance mediates the relationship between ICT appropriation and educational performance. This method enabled the identification of both direct and indirect effects, providing a more nuanced understanding of the mechanisms through which ICT impacts educational outcomes via individual performance. The findings suggest that ICT is a crucial factor in improving higher education performance and highlight the importance of platform quality and students' sense of self-determination in the effective integration of ICT in the educational process. Future research should continue to explore individual performance among Moroccan university students and its impact on educational outcomes.

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**Keywords:** The Use of ICT in Education, Appropriation of ICT in Education, Educational Performance, University Students, Moroccan Context

## **Introduction**

Over the past two decades, Moroccan higher education institutions have increasingly prioritized information and communication technologies (ICT). The integration of ICT into teaching and learning has had a major impact, leading to the implementation of digital strategies and programs aimed at enriching the educational system. As a result of these efforts, significant improvements in skills within higher education have been observed. An ambitious national policy has promoted the widespread adoption and integration of ICT into the educational system, resulting in progress such as providing most institutions with computer equipment and expanded internet access, particularly in universities.

However, despite these advancements, questions persist about the actual impact of these technologies on student success and the overall effectiveness of the educational system. Researchers in the field of ICT, including Pierson (2001), Sharpe (2004), Scheerens (2015), Paivandi (2018), and AlAli & Wardat (2024), have attempted to explore this issue both theoretically and empirically, focusing on the academic environment. Yet, two main challenges remain: on one hand, observing individual student performance is complex due to the diversity of possible definitions; on the other hand, the rapid evolution of ICT makes it difficult to isolate their effects in an educational setting.

Despite the potential benefits of ICT, their impact on overall educational performance remains ambiguous. Recent studies by Youssef & Dahmani (2010), Burnett & Lisk (2021), suggest that the outcomes of ICT in higher education can vary depending on the level of appropriation and the opportunities provided by these technologies. Furthermore, the lack of significant organizational changes in universities limits the potential impact of ICT, despite substantial investments in equipment and increasing adoption by students.

There is a lack of empirical studies, both in Morocco and internationally, on the impact of students' appropriation of ICT on educational performance within universities, as noted by Kabore (2021). This absence of consensus on how ICT is appropriated by students and its effect on the educational system underscores the need for further exploration of this issue.

This article makes a significant contribution to the literature by exploring the relationship between students' ICT appropriation and educational performance within the specific context of public universities in the Casablanca-Settat region. Unlike most previous studies, this research also examines the role of individual performance in this relationship, thus providing a more comprehensive perspective on the effects of ICT in higher education. Through a quantitative study based on structural equation modeling (SEM), this research offers an in-depth analysis of the mechanisms by which ICT appropriation influences student performance. By applying mediation analysis as described by Baron and Kenny (1986) and MacKinnon et al. (2007, 2012), the study investigated how individual performance mediates the relationship between ICT appropriation and educational performance. This approach allowed for the identification of both direct and indirect effects, offering a more nuanced understanding of the mechanisms through which ICT influences educational outcomes through individual performance.

The study focused on the impact of ICT appropriation by students on educational performance within public universities in the Casablanca-Settat region. The main findings highlight a significant positive relationship between

ICT appropriation and educational performance. They also reveal the mediating role of students' individual performance in this relationship. Specifically, the data show that ICT appropriation contributes to a notable improvement in individual performance, which in turn positively influences educational performance. The results suggest that ICT appropriation by students is a key factor in enhancing higher education performance. Moreover, the analysis confirms that elements such as platform quality and students' sense of self-determination play a crucial role in the effectiveness of ICT integration into the educational process.

Thus, the article is structured as follows: First, we will define the measures of ICT appropriation, educational performance, and individual performance. Next, we will examine the relationship between ICT appropriation and educational performance, with a focus on the role of individual performance in this relationship. The study will conclude with a discussion of the results, their implications for higher education, and recommendations for future research.

## **Literature Review**

### ***Best use of ICTs***

Since the early 1990s, higher education worldwide has undergone a remarkable transformation due to the integration of information and communication technologies (ICT), as noted by Dusen & Gerald (1997). Initially seen as mere innovations, these digital tools have quickly become indispensable in universities and higher education institutions. Their use now extends well beyond administrative tasks, such as decision-making systems, Lévy (2000), to more complex aspects, such as course evaluation, Mangenot (2000). Thus, ICTs have become a central pillar in the daily operations of these institutions, promoting better management and more effective learning.

The highest expectations for ICT outcomes often focus on teaching and learning, Wilson & Wilson (2009). Globally, organization on emphasizing training and development, whether in businesses or educational institutions, Schroeder (2010). These trainings are increasingly technology-based, including online learning, simulation training, and games. Particularly, computer games have taken a significant place in recent research and training, especially in developed countries like the United States, Hilton & Honey (2011), Zeng et al. (2020). It is crucial to differentiate between the use of ICT in traditional educational settings, such as lectures that utilize tools like PowerPoint, which, despite their pedagogical limitations, continue to dominate university teaching, Puranik (2020); Hontarenko & Kovalenko (2024), and their innovative applications for non-traditional student groups, particularly in fields like mathematics, Csernoch et al. (2015) or engineering,

Lukman & Krajnc (2012). In these disciplines, non-traditional teaching methods often emphasize constructivist and collaborative approaches, actively engaging students in constructing their knowledge and solving problems through techniques such as e-learning, group work, and interactive exchanges, Tularam & Machisella (2018).

The increasing internationalization and commercialization of higher education, as well as the development of interactive, part-time, and distance learning models, are transformations enabled by the adoption of new ICTs. These developments lead to intensified competition among higher education institutions, Schneckenberg (2009). This article will examine the use of ICT in traditional higher education environments.

Indeed, the integration of ICT into university teaching is becoming more common. However, the effectiveness of these tools largely hinges on student motivation, as noted by King et al. (2017). This motivation can be intrinsic, aligning with personal values and desires, or extrinsic, driven by external goals (Brault, 2018; Valentin, 2013). It is therefore crucial to understand the extent to which students are willing to engage in courses that place a strong emphasis on ICT.

Despite the importance placed on motivation and engagement in learning through ICT, Agarwal & Karahanna (2000), Tharenou (2001), Heutte (2012), few studies have examined the effect of these factors on students identified as role models, Shé et al. (2023) or broadly referred to as "exemplary technology users" in their learning process, Pierson (2001), Kabore, (2021). Furthermore, there is a scarcity of studies comparing ICT use in post-secondary learning environments from both student and professor perspectives, King et al. (2017).

The meaning of the term "exemplary use" (or best use) generally refers to users who can serve as role models for other users. English-speaking authors use a variety of phrases and expressions to refer specifically to those users who integrate ICT in an ideal way into their work processes. These include "experienced and accomplished teachers at integrating computers into their teaching" Sheingold & Hadle (1990); "exemplary computer-using teachers" Becker (1994); "exemplary technology-users" Parks & Pisapia (1994); Pierson (2001); "exemplary technology teachers" and "exemplary technology-using teachers" Berg et al. (1997). Within the same vein, we emphasize "proficient technology-oriented teachers" Roblyer et al. (1997); "expert users of computer resources" Becker (1999); "exemplary technology integrators"; "exemplary technology-integrating teachers" by Pierson (2001) and Raby C. (2004, p. 41).

For Becker (2000, p. 275), a series of studies have identified significant factors that appeared to be different in the environments of exemplary computer-using teachers, including developmental activities, staff support,



smaller class sizes and access to software. The studies have highlighted the potential influences of the increase in extrinsic enablers, and further attention needs to be paid to intrinsic factors Becker (1991). On the other hand, according to Berg et al. (1997), an exemplary use of ICT is due to the technology's ability to provide learners with the tools they may need to actively process, transform, and appropriate new information Ertmer et al. (2006, p. 55). For Pierson (2001, p. 414) users, especially exemplary technology teachers, spend a great deal of time working with digital tools, but they also have had training and experience, as well as very high levels of innovation and confidence. Colleagues who use computers for meaningful activities surround them; they have support at the school level, and they are offered many opportunities for personal growth. The pedagogical integration of ICT into the teaching field cannot, however, be regarded as a mechanical process; in concrete terms, it raises the whole fundamental issue of preparing and training - both administrators and teachers - for the optimal use of ICT in line with the improvement of teaching and student learning in a purposeful learning context.

However, Raby C. (2004, p. 44) identified a new logic of exemplary ICT use by distinguishing four different stages and cycles: 'awareness', 'personal' use, 'professional' use, and 'educational' use. "Awareness" pertains to vicarious interactions with ICTs, experienced within an individual's personal or professional contexts. The "personal" use stage also appears to be significant. It refers to using ICTs in personal activities, such as communicating with family or colleagues, managing personal and family affairs, or even looking for information directly related to subjects of personal interest, such as finding a specific address. Concerning "professional" use, this refers to the use of ICTs by individuals as part of their professional activities, but not in direct interaction with learners. For example, it reflects the use of a platform within the University for Communication with managers or administrative staff.

The "educational" use level is divided into five parts:

1. During the motivation process, teachers develop a curiosity, a need or a pedagogical obligation to integrate ICTs into the classroom.
2. During the familiarization phase, users prompt learners to use technical tools as a reward or occupation. Beyond emotional interest, the educational value of such activities seems limited to the initial and basic development of the students' ICT skills.
3. In the "exploration" phase, teachers use ICTs to enrich pedagogical content. Students then engage in activities to reinforce or enrich concepts taught in class, or to retrieve information to improve their

- learning level. In addition to acquiring knowledge, the activities also facilitate the development of transversal skills related to the ICTs.
4. During the "infusion" stage, teachers engage their students in the use of ICTs. This will enable them to develop disciplinary competencies and further develop competencies in the use of ICTs.
  5. The final "appropriation" stage is characterized by the regular and frequent use of knowledge transmission and construction, carried out in an active and meaningful, goal-oriented learning environment.

In this respect, appropriation enables the development of disciplinary and cross-disciplinary skills for the various users.

### ***Technology Appropriation***

Adaptive structuring theory, or technology structuring and appropriation theory, defines the concept of appropriation as a set of processes in which users make use of technologies in different ways that are compatible with work requirements, DeSanctis and Poole (1991). In the workplace context of the digital age, technology appropriation refers to the use of technologies in different ways to achieve organizational goals, using different IT tools and communication technologies. More concretely, it is about how a group uses, adapts and reproduces a structure Roux (2007, p. 4).

Ko et al. (2021, p. 2) define appropriation as the use of ICTs in various ways to achieve organizational goals, Poole & DeSanctis (1991). It also argues that, when specific ICTs are accepted and used appropriately to meet task or organizational specifications, this leads to individual employee performance as well as organizational performance DeLone and McLean (1992, 2003).

In the educational field, the integration of ICT goes far beyond mere adoption. According to Meza et al. (2018, p. 2), this integration requires a genuine appropriation by the user, meaning a thoughtful and intentional use of ICT, Chordia & Hiniker (2019), Watson (2024). This appropriation extends beyond merely using tools; it involves a level of autonomy in which users exert control over the technology and the content they manage. In this context, Burnett and Lisk (2021) underscore that ICT usage can boost user engagement in their work or learning, particularly by facilitating enriching interactions and providing meaningful feedback. Additionally, Murray et al. (2021) stress the significance of allowing users to freely select and control the information sources they deem relevant, thereby enhancing their involvement and sense of mastery. However, as O'Brien et al. (2022) remind us, for this technological experience to be truly beneficial, it must be both meaningful and positive. Indeed, negative experiences with technology can lead to user disorientation and disengagement from educational or professional activities, Ferrero & Sainz (2024).

The positive impact of ICT use on educational performance has also been highlighted in several studies, Gutiérrez et al. (2020), Berrocoso et al. (2022), Kilag et al. (2023), Adeniyi et al. (2024). These studies have asserted that students with a favorable attitude toward ICT use them proactively to enhance their study habits and, consequently, their academic outcomes. Furthermore, recent research (Zhang et al., 2021; Cheng & Yang, 2023) has shown that integrating ICT into pedagogical practices (e.g., collaborative or student-centered learning) not only offers opportunities for innovation but also improves learning outcomes. Positive experiences with ICT not only strengthen student engagement and skill mastery but also play a direct role in improving their overall educational performance (Hanaysha et al., 2023; Farrukh et al., 2024).

### ***Educational performance: definition and context***

The evolution of the education sector in recent years has been marked by the increasing integration of ICT, leading to a radical transformation in teaching and learning methods, Alnoaimi et al. (2011), Qolamani & Mohammed (2023). Universities' investments in these technologies aim not only to modernize educational infrastructures but also to enhance students' educational performance, often measured by their academic success, graduation rates, and other skill acquisition indicators, Deniger (2004), York & al. (2015).

The impact of ICT on educational performance manifests in several ways. On one hand, facilitated access to digital educational resources, whether generic or university-specific, allows for greater use of educational content by students. This promotes increased flexibility in the learning process, facilitating self-directed learning, such as online education, which proves particularly beneficial for students needing additional support, Ragan et al. (2023). The increase in interactions between teachers and students, thanks to the use of digital platforms, also enhances the educational experience by facilitating collaboration and knowledge sharing, Perrenoud (2002), Hoi (2021).

However, despite these apparent benefits, the impact of ICT on overall student performance remains mixed. Although the integration of technology has led to improvements in certain dimensions such as the quality of training, student participation, and access to data and educational resources, it has not necessarily resulted in a significant increase in success rates or a reduction in university failures, Sharpe (2004), Scheerens (2016), AlAli & Wardat (2024). This raises questions about how productivity in the educational sector is measured and the limitations of ICT in addressing some of the structural challenges faced by universities, Cosculluela et al. (2024).

Thus, educational performance is not limited to immediate academic results (grades, year validation) but also encompasses broader dimensions such as engagement in formative activities, participation in seminars, and involvement in research projects, Brault (2010), Nasirun & Shahidan (2024). It is also essential to consider students' assessments, as they play an active role in their own educational journey, Paivandi (2018). The conventional perspective of performance as solely academic, typically reliant on strict institutional criteria, warrants re-evaluation to include the subjective and personal dimensions of learning. This shift would promote a more holistic approach that addresses the diverse needs of students.

On the other hand, some studies, Bodin & Millet (2012), AlAli & Wardat (2024) challenge the notion of "academic failure." The university should not only be seen as a place for knowledge transmission but also as a space for socialization and personal development, Ou et al. (2022), where study paths may vary without being considered failures. This diversity of paths should be recognized and valued, rather than stigmatized, in the evaluation of educational performance.

### ***Individual Performance***

Research on educational performance can be categorized into three main areas when examining individual performance within organizations. "Learning productivity", which explores the learning capacity of students and focuses on the individual's ability to learn. Researchers such as Johnstrone (1993), Hooker (1997), and Kuh and Hu (2001) have contributed to this thematic concern by investigating various aspects of learning productivity.

"Academic experience", on the other hand, concentrates on the learning environment and the overall experience of the students. Scholars like Astin (1985) and Kuh and Hu (2001) have examined how the student's environment and educational experience influence their individual performance. In other words, this aspect explores how the learning environment influences individual performance. Conversely, "teaching effectiveness" focuses on improving student learning by suggesting effective teaching methods. Researchers such as Chickering and Gamson (1991), Hativa et al. (2001), and Sigmen (2006) have contributed to this issue by suggesting strategies and approaches that can improve the student learning outcomes.

Over time, the concept of individual performance has undergone multiple transformations and has extensively been studied. Researchers, including Borman, W. C., Motowidlo, S. J. (1997), Motowidlo & Keil (2003), and Agonhossou & Godonou (2011), among others, have fervently attempted to define individual performance. However, a universally accepted and unequivocal definition of this concept remains elusive. This challenge stems

largely from the nature of academic research, which predominantly focuses on the criteria and methodologies employed in assessing individual performance.

However, Performance was defined as “Action or behavior that is relevant to the achievement of organizational objectives and that is measurable in terms of level of profitability” Motowidlo, S. J. et al. (1997, p. 99). This definition implies that they consider individual performance to be a key factor in organizational success. For Agonhossou D.K. and Godonou C.K. (2011), individual performance is “the total value expected by the organization from the discrete behavioral episodes that an individual performs over a given period of time” p. 109).

Indeed, university education plays an important role in the development of students' skills, preparing them to independently overcome the various challenges they encounter, Almufarreh & Arshad (2023). The university prioritizes individual performance as a crucial measure of its overall effectiveness, according to Youssef et al. (2022). This focus represents a privileged setting for evaluating the efficacy of teaching methods and their impact on students' skills acquisition, even amidst a variety of available technological tools, as noted by Pandey et al. (2023). Consequently, teachers have the opportunity to tailor and experiment various pedagogical approaches to enhance both students' individual performance and, by extension, the educational performance of the institution as a whole, as highlighted by Kapo et al. (2024).

## **Hypotheses and Research Model**

### ***The Direct Effect of ICT Appropriation on Students' Individual Performance***

ICT appropriation in education goes beyond the mere use of technology; it is embedded in a broader context of interactions and cultural practices, Cárdenas & Manuel (2004), Holmfeld et al. (2023). It involves epistemological, pedagogical, and axiological dimensions (Heath et al., 2023), forming a set of actions that shape a digital culture and connectivity (Lundholm, 2023). The actors in this process—students, teachers, and administrators—are thus encouraged to develop digital skills and innovative teaching practices (Espinosa et al., 2023). This is particularly important as labor market demands and the challenges of the digital society require continuous adaptation, Canal et al. (2022), Yüceol (2021).

In this context, the study by Giraldo & Báquiro (2020) on the appropriation of Colombian public policies regarding ICT in education, conducted over the period from 2000 to 2019, highlights the importance of training focused on the use and appropriation of ICT. They show that this training is essential for promoting pedagogical innovation and the development of digital skills. The authors emphasize the creation of spaces for

reflection and collective decision-making, enriched by the experiences of academic actors, to strengthen innovation and effectiveness in the use of ICT.

Furthermore, the conclusions of the qualitative study by Boufarouj & Mdarbi (2022) reinforce the idea that ICT appropriation has a direct and positive impact on pedagogy. They demonstrate that it not only improves users' knowledge but also stimulates their engagement by offering more attractive and dynamic content. This active appropriation of ICT thus contributes to enhancing skills, increasing student engagement, and ultimately improving their individual performance.

These findings align with recent research by Ley et al. (2021), Zhao et al. (2023), and Ekwufolu (2024), which indicate that ICT appropriation is a crucial factor in skill development and the enhancement of student performance. They emphasize the importance of an integrated approach that goes beyond the acquisition of technical knowledge to include reflection, decision-making, and pedagogical innovation, Montoya et al. (2024).

Based on these findings, we propose the following hypothesis:

***H1.1: ICT appropriation has a significant and positive impact on students' individual performance.***

### ***The Direct Effect of Students' Individual Performance on Educational Performance***

In the African continent, the examination of educational reforms reveals several relevant results, Adeniyi et al. (2024). First, these reforms aimed to enhance the quality and relevance of education, leading to modifications in curricula, teacher training program initiatives, and increased integration of educational technology, Ganiyu et al. (2024). The impact of these reforms has been measured using various performance indicators, such as standardized test scores and graduation rates, Oguguo et al. (2021), Adeniyi et al. (2024).

In the same vein, the results of recent studies, Calderón et al. (2020), Zhou et al. (2023), David & Weinstein (2024) emphasize that improving educational performance is intrinsically linked to innovative teaching practices and student engagement, Shin & Bolkan (2020). Educational reforms have also considered socio-economic, cultural, and infrastructural contexts, which play a determining role in their implementation and effectiveness. The conclusions of these studies show that when reforms are well-designed and adapted to the specific needs of local contexts, they have a positive and significant effect on students' individual skills in ICT use, Tolani et al. (2011), Sun et al. (2022), on their academic success, and on the performance of educational institutions, Kimuya et al. (2021).

Therefore, the data suggests that ICT appropriation, when embedded within a framework of thoughtfully designed educational reforms, can significantly and positively influence both individual and overall student performance. This supports the hypothesis that the effective integration and utilization of technologies in education enhance learning outcomes and strengthen student performance.

These observations allow us to conclude that ICT appropriation, as a key element of educational reforms, Wang et al. (2024), plays a crucial role in improving educational performance. This reinforces the idea that students' individual performance is positively influenced by their ability to engage with and integrate these technologies into their learning process, which in turn positively impacts overall educational performance.

In conclusion, empirical studies indicate a positive correlation between individual performance and overall educational performance, which leads to the formulation of the second sub-hypothesis:

***H1.2: Students' individual performance significantly and positively impacts educational performance.***

### ***The Mediating Effect of Students' Individual Performance on the Link between ICT Appropriation and Educational Performance***

Researchers in the field of ICT, such as Ben Youssef and Dahmani (2010), Abdel-Ouahed (2014), and Ko et al. (2021), have studied the use and appropriation of ICT and their impact on students' educational performance. According to Ben Youssef and Dahmani (2010), ICT has a profound impact on the learning process by offering new possibilities that can improve students' performance and outcomes. However, they emphasize that ICT appropriation by higher education institutions requires a long process before significant changes can be observed. The adoption of complementary organizational innovations is essential for students to acquire skills aligned with labor market needs. Abdel-Ouahed (2014, p. 103) adds that student autonomy is essential for effective ICT appropriation. This autonomy is acquired through involvement, mutualization, self-observation, and self-evaluation. Student motivation plays an important role in ICT integration, as it directly influences learners' attitudes toward the use of technological tools. Indeed, a technological tool can only promote a knowledge mediation process only if the receiver maintains a favorable cognitive stance toward the medium.

In parallel, although cognitive absorption is recognized as an important element of high engagement and involvement of an individual during training, Webster & Ho (1997), several studies, Andersén & Kask (2012), Yildiz et al. (2019), Shirish et al. (2023) have shown that it is insufficient to focus solely on this dimension to understand under which conditions it promotes individual learning. Cognitive absorption largely relies on intrinsic motivation, Agarwal

& Karahanna (2000), but this motivation can sometimes indicate a total or partial lack of self-determination, Deci & Ryan (2000, 2002). Learners might attribute their actions to intrinsic factors that are beyond their control or be driven by external goals, such as passing exams, which may not align with their personal values, Blanchard et al. (2004), Kindelberger et al. (2023). The self-determination theory, Deci & Ryan (2000) allows us to distinguish between different types of motivations in various learning contexts, including academia, Reeve (2012), Litalien et al. (2017). According to Ko et al. (2021, p. 6), platform quality, task performance, and a sense of self-determination positively influence ICT appropriation, which in turn significantly impacts educational performance. Thus, an environment conducive to self-determination and the quality of technological tools promotes more effective ICT appropriation, leading to improved student performance.

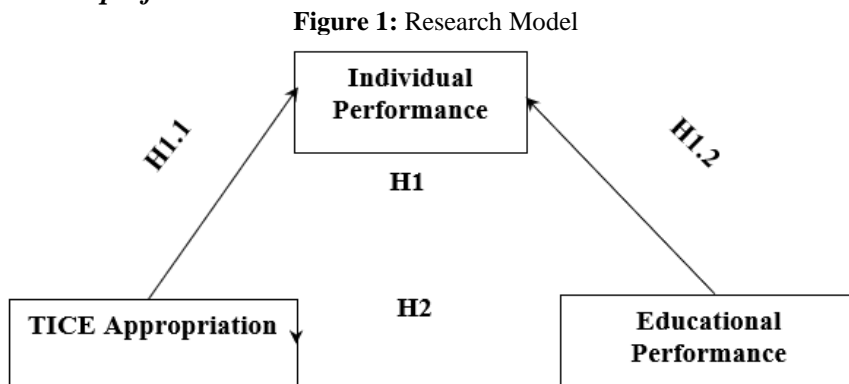
These empirical works suggest that for ICT appropriation to positively impact educational performance, it is necessary to consider individual factors such as autonomy, intrinsic motivation, and student engagement. We can thus conclude a mediating effect of students' individual performance on the link between ICT appropriation and educational performance. These conclusions lead us to formulate two hypotheses, namely:

The main hypothesis regarding the mediating effect of students' individual performance on the link between ICT appropriation and educational performance:

***H1: Students' individual performance mediates the relationship between ICT appropriation and educational performance.***

Additionally, the hypothesis positing a significant relationship between students' ICT appropriation and educational performance is as follows:

***H2: Students' ICT appropriation has a significant and positive impact on educational performance.***



Source: (Authors)



## **Methods**

### ***Research methodology***

In this section, we will move into the research methodology adopted in our study. We will explore various aspects, including the selection of the target population, our epistemological stance, the methodology chosen, and the sampling and data collection procedures implemented to effectively address our research question.

### ***Population***

Nowadays, educational systems have significantly ramped up their technological resources to resume normal activities. The integration of technology in education has taken various forms such as distance learning, e-learning, hybrid learning, virtual education, and the traditional approach supported by technology. These advancements have had a substantial impact on educational performance.

The incorporation of Information and Communication Technology in Education (ICTE) plays a crucial role in creating a highly effective teaching and learning environment. It enhances the overall educational experience for students by improving the teaching and learning processes. Higher education administrators are actively involved in facilitating the integration of these new educational technologies across institutions through a continuous cycle of design, development, and advancement of functionalities.

In this context, appropriation refers to the conscious adoption and control of ideas, tools, technologies, and more, within the context of users' actual and perceived culture. The appropriation of ICTE encompasses the use of laptops, digital content, software, projectors, platforms, and the internet for educational purposes in the classroom, aiming to enhance teaching quality and educational performance across different educational settings.

Learning to effectively utilize ICT has different interpretations. Since the impact of ICT on student outcomes heavily relies on the consistency of its implementation, it becomes challenging to separate this type of learning from the inherent infrastructure of ICT as it pertains to academic achievements. The use and implementation of ICT in learning have demonstrated significant success in improving academic performance, especially in an increasingly globalized environment.

Considering the significance of the topic, our research focuses on university students. They play a central role in our research context and are actively engaged in pedagogical projects that prioritize student-centered learning approaches over traditional teacher-controlled methods.

### ***Epistemological positioning***

In order to ensure coherence between the research problem and the research context, it is widely acknowledged that the epistemological position, research approach, and choice of methods should align.

As far as our epistemological stance is concerned, we have adopted a positivist perspective for our study, as we seek to examine the growing significance of ICT appropriation in the educational performance of students in Moroccan public institutions. Positivism justifies the construction of a hypothetico-deductive system, which is subsequently tested against representative empirical situations. This approach involves formulating one or more hypotheses and comparing them with real-world observations. The objective is to assess the validity of the initially proposed hypothesis. In other words, our analytical tools are derived from theoretical foundations.

We have employed a quantitative research approach for our study, utilizing structural equation modeling and software such as SPSS and SMART PLS. This approach allows us to examine causal relationships between variables and test our proposed hypotheses.

### ***Measurement scales***

To measure ICT appropriation, we used the 3 dimensions adopted by Pelletier C. et al. (2008). The instrument consists of 4 items, covering 3 dimensions of ICT appropriation, namely cognitive absorption, inspired by the "Flow Theory" presented by Csikszentmihalyi (1990), user skills, inspired by the model unveiled by Munro M.C. et al., (1997), and feelings of self-efficacy towards technology, inspired by the "Social Cognitive Theory" put forward by Bandura A. (1977).

To measure educational performance, we used the approach adopted by Charlot et al. (1992). The instrument is made up of 3 items, covering a single dimension of educational performance, and consists in drawing up a balance sheet of knowledge and appreciation regarding the use of ICTE in connection with a job.

To measure individual performance, we used the 2 dimensions adopted by Koopmans L. et al. (2011). The instrument consists of 18 items.

### ***Sampling and data collection***

We conducted a questionnaire survey of students at public universities in the Casablanca-Settat region of Morocco. The survey covered all streams and cycles of the three universities in the region, namely: Hassan II University of Casablanca (UH2C), Chouaib Doukkali University of El Jadida (UCD), and Hassan I University of Settat (UH1). These universities comprise 32 establishments, with 193,509 students.

The region was chosen because of its involvement and progress in implementing information and communication technologies in education (ICTE). In this context, we collected 185 questionnaires, a sample comprising 46% men and 54% women, with an average age between 18 and 30.

The data collection method differed from one school to another, as each school had its contextual constraints. Indeed, the questionnaire was distributed via social networks, emails, etc. Students participated voluntarily in the contribution of this article. The "snowball" method was also used to distribute the questionnaire to reach a large number of students.

## **Results**

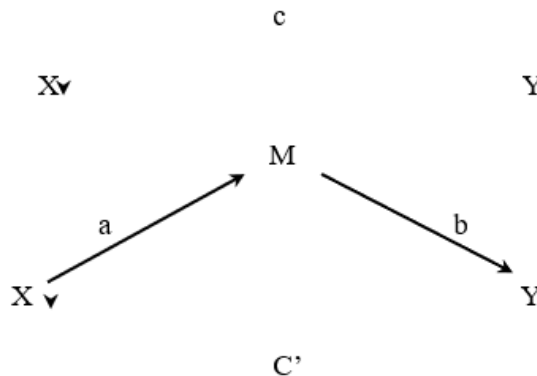
The model is tested by the PLS-SEM (Part Least Squared Structural Equation Modeling) method, this choice is motivated in particular by the fact that this method does not require a standardized distribution of the data Chin (1998); Fornel & Larcker (1981); Gefen et al. (2011); Ringle et al. (2012), and is considered the most suitable for moderate sample sizes Fernandes (2012).

A three-stage analytical procedure is followed using Smart PLS 4.0 software: evaluation of the psychometric specificities of the research model (measurement model), followed by hypothesis testing (structural model). Finally, the mediation analysis procedure was conducted to assess the mediating effect of individual performance in the relationship between ICTE appropriation and educational performance.

### ***Method of Data Analysis: Mediation***

In this study, the mediating effect is observed when the relationship between an independent variable (ICT appropriation) and a dependent variable (educational performance) occurs through an intermediary variable (individual performance). This mediating variable acts as a bridge between ICT appropriation and educational performance, revealing a multi-step process. In other words, ICT appropriation has a direct impact on students' individual performance, which in turn influences educational performance. The illustrative (figure 2) below helps to clarify these relationships:

**Figure 2:** Details from Baron and Kenny's (1986) mediation model



Source: Pardo & Román (2013)

Indeed, the direct effect ( $c'$ ) occurs when ICT appropriation (the independent variable) directly influences educational performance (the dependent variable) without involving an intermediary variable (individual performance).

In contrast, the indirect effect takes place when ICT appropriation (the independent variable) first impacts ( $a$ ) individual performance (the mediating variable), which then influences ( $b$ ) educational performance (the dependent variable). To build on this, while the indirect effect highlights how ICT appropriation influences educational performance via individual performance, it is crucial to further distinguish between the types of mediation at play.

In the case of full mediation, as outlined by Baron and Kenny (1986), the connection between the independent variable ( $X$ ) and the dependent variable ( $Y$ ) is entirely accounted for by the intermediary role of the mediating variable ( $M$ ). In other words, once the mediating variable is included in the analysis, the direct effect ( $c'$ ) of the independent variable ( $X$ ) on the dependent variable ( $Y$ ) should become insignificant. This implies that ICT appropriation affects educational performance only indirectly through its influence on individual performance.

In the case of partial mediation, both the direct and indirect effects are significant. This means that the independent variable ( $X$ ) not only has a direct impact on the dependent variable ( $Y$ ) but also exerts an indirect influence through the mediating variable ( $M$ ). As Zhao, Lynch, and Chen (2011) point out, while full mediation is often considered ideal, partial mediation is more frequently observed, where both the direct and mediated paths contribute to explaining the variance in the dependent variable ( $Y$ ). The results presented below will clarify which form of mediation has been confirmed in this study.

**Assessment of measurement model**

Factor loadings were assessed for each item (Table 1). All items met Fernandes' (2012) thresholds of 0.5, except for the five individual performance items, Perf\_individ\_14 (CF=0.378), Perf\_individ\_15 (CF=0.339) Perf\_individ\_16 (CF=0.191), Perf\_individ\_17 (CF=0.246) and Perf\_individ\_18 (CF=0.235); which we decided to eliminate.

From a statistical point of view, the reliability of the constructs is assessed by calculating Cronbach's alpha and the composite reliability index (CR). As shown in Table 1, these indices greatly exceed the acceptability threshold of 0.7 Fernandes (2012); George and Mallery, (2003). To assess convergent validity, we examine the average variance extracted (AVE) of the constructs, with all three values exceeding Fornell and Larcker's (1981) required thresholds of 0.5. (see Table 1)

Discriminant validity is also ensured, firstly according to the criterion of Fornell and Larcker (1981), which consists of verifying that the square root of the AVE for each construct exceeds the correlations between the constructs and their measurement items are greater than the cross-correlations (see Table 2).

The results of the cross-loadings (Table 3) confirm that all the items significantly contribute to their respective variables when compared to other variables.

**Table 1: Loadings, Reliability, and Convergent Validity**

Construct	Items	Loadings	Alpha	CR	AVE
<b>ICTE Appropriation</b>	Approp_TICE_1	0,809	0,821	0,881	0,650
	Approp_TICE_2	0,820			
	Approp_TICE_3	0,778			
	Approp_TICE_4	0,817			
<b>Educational Performance</b>	Perf_educ_1	0,918	0,910	0,943	0,847
	Perf_educ_2	0,919			
	Perf_educ_3	0,924			
<b>Individual performance</b>	Perf_individ_1	0,734	0,942	0,950	0,593
	Perf_individ_2	0,805			
	Perf_individ_3	0,755			
	Perf_individ_4	0,823			
	Perf_individ_5	0,784			
	Perf_individ_6	0,773			
	Perf_individ_7	0,790			
	Perf_individ_8	0,801			
	Perf_individ_9	0,805			
Construct	Items	Loadings	Alpha	CR	AVE
<b>Individual performance</b>	Perf_individ_10	0,750			
	Perf_individ_11	0,738			
	Perf_individ_12	0,753			
	Perf_individ_13	0,685			
	Perf_individ_14	0,378			

	<b>Perf_individ_15</b>	0.339			
	<b>Perf_individ_16</b>	0.191			
	<b>Perf_individ_17</b>	0.246			
	<b>Perf_individ_18</b>	0.235			

CR: Composite reliability, Alpha : Cronbach Alpha  
 Source: (Smart PLS 4.0)

**Tableau 2:** Discriminant validity (Fornell et Larcker, 1981)

	<b>.(1)</b>	<b>.(2)</b>	<b>.(3)</b>
<b>ICTE Appropriation (1)</b>	<b>0,806</b>		
<b>Educational Performance (2)</b>	0,669	<b>0,920</b>	
<b>Individual Performance (3)</b>	0,772	0,716	<b>0,770</b>

The diagonal: the square roots of AVE  
 Source: (Smart PLS 4.0)

**Table 3:** Cross-loadings

<b>Construct</b>	<b>Items</b>	<b>ICTE Appropriation</b>	<b>Educational Performance</b>	<b>Individual Performance</b>
<b>ICTE Appropriation</b>	Approp_TICE_1	<b>0,809</b>	0,508	0,572
	Approp_TICE_2	<b>0,820</b>	0,489	0,611
	Approp_TICE_3	<b>0,778</b>	0,598	0,617
	Approp_TICE_4	<b>0,817</b>	0,553	0,679
<b>Educational Performance</b>	Perf_educ_1	0,637	<b>0,918</b>	0,677
	Perf_educ_2	0,604	<b>0,919</b>	0,615
	Perf_educ_3	0,606	<b>0,924</b>	0,682
<b>Construct</b>	<b>Items</b>	<b>ICTE Appropriation</b>	<b>Educational Performance</b>	<b>Individual Performance</b>
<b>Individual performance</b>	<b>Perf_individ_1</b>	0,559	0,575	<b>0,734</b>
	<b>Perf_individ_2</b>	0,645	0,582	<b>0,805</b>
	<b>Perf_individ_3</b>	0,550	0,565	<b>0,755</b>
	<b>Perf_individ_4</b>	0,728	0,696	<b>0,823</b>
	<b>Perf_individ_5</b>	0,518	0,585	<b>0,784</b>
	<b>Perf_individ_6</b>	0,569	0,518	<b>0,773</b>
	<b>Perf_individ_7</b>	0,601	0,547	<b>0,790</b>
	<b>Perf_individ_8</b>	0,574	0,526	<b>0,801</b>
	<b>Perf_individ_9</b>	0,596	0,535	<b>0,805</b>
	<b>Perf_individ_10</b>	0,597	0,500	<b>0,750</b>
	<b>Perf_individ_11</b>	0,493	0,457	<b>0,738</b>
	<b>Perf_individ_12</b>	0,554	0,476	<b>0,753</b>
	<b>Perf_individ_13</b>	0,673	0,546	<b>0,685</b>

Source: (Smart PLS 4.0)

With the psychometric specificities required for our model assured, we next examine the structure.

***Assessment of structural model***

During this stage, we have evaluated the structural fit of our model by initially examining the level of variance explained by the endogenous constructs, utilizing the R2 index. Subsequently, considering the validity of the research hypotheses, we assess each correlation coefficient associated with them. This assessment involves considering the value of the standardized beta coefficient (close to 0 indicating a weak link, and close to 1 indicating a strong link), the direction of the effect (positive or negative), the significance level (typically set at 1.96), as well as the probability of error (the p-value).

Table 4 and Figure 3 summarize the results of our overall research model, wherein all the hypotheses are corroborated.

**Table 4:** Hypothesis testing

Hypothesis	Beta	T statistics	P values	Validation
<b>Approp_TICE -&gt; Perf_educ</b>	0,289	2,829	0,005	YES
<b>Approp_TICE -&gt; Perf_individ</b>	0,772	20,898	0,000	YES
<b>Perf_individ -&gt; Perf_educ</b>	0,493	5,243	0,000	YES

Source: (Smart PLS 4.0)

We then proceed to analyze the mediation.

***Mediation analysis***

A mediation analysis was performed to assess the mediating role of individual performance on the relationship between ICTE appropriation and educational performance. The results (Tables 5 and 6) reveal that the total effect between ICTE appropriation and educational performance is significant and positive (beta=0.669, t=13.209, p=0.000).

In the presence of the educational performance variable, the direct effect of ICTE appropriation on educational performance is always significant and positive (beta=0.289, t=2.829, p=0.005). As for the indirect effect of ICTE appropriation on educational performance through individual performance, it is both significant and positive (beta=0.381, t=5.027, p=0.000).

Based on these findings, we have found support for the hypothesis proposing the presence of a mediating effect of individual performance in the connection between ICTE adoption and educational performance. However, it is important to note that this mediation effect is partial rather than complete. This distinction becomes even clearer upon closer examination of the data.

Indeed, the results confirm the presence of partial mediation, as illustrated in the previous analysis (Figure 2). Even with the inclusion of the mediating variable, the direct relationship between ICT appropriation and educational performance remains significant. This indicates that the mediation

through individual performance does not entirely absorb the effect of ICT appropriation. This observation aligns with the concept of partial mediation described by Baron and Kenny (1986), as well as by Zhao, Lynch, and Chen (2011), where both direct and indirect effects simultaneously contribute to explaining the variance in educational performance. While individual performance plays a key role in the process, ICT appropriation still exerts a distinct and independent influence on educational performance. Thus, the observed mediation effect does not completely eliminate the direct impact, but rather reinforces the importance of individual performance as an intermediary in this relationship.

**Table 5:** Total and indirect effects

	Total effect		Direct effect	
	beta	P values	beta	P values
<b>Approp_TICE -&gt; Perf_educ</b>	0,669	0,000	0,289	0,005

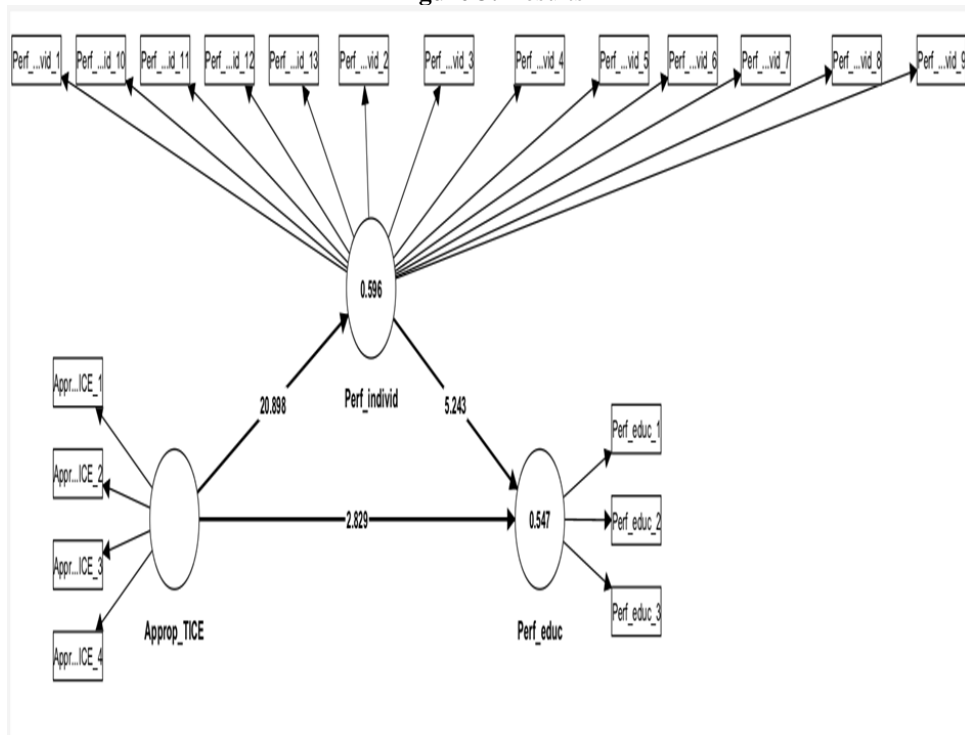
(Source: Smart PLS 4.0)

**Table 6:** Direct effect

	beta	moyenne	Ecart type	T statistics ( O/STDEV )	P value
<b>Approp_TICE -&gt; Perf_individ -&gt; Perf_educ</b>	0,381	0,381	0,076	5,027	0,000

Source: (Smart PLS 4.0)

**Figure 3:** Results



$R^2$  (individual performance) =0,596 ;  $R^2$  (educational performance) =0,547

Source: (Smart PLS 4.0)



## Discussion

This study is part of the ongoing debate on the impact of Information and Communication Technologies in Education (ICTE) on educational performance. It aims to shed light on the mediating role of individual performance in the relationship between ICT appropriation and educational performance. The results obtained demonstrate that students' individual performance is a key factor in improving educational performance, acting as a significant mediator between ICT appropriation and academic outcomes.

The contributions of this research are twofold: Firstly, it validates the measurement tools for ICT appropriation proposed by Pelletier et al. (2008), the educational performance tools proposed by Charlot et al. (1992), and the individual performance tools proposed by Koopmans et al. (2011) by assessing their explanatory capacities. Secondly, it validates the measurement tools that integrate individual performance to explain the nature of the impact of ICT appropriation on educational performance. The results demonstrate the validity and convergence of the models adopted in this research.

After analyzing the reliability and validity of various measurement scales, we eliminated five items deemed non-explanatory due to statistical results that did not meet the required threshold of 0.5. We confirm the validation of the research model. Respectively, the ICT appropriation by Pelletier et al. (2008), the educational performance by Charlot et al. (1992), and the individual performance by Koopmans et al. (2011) apply to students in public higher education in the Casablanca-Settat region.

The second objective of this study was to identify the role that individual performance plays in the relationship between ICT appropriation and individual performance. The results indicate that individual performance represents a mediating variable between ICT appropriation and educational performance. The results revealed, on the one hand, a significant and positive relationship between ICT appropriation and educational performance ( $\beta=0.289$ ,  $t=2.829$ ,  $p=0.005$ ). On the other hand, a significant and positive relationship was confirmed between ICT appropriation and educational performance ( $\beta=0.381$ ,  $t=5.027$ ,  $p=0.000$ ). This leads us to conclude that students' appropriation of ICTE largely explains the educational performance of public higher education institutions in the Casablanca-Settat region. Additionally, these students' performance in using ICT contributes to improving educational performance in the academic environment.

Indeed, the results of this study confirm that ICT appropriation promotes interactivity and student engagement, which has a positive impact on their educational performance, as noted by Barragán and Báquiro (2020), Burnett & Lisk (2021), and Hamzi et al. (2024). The increased engagement of students in using ICT also appears to foster the development of essential skills for their academic success, as supported by Kabore (2021) and Shé et al.

(2023). In this context, individual performance emerges as a key factor in maximizing the benefits of ICT appropriation.

Recent studies have demonstrated the importance of individual performance in achieving higher levels of educational performance related to the use of ICT, as noted by Saint-Onge & Magnan (2007), Frese & Sonnentag (2002), Abdel-Ouahed (2014), and Cabellos et al. (2024). Individual performance enables the full potential of ICT to be harnessed by facilitating the adoption of more effective learning strategies and fostering a deeper understanding of the subjects studied, according to Turienzo (2024).

The testing of the sub-hypotheses confirms that ICTE appropriation significantly and positively impacts individual performance, supporting sub-hypothesis (H1.1), and that individual performance significantly and positively impacts educational performance, supporting sub-hypothesis (H1.2). This summary is consistent with previous studies, particularly the findings of Vithal (2013), Basri et al. (2018), and Rahmi et al. (2023), which assert that the use and adoption of ICT for teaching and learning purposes improve students' academic performance. Barragán & Báquiro (2020) highlight that ICT appropriation is essential for pedagogical innovation and skill development among users. Boufarouj & Mdarbi (2022) also suggest that ICT appropriation enables users to maximize their knowledge. Therefore, we can conclude that individual performance mediates the relationship between students' ICT appropriation and educational performance (H1 confirmed).

The second hypothesis (H2) regarding the significant and positive effect of ICT appropriation on educational performance has been confirmed. Referring to the literature, Ben Youssef and Dahmani (2010) and Coscolluela et al. (2024) state that ICT appears to have a profound impact on the learning process in higher education by offering new opportunities to learners. Other authors, such as Ko et al. (2021) and Rad et al. (2024), affirm that the quality of platforms, task performance, and the feeling of self-determination have been shown to positively influence ICT appropriation, and consequently, significantly impact the performance of actors.

The literature on the impact of ICT on student performance is divided. On one hand, some studies show benefits such as greater autonomy in school tasks Silva et al. (2024), increased awareness of their program's updates Xu et al. (2024), and improved problem-solving skills in real-world scenarios Chen et al. (2024). ICT use is associated with better performance in subjects like science and mathematics Sun et al. (2022) compared to other disciplines such as humanities and social sciences Alieto et al. (2024). On the other hand, some research suggests a limited or negative impact of ICT on performance Kirkpatrick & Cuban (1998), Angrist & Lavy (2002), while others highlight negative consequences associated with its use Ioannou et al. (2024), especially when focused on entertainment Silva et al. (2024) Asad et al. (2023)

emphasize that the impact depends more on the quality rather than the intensity of ICT usage.

The factors influencing students' use of ICT are still underexplored, as noted by Silva et al. (2024). Some studies focus on sociodemographic factors, such as gender and family structure, Owan & Asuquo (2021). Others examine how these factors influence ICT adoption by teachers, Stumbrienė et al. (2024).

For a comprehensive overview of our study's findings, please refer to the table below:

**Table 7:** Summary of Results Achieved

<b>Main and sub-hypotheses</b>	<b>Final Decision</b>
<b>H1 : Individual student performance mediates the relationship between ICT appropriation and educational performance</b>	<b>Approved</b>
<b>H1.1 :</b> ICT appropriation significantly and positively impacts individual student performance	<b>Approved</b>
<b>H1.2 :</b> Individual student performance has a significant and positive impact on educational performance	<b>Approved</b>
<b>H2 : Students' appropriation of ICT has a significant and positive impact on educational performance</b>	<b>Approved</b>

Source: (Authors)

## Conclusion

In this article, we have synthesized key findings from the literature review of theoretical and empirical studies on the ICT usage, ICT appropriation, educational performance, as well as the individual performance of university students. ICT has shown a significant impact on the learning process in higher education, providing new opportunities to learners and positively influencing their achievements and performance, Daouk & Aldalaien (2019), Zeng et al. (2020). Our findings affirm the presence of a direct relationship between ICT appropriation and educational performance, as well as an indirect relationship mediated by individual performance.

Recent literature has increasingly explored the link between ICT usage and student performance, specifically emphasizing the impact of online pedagogical activities, Rivero et al. (2017), Kuhfeld et al. (2020). Although some historical studies, Kirkpatrick & Cuban (1998), Angrist & Lavy (2002), minimized the impact of ICT on higher education, more recent research, Xiao & Hu (2019), Srijamdee & Pholphirul (2020), supports the idea of a significant impact on student performance. Notably, ICT appears to foster the development of skills such as collaboration and critical thinking, which are essential in an increasingly digitalized labor market, Hetmańczyk, (2024).

However, this study has its limitations. The results may be influenced by response bias, and the sample being restricted to the Casablanca-Settat region limits the ability to generalize findings to other contexts, Biagi & Loi

(2013), Zhai et al. (2019). Future research should further explore the factors that influence ICT appropriation and their effect on student performance, Silva et al. (2024). It is crucial to recognize that the individual remains central to measuring educational performance. The adoption of organizational innovations in higher education is a key factor in student success. The appropriation of ICTE contributes to the acquisition of skills relevant to today's professional landscape, by promoting autonomy, collaboration, and better adaptability to labor market demands, O'Brien et al. (2022), Hamzi et al. (2024), Stumbrienė et al. (2024).

Future research should therefore focus on a comprehensive analysis of individual performance among university students, particularly within the Moroccan context, to better understand its influence on overall educational performance. Such investigations could offer avenues for enhancing the higher education system, by more closely aligning learning methods with the real needs of students and market demands.

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### **Authors' contributions**

All the researchers namely—S. Mdarbi, L. Simour, C. Boufarouj, Z. Belkebir, K. Stili, M. Ennadi— contributed to conceptualizing the study, writing and revising the manuscript. L. Simour translated the article from French into English and revised the manuscript. C. Boufarouj, Z. Belkebir, K. Stili, M. Ennadi developed the questionnaire, collected the data, and carried out the data analysis. S. Mdarbi provided mentorship throughout the entire process.

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## Economic evaluation of the direct use values of goods and services provided by the Bagré wetland in Burkina Faso

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### Abstract

Aim missing this study examines the sustainability of the Bagré wetland in Burkina Faso by assessing the direct use values of its ecosystem goods and services. It is accompanied by practical policy recommendations and aims to contribute to strengthening the country's economic growth. The conceptual framework of Munasinghe's (1992) theory and the economic evaluation guide developed by Somda and Awaï's (2013) made it possible to identify and evaluate the direct use values in the Bagré wetland. A documentary synthesis and individual surveys with a sample of 120 stakeholders spread across nine municipalities were carried out. The summary identifies agricultural, fishing, and forestry resources as the zone's main direct-use goods. Data analysis shows that the monetary value of agricultural and fishery production from 1989 to 2019 is 141,251,106,000 FCFA, distributed into nearly 41% for rice and 29% for fish products. The areas sown during this period cover 89,967 ha. Forestry potential is estimated at around 19 billion FCFA, distributed into 54% for non-timber forest products and 44% for firewood. The direct use value of the Bagré wetland in three decades is estimated at over 160 billion FCFA. The challenges of promoting direct-use goods affect the country's gross domestic product, food self-sufficiency, and job creation. Also, irrational valorization actions negatively impact ecosystems and degrade natural resources. Political implications must be considered for sustainable and inclusive management.

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**Keywords:** Bagré wetland; Assessment; Ecosystem goods and services; values; Burkina Faso

## Introduction

Burkina Faso, a landlocked Sahelian country in the heart of West Africa, is among the poorest countries in the world, with nearly 40% of its population living below the poverty line, estimated at 194,629 FCFA/year (UNDP.<sup>1</sup>, 2022; INSD<sup>2</sup>, 2022). In 2021, it was ranked 184<sup>th</sup> out of the 191 countries assessed by the United Nations with a human development index (HDI)<sup>3</sup> of 0.449. Its majority rural population, 73.86%, according to INSD (2022), depends on natural resources. These resources contribute 61.5% to household income, of which approximately 67% and 31% come from crop and livestock production, respectively (DGPER<sup>4</sup>, 2010). The country's economy is rural and dependent on natural ecosystems. Statistics from the fifth general population and housing census in Burkina Faso show that more than six out of ten people are employed in agriculture, livestock, hunting, and support activities (INSD, 2022). The agricultural sector employs 82% of this proportion. In climate change and population growth contexts, natural ecosystems, particularly wetlands, are undergoing accelerated degradation (Tapsoba et al., 2023). However, the significance of these wetlands' socio-economic and cultural problems only becomes apparent when their ecosystems are degraded or lost. This is why studies have attempted in recent years to estimate the economic value associated with the goods and services provided by these humid ecosystems (Somda et al., 2010; Tapsoba, 2015; Daly-Hassen, 2017; Mevanly et al., 2019) on the wetlands (WL) of Bagré. The Bagré wetland is of capital environmental and socio-economic importance for Burkina Faso. Its agricultural potential was identified in the 1970s, a period of serious drought and famine (Kaboré and Bazin, 2014). It was established as an economic center with hydro-agricultural development plans to respond to the situation at that time. However, its natural resources are not spared from the phenomenon of degradation. Understanding this strategic ecosystem's economic value can help improve its sustainable management through protection and conservation actions. Thus, this study aims to examine the sustainability of the Bagré wetland based on a monetary evaluation of the direct use values of its ecosystem goods and services.

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<sup>1</sup>United Nations Development Program

<sup>2</sup>National Institute of Statistics and Demography

<sup>3</sup>Human Development Index: Parameter by which the United Nations (UN) measures people's chances of leading a long and healthy life, of having access to knowledge and a decent standard of living.

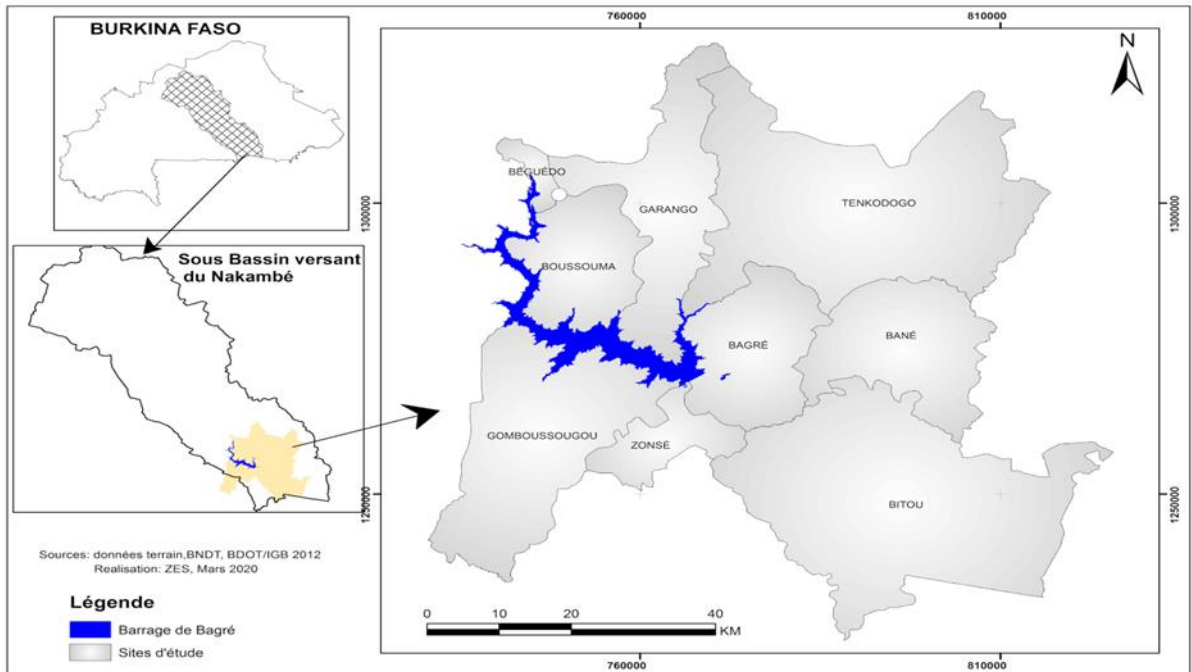
<sup>4</sup>General Directorate for the Promotion of the Rural Economy

## 1. Methodology

The methodology used first describes the study area, then defines a sample of direct actors for the surveys, and finally presents the methods used for data collection and analysis.

### 1.1. Study zone

Data collection occurred in nine municipalities chosen based on their proximity to the Bagré Dam and their relationship with it. They are the four municipalities contiguous to the Dam (Bagré, Beguedo, Boussouma, Gomboussougou) and which shelter the technical units of the fishing area of economic interest (UTP), the three urban municipalities (Bittou, Garango, Tenkodogo) which are crossroads of transactions through their market and the two rural municipalities (Bané, Zonsé), as shown in Figure 1. The municipality of Bittou is the region's heart of economic activities.



**Figure 1:** Location of the municipalities surveyed

The Bagré dam was built from 1988 to 1993 and was impounded in 1994 (Venot *et al.*, 2017; Daré *et al.*, 2019). The same authors report that the first land developments observed on the left bank covered an area of 680 ha in 1995 and 1,200 ha on the right bank between 1995 and 2002, followed by an extension of a perimeter of 1,500 ha on the left bank between 2002 and 2010.



## 1.2. Sampling

The sample size is 120 stakeholders, 72% direct operators of water, land, and plant resources, goods, and services. Initially, 162<sup>5</sup> actors had to be surveyed due to 2 actors per field of activity.<sup>6</sup> Per municipality, at least one respondent per technical service in the three urban municipalities and one municipal representative or a village development advisor (CVD) per municipality.

The choice of direct resource actors was made following an interview with municipal services, which have a directory of peasant associations and organizations in their locality. Thus, two actors were chosen from the repertoire while respecting gender parity. The selection criteria were seniority in the field of activity and the actor's reputation in the locality and the surrounding villages. Thus, approximately 71% of the planned sample was interviewed, distributed as 44% female respondents and 80% direct operators. The stakeholders in rice, market gardening, non-timber forest products, and the production of plants and fruits are the most numerous in the population surveyed, with a proportion of 17%, 15%, 14%, and 10%, respectively. The low rate of fishing stakeholders (7% fishermen and 4% fishmongers) is justified by the fact that data collection occurred outside the favorable period of their activities (July, August, and September). Loggers are solely women, representing 6% and breeders 8% of the population surveyed. The restricted sample is explained on the one hand by the precautionary measures suggested for the municipalities of Gomboussougou and Béguédo due to the reported presence of unidentified armed groups. On the other hand, the workforce is reduced since all activities (market gardening, fish farming, fishing, exploitation of timber and non-timber products, rice growing, breeding, and production of plants) are not carried out in all nine municipalities studied.

## 1.3. Conceptual frame

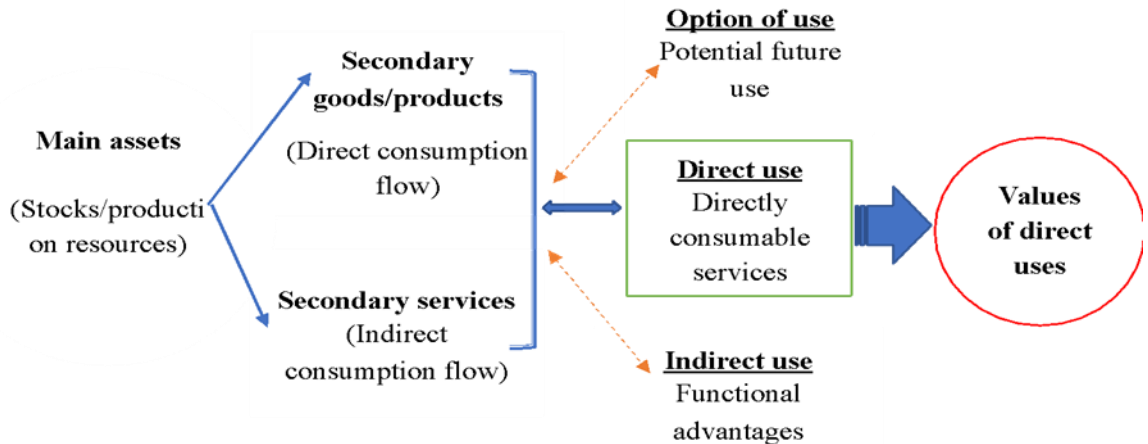
The conceptual framework used for this study is Munasinghe's theory (1992). This theory groups values into two categories for assessing total economic value (TEV). The first is made up of direct use values, and the second of those of future uses or non-uses. Pearce and Warford (1993) support this theory by believing several values must be considered when evaluating TEV. However, this study, which tries to evaluate the TEV of the Bagré wetland, will focus on values, particularly direct use values defined by Munasinghe (1992). The guide Somda and Awaïs (2013) developed made it

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<sup>5</sup>(2 actors x 9 municipalities x 8 areas of activity) + 3 (rural technical service agents) x 3 urban municipalities + CVD/municipalities = 162

<sup>6</sup>Lumberjacks, breeders, market gardening producers, fishing stakeholders (fisherman and fishmonger), operators of non-timber forest products, producers (plants and orchards), and rice producers.

possible to identify and evaluate the ecosystem goods and services of the Bagré wetland. The conceptual framework of this study is presented in Figure 2.



**Figure 2:** Scheme adopted for the evaluation of use value, adapted from Munasinghe (1992)

This attempt to evaluate the value of the natural potential of the Bagré wetland will only consider values that directly affect the well-being of populations. As a result, it will consider the goods and services from the three production resources: water, land, and plant. These ecosystem goods and services available in the locality of the said zone were identified and then grouped by type of use.

#### 1.4. Collection, nature, and analysis of data

The data collected is more secondary in nature than primary. The approach used first consisted of documentary research, which made it possible to understand the theme and context of the study. This literary review subsequently facilitated the collection of primary information, which made it possible to confirm, refute, or even supplement what was obtained from the documentation. This collection was made from stakeholders related to the management and/or exploitation of water, land, and plant resources on the outskirts of the Bagré Dam. It was carried out through individual surveys administered through a questionnaire organized according to the eight types of actors. The secondary data, of a quantitative nature, are largely extracted from activity reports produced by UTP, Bagrépôle, and the Bagré Growth Pole. Data on the hydroelectric production of the Bagré Dam were collected from the National Electricity Company of Burkina Faso. SPSS v20 and XLSTAT spreadsheets were used to process and analyze the data.

## 2. Results

The results are from a functional analysis of the Bagré wetland and the evaluation of the direct use values of the ecosystem goods and services it offers.

### 2.1. Ecosystem goods and services in the Bagré Wetland

In rural areas, wetlands contribute significantly to improving the living conditions of populations. They lead to the development of socio-economic activities<sup>7</sup> and tourism and leisure activities based on the goods and services of these natural ecosystems. In the Bagré wetland, four types of ecosystems are observed: (i) agroecosystems, (ii) aquatic/humid ecosystems, (iii) silvicultural and pastoral ecosystems, and (v) habitation areas. This set provides goods and services to meet the needs of populations (Table 1).

**Table 1:** Types of ecosystems encountered in the Bagré wetland

Ecosystem	Description
Agricultural/valleys	It is the area of soil nutrients concentration and biodiversity refuge (Adouabou, 2009). It is made up of “the main valleys draining small watersheds (5 to 200 km <sup>2</sup> ), and whose terrain is relatively flat, with a very low slope (less than 1%)” (Lamachère and <i>al.</i> , 1993).
Wet/Aquatic	Includes the body of water and its hydrographic network. It comprises the receptacle of species of aquatic animals and plants.
Sylvopastoral	The whole consists of grassy, shrubby, wooded, and wooded savannahs of riparian formations. It is also an area of concentration of small ponds.
Housing areas	This is the landscape unit used to construct homes and livestock parks.

Source: Author (2024)

Identifying goods and services in the Bagré wetland facilitates the economic evaluation exercise. In summary, three main ecosystem services are identified, and only one provisioning service is considered in this study. The valued goods and services (G&S) are recorded in Table 2.

**Table 2:** Environmental goods and services offered by the Bagré Wetland

Ecosystem services	Main assets	Secondary goods
<b>Supply</b>	Water	Freshwater, fishery products, irrigation products, hydroelectric production
	Earth	Arable soils, agricultural products
	Flora	NWFP, wood, pasture/fodder,
	Wildlife	Small wildlife
<b>Regulation &amp; self-maintenances</b>	<b>Secondary services</b>	
	Soil nutrients	
	Climate regulation by influencing environmental temperatures	
	Hydraulic regime	

<sup>7</sup>Water supply, fishing, energy, transport, etc.

<b>Cultural and social</b>	Floor protection
	Stock carbon
	Underground recharge
	Cultural heritage (tourist sites)
	Recreational and educational spaces
	Spiritual and religious spaces

Source: 2020 Survey and Tapsoba (2015)

Table 2 reveals the main goods obtained from procurement services. This preliminary work to identify environmental/ecosystem goods and services allows a monetary estimate of the use values offered by the Bagré wetland.

### ***Halieutics resources***

The State's policy of erecting growth poles around large water reservoirs was initiated from the consequences of the droughts of the 1970s. Thus, a program to build large dams was undertaken to contain and control surface water. The Bagré Dam, with a capacity of 1.7 billion m<sup>3</sup> and extending over 25,000 ha during low water periods, was built in 1992. Its fishing potential was discovered in 1994, giving it the Fisheries status. In 2004, the dam was turned into an aquaculture perimeter of economic interest (PAIE) and then as a fishing perimeter of economic interest (PHIE), given the importance of its fishing potential, estimated at 1,600 tons per year. The Bagré Dam is the 2<sup>nd</sup> fisheries of great importance in terms of surface area and production potential after the Kompienga Dam and that of Sourou.

However, the surveyed actors reveal that certain fish species have disappeared from the Bagré dam over time. Nowadays, the big fish commonly called "Captains" (*Lates niloticus* or *Nile perch*) large size are no longer encountered during captures. For these stakeholders, the probable explanation is the overexploitation and pollution (silting, pesticides, and chemical fertilizers) of the water body, which would disrupt the reproductive capacity of fish. Primary information unanimously reveals that fishing activities occur in biological resting areas/spawning areas, in areas temporarily closed to fishing, and even during fishing closure times. From a biological point of view, all these practices hinder fish reproduction and the sustainability of fishing activity. Beyond the legislative and regulatory framework that governs the management of hydraulic and fishery resources, efforts must be mobilized to preserve wetland ecosystems. Implementing actions to reduce the overexploitation of fishery resources and slow down the processes of silting and pollution with agricultural chemicals in the Bagré Dam can help improve its sustainable management.

### **Forest resources**

The Bagré Dam wetland is part of the Sudanian phytogeographic domain and precisely the northern Sudanese sector. Field observations made during the study of the spatiotemporal dynamics of resources show that the Bagré area is characterized by former fallows, degraded savannahs, and shrub savannahs predominantly occupied by species such as *Piliostigma reticulatum*, *Balanites aegyptiaca*, and *Ximenia americana*.

**The wooded savannah** is dominated by woody species such as *Vitellaria paradoxa*, *Tamarindus indica*, *Faidherbia albida*, *Lannea acida*, *Acacia gourmaensis*, *Ficus sycomorus*, *Khaya senegalensis*, etc. The strata of gallery forests downstream of the dam are formed by species such as *Khaya senegalensis*, *Anogeissus leiocarpus*, *Diospyros mespiliformis*, *Daniella Oliveri*, *Parkia biglobosa*, *Tamarindus indica*, *Pterocarpus erinaceus*, etc.

**The shrub**, consisting of species such as *Piliostigma reticulatum*, *Balanites aegyptiaca*, and *Ximenia americana*, predominates and comprises former fallows to the south of Béguédo.

**The relict tree layer** is characterized by the absence of crops. It is composed of woody species such as *Lannea acida*, *Vitellaria paradoxa*, *Tamarindus indica*, *Khaya senegalensis*, *Faidherbia albida*, *Acacia gourmaensis*, *Ficus sycomorus*, etc.

**The stratum of gallery forests** along the river downstream of the Dam, very dense in places, is composed of *Khaya senegalensis*, *Daniella Oliveri*, *Anogeissus leiocarpus*, *Diospyros mespiliformis*, *Pterocarpus erinaceus*, *Parkia biglobosa*, *Tamarindus indica*, etc.

**The grassy savannah** encountered is quite large and composed of species such as *Andropogon gayanus*, *Schoenefeldia gracilis*, and *Cymbopogon schoenanthus*.

The species frequently exploited by the populations of the Bagré wetland are recorded in Table 3 in appendix according to the type of use. Table 3 shows various uses depending on species. All those recorded in the table are exploited as non-timber forest products (NTFP) in human and animal food and human and animal health care. Furthermore, survey results combined with information provided in the descriptive sheet of the Bagré Ramsar site identify *Vitellaria paradoxa* and *Khaya senegalensis* as threatened plant species. The information collected also attests that *Acacia laeta*, *Bombax costatum*, *Combretum aculeatum*, *Combretum mole*, *Crossopteryx febrifuga*, *Daniellia Oliveri*, *Ficus gnaphalocarpa*, *Ficus sp.*, *Grewia sp.*, *Lannea acida*, *Mearua crassifolia*, *Parkia biglobosa*, *Securidaca long pedunculata*, *Terminalia macroptera*, *Ximenia americana*, and *Ziziphus micronata* are plant species very rarely encountered in the locality.

Species such as *Vittelaria Paradoxa*, *Parkia biglosa*, and *Balanites aegyptiaca* have important social, cultural, and economic value. Their NTFPs

are the subject of regional, national, and even cross-border trade. However, other species are highly used for their woody material, which is used for energy and lumber. This is the case of *Vittelaria paradoxa*, which is highly used for its firewood and charcoal, although it is a threatened and protected species. In the various municipalities concerned by this study, the standing wood potential is composed, among other things, of trees providing firewood, utility wood, NTFPs, and domestic fruits (Table 4 in appendix).

Table 4 reveals that the study area has a plant potential estimated at more than 9.6 million tree plants with an average density of woody material estimated at around 19 m<sup>3</sup> per hectare. The potential providers of NTFPs (larger) and those providing firewood represent 48% and 39% of the total estimated volume, respectively. Forest resources in the locality constitute a potential supply of NTFPs and energy wood for the populations.

### **Wildlife Resources**

The documentary review reports that the Bagré wetland is home to the following protected areas (PA): the Oulingoré classified forest (6,850 ha), the classified forest of Yakala (1,600 ha), and the Sitenga classified forest (840 ha). However, each of these PAs has very little rich and varied fauna due to the intensity of the anthropogenic pressure observed there. This fauna is largely made up of small game (hares, small antelopes, rats, squirrels, doves, etc.) found in relics such as old fallows, sacred woods, and hills unsuitable for agriculture. For its survival, almost extinct, Big Game finds refuge in more secure areas except for the population of hippos and emblems of the dam, which led to its classification on the list of Ramsar sites very present in Yakala and Fougou. A few mammals and reptiles are present alongside an avian fauna made up of nearly 150 species of birds. Those with frequent encounters include graylings, cattle guards, doves, small hornbills, herons, francolins, sandgrouse, guinea fowl, and weavers. In addition to hippos, some birds, mammals, and reptiles are observed for aquatic fauna. These are the Nile Monitor, the Nile Crocodile, aquatic turtles, and wild ducks.

Beyond its fish production capacity of around 600 tons on average of fish/year, the ichthyofauna encountered there is quite varied. There are 13 *Chlorophyceae*, 2 *Euglenophyceae*, 6 *Cyanophyceae*, 7 *Chrysophyceae*, and 5 *Rhodophyceae*; eight genera of Rotifera, a species of *Cladocera*, a species of *Daphnia pulex* and *Copepods*; *Caelatura aegyptiaca*; 45 species of fish, the most common of which are *Clarias gariepinus* (catfish), *Lates niloticus* (captains), *Oreochromis niloticus*, *Sarotherodon galilaeus*, *Tilapia zillii*, *Schilbe mystus*, *Protopterus annectens*, *Brycinus nurse*, as well as a species of shrimp (*Macrobrachium sp*) and some species of frogs (*Rana sp.*).

### ***Agricultural resources***

The pilot project for rice cultivation, called "Petit Bagré," which extends over 80 ha, was initiated in 1979 to certify the real agricultural potential of the Bagré wetland as well as the capacity of farmers to practice irrigated rice cultivation. This rice field is fed from a hillside lake of 3.5 million m<sup>3</sup>, which has become a buffer reservoir in the general irrigation system in the Bagré area. The potential for agricultural land is 30,000 ha, which can be developed upstream (9,000 ha) or downstream (21,000 ha) of the Bagré Dam. Rainfed agriculture and irrigated agriculture are carried out there. Off-season crops employ farmers after the seasonal harvests. The agribusiness (agricultural entrepreneurs) and family farmers live together on the site. The land potential for rainfed agriculture is 170,000 ha from May to October. Irrigated agriculture differs depending on the bank. The left bank is set up for agribusiness-type exploitation (market gardening and fruit growing), and the right bank is occupied by the villages bordering the Bagré Dam and practicing there alongside rice cultivation, that of the off-season (market gardening farming).

### ***Pastoral resources***

The synthesis of survey data and information extracted from the literature review indicates three types of breeding. Extensive transhumant, sedentary, and semi-extensive breeding is practiced in the Bagré wetland. The first is practiced by Fulani pastoralists, the second by indigenous farmers, and the third by groups of mixed breeders (Fulani pastoralists and indigenous farmers). Livestock farming concerns cattle, sheep, goats, pigs and poultry. Animals use unmarked trails to access grazing and traditional wells, rainwater reservoirs, and boreholes.

Two pastoral areas covering 7,125 ha<sup>8</sup> are developed in Doubégué and Tcherbo on both banks of the Nakambé. However, woody plants are integral to livestock feeding alongside dry and fresh natural grazing. During the dry season, animals graze along the Nakambé and Bagré Dams. The breeders cut down shrubs, limbs and prune leaves and fruits from trees to feed the herd. During the rainy season, they take their herds away from the fields, mosquitoes, and tsetse flies.

Livestock infrastructure is poorly developed. The information collected shows that the most common animal diseases are anthrax, Newcastle's disease, tuberculosis, avian pox, and pasteurellosis. Animals (goats, sheep, and cattle) from the area are exported to Ghana and Togo.

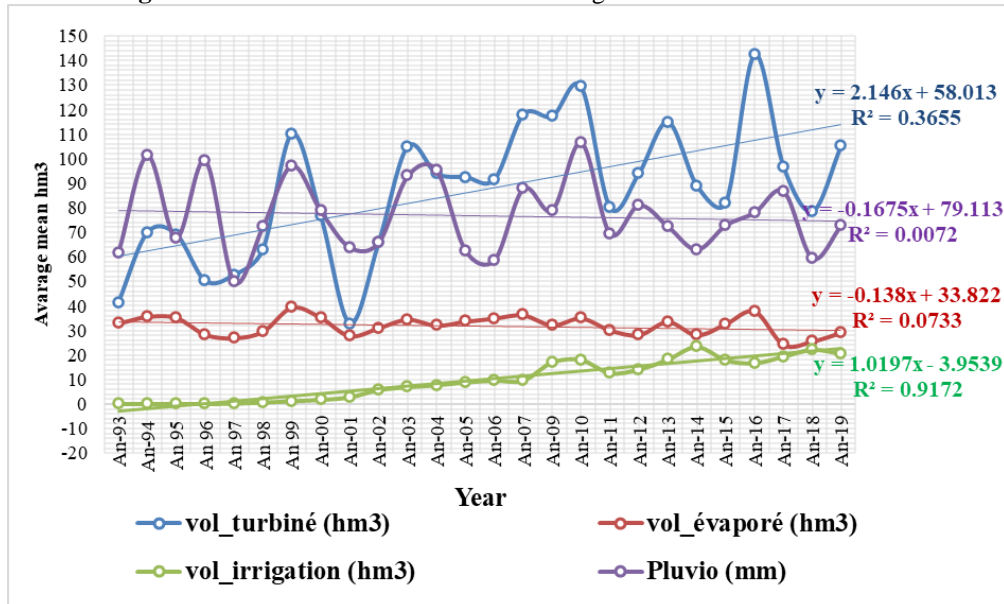
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<sup>8</sup>(Ouédraogo, 2012)

## 2.2. Hydroelectric resources

The Bagré Dam, built to address the problem of food insecurity through the development of irrigated agriculture, has also provided electrical energy since 1993 from the hydroelectric power station installed downstream of the dam. The initial planned production of 44 GWh per year almost doubled today. The Burkina Faso National Electrification Company (SONABEL) ensures electricity production and transport. Electricity production has increased over the three decades (figure 3).

**Figure 3:** Use of the water volume of the Bagré Dam from 1990 to 2019



Source: Author (2024)

Figure 3 shows that volumes of turbines and irrigated water increase over time, while volumes of rainwater decrease over the same period. However, the quantity that evaporates is almost constant over time, implying that the impact of the climatic variable (temperature rise) is significant on the sustainability of the dam's water stock.

Econometric results make it possible to understand better the correlation between the services the Bagré wetland provides for electricity production and irrigation. Thus, the predominance of quantitative variables leads to opting for a multivariate linear regression. Considering the explained variable  $Y = vol\_turbiné (hm^3)$  and the independent (explanatory) variables  $X_i$  with  $i = year; evaporated\_vol (hm^3); vol\_irrigation (hm^3); rainfall (mm)$ , the model of the evolution of electricity production from the turbine volume can be written as follows:  $Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4}$  with  $\beta_0$ , a constant. The regression results obtained from XLSTAT are reported in Table 5.



**Table 5:** Result of multivariate linear regression

Source	Value	Standard error	T	Pr >  t	Lower bound (95%)	Upper bound (95%)	P-value meaning codes
Constant	-109.643	22,504	-4.872	<0.0001	-156.442	-62.844	***
Year	1.709	1.065	1.605	0.123	-0.505	3.924	°
Evaporated_vol (hm3)	3.993	0.665	6.007	<0.0001	2.611	5.376	***
Vol_irrigation (hm3)	1.045	0.999	1.046	0.308	-1.033	3.124	°
Rainfall (mm)	0.464	0.166	2.801	<b>0.011</b>	0.120	0.809	*

Meaning codes: 0 < \*\*\* < 0.001 < \*\* < 0.01 < \* < 0.05 < . < 0.1 < ° < 1

The model of the evolution of the production of the volume of turbid water can then be written according to the following equation:

$$Y = -109.6 + 1.709 * \text{year} + 3.993 * \text{evaporated\_vol} + 1.045 * \text{irrigation\_vol} + 0.464 * \text{rainfall}$$

The R-squared of the model is 0.845 (R<sup>2</sup>= 84.5%), indicating that the model is well-specified and adequate. The volume of turbid water is 84.5%, according to the volumes of irrigated and evaporated water and the quantity of rainwater that falls. The results allow us to estimate that the volume of turbined water from the Bagré Dam increases yearly by 1.7%, ceteris paribus. This implies that the need for consumption or supply of electricity is increasing over time.

### 2.3. Economic evaluation of direct use values

The values of direct-use goods and services in this study are agricultural, fishery values, and plant potential. These three values come from the land, water, and plant resources considered in studying land use dynamics around the Bagré Dam. The Bagré wetland offers economic benefits to populations. Indeed, in addition to fishing opportunities, other income-generating activities are carried out there. For this study, the economic evaluation did not cover all ecosystem goods and services due to the unavailability of statistical data. Consequently, the evaluation of the total economic value of the said zone will be reduced to the evaluation of the direct use values of the goods and ecosystem services it provides.

#### *Monetary values of agricultural and fishery production in the Bagré wetland*

The estimated agricultural production is irrigation from areas developed for the occasion. The estimates of values are made in this study based on the ceteris paribus hypothesis. Thus, the potential for developed agricultural land is estimated by multiplying the annual surface area (X= 30,000 ha) by the number of years (n). The potential of agricultural land (Y)

that can be developed for ten years of agricultural activities is 300,000 ha obtained from the formula " $Y = 30,000 \times 10$ ".

The total area sown from 2010 to 2019 is 57,903.7 ha. It is obtained from the summary of the annual reports of activities of the "Economic Development Directorate" of Bagrépôle, those of the "Bagré Growth Pole Project" of the Bagré Project manager, and the activity reports of the Technical Unit of the fishing area of economic interest of Bagré. The total agricultural and fishery production in tons recorded in the Bagré wetland between 2010 and 2019 is reported in Table 6 in appendix

The total agricultural and fishery production from 2010 to 2019 is approximately 298,422 tons and 5,616 tons, respectively. Rice production represents 80.42% of the total agricultural production of the decade. Statistical data on production are unavailable from 1990 to 1999 and 2000 to 2009. In fact, from 1990 to 1996, agricultural and fishery production had a zero value (0 tons) because the dam was filled with water in 1994, and the first developed perimeter was recorded in 1995. Also, data on the production of corn, market garden crops, fruit, and fish from 1997 to 2009 are unavailable because they have not been archived.

The summary of the activity reports of Bagrépôle, PHIE-B, and MOB reveals that the total rice production from 1989 to 1999 was 13,134 tons.<sup>9</sup> They were cultivated in an area of 3,444 ha. From 2000 to 2009, 133,711 tons were produced, or 28,619 ha. Furthermore, this economic evaluation study does not include agricultural and fishery production at the "Petit Bagré" pilot project level. Petit Bagré is supplied with water by a hill lake, while the Nakambé River supplies the Bagré Dam, which was the subject of the area's classification on the list of Ramsar sites. Based on the *ceteris paribus* hypothesis, the missing statistics, apart from the zero values (0 ha and 0 tons) recorded over the period from 1989 to 1996, are obtained from the mathematical formula of the rule of three, which follows:

$$Y = \frac{N \times X}{n}$$

Y= value of agricultural production of corn, market gardening, or fruit sought  
X= value of agricultural production of corn, market gardening, or fruit from 2010 to 2019

N = total area sown for the period for which production data are missing

n = total area sown from the period 2010 to 2019

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<sup>9</sup>This value represents the sum of the quantities produced during the three years 1997, 1998 and 1999 on areas of 648 ha, 1,248 ha and 1,548 ha respectively.

The total agricultural and fishery production estimated during the three decades 1989 to 1999, 2000 to 2009, and 2010 to 2019 is given in the table (table 7).

**Table 7:** Agricultural and fishery production (in tons) in the Bagré wetland

Period	Total sown area (ha)	Rice (Ton)	Corn (Ton)	Market gardening (Ton)	Fruits (Ton)	Fishery products (Ton)
<b>1989-1999</b>	3,444	13,134	531.7	1,739,8	1,204.2	5,713
<b>2000-2009</b>	28,619	133,711	4,419	14,457.5	10,006.3	8,817
<b>2010-2019</b>	57,903.7	239,984.6	8,940.8	29,251.3	20,245.4	5,616.5

Source: adapted from the reports of Bagrépôle (2013, 2014, 2015, 2016, 2018, 2019); MOB (2011); PHIE-B (2016, 2011, 2016, 2018)

As the capacity and expansion of the Bagré Dam (25,000ha) remain unchanged, the total fishery production estimated (*ceteris paribus*) for the periods from 1989 to 1999<sup>10</sup> and from 2000 to 2009 is obtained from the annual activity reports of the Technical Unit of the Aquaculture Perimeter of Economic Interest of Bagré. A downward trend in fish production has been observed over the last two decades. On the other hand, an intensification of agriculture is observed during the same periods with increasing production. The monetary value of agricultural and fishery production is estimated by multiplying the quantities produced per decade by their average price per kilogram (kg) (table 8).

**Table 8:** Monetary value in thousands of CFA francs of agricultural and fishery products

Period	Rice	Corn	Market gardening	Fruits	Fishery products
1989-1999	1,970,100	97,833	1,304,850	240,840	11,426,000
2000-2009	20,056,650	813,096	10,843,125	2,001,260	17,634,000
2010-2019	35,997,690	1,645,107	21,938,475	4,049,080	11,233,000
1989-2019	58,024,440	2,556,036	34,086,450	6,291,180	40,293,000

- The average price per kg of paddy rice at the edge of the fields is 150 CFA.
- The average price of a kg of corn at the farm gate is 184 CFA francs
- The average price of a kg of freshwater fish is 2,000 CFA francs (Aliou, 2021)
- Average price per kg of organic vegetables: 750 FCFA (Yonli & Ouedraogo, 2023)
- The average price per kg of fruit (banana, citrus fruit, watermelon, yellow melon) at the farm gate is 200 CFA francs.

<sup>10</sup>In the first year of filling of the Bagré Dam in 1994, the quantity of fish captured was 746 tons (PHIE-B, 2006).

The monetary value of agricultural and fishery production in the Bagré wetland during the three decades from 1989 to 2019 is 141,251,106,000 FCFA. Rice production represents 41.08% of the total monetary value, and fishery products represent 28.53% of the total monetary value. These two rates make it possible to confirm the vocation of rice-growing plains and fisheries, which motivated the construction of the Bagré Dam and the hydro-agricultural developments of the dam. Corn cultivation yields the lowest quantity produced in thirty years, with a monetary estimate of 2,556,036,000 FCFA or 2.5% of the total monetary value of agricultural production in the Bagré wetland.

**Monetary value of plant potential in the Bagré Wetland**

Based on the results of the work carried out by Ouédraogo (2015), “Pricing of wood energy in Burkina Faso: the problem of the internalization of social costs linked to the exploitation of energy,” the price of a cubic meter of wood of fire estimated at 2,200 FCFA is used to estimate the monetary value of the potential of standing trees of the benefits cited in table 9.

**Table 9:** Monetary value of the potential of standing trees supplier of products

Products	Tree volume (feet)	Total value (FCFA)
Fruits	62,351	137,172,200
NWFP	4,665,841	10,264,850,200
Lumber	36,706	80,753,200
Firewood	3,803,528	8,367,761,600
<b>Total</b>	<b>8,568,426</b>	<b>18,850,537,200</b>

Source: adapted from MEEVCC (2018)

The plant resources, particularly forestry, available on the Bagré site constitute the main supply source for local populations. Its potential is estimated at more than 9 billion FCFA. The value of NTFPs represents 54.45% of the total value, followed by that of firewood (44.49%).

**Monetary estimation of direct use values of the Bagré Wetland**

The unavailability of statistical data, the extent of the study site, and the diverse multitude of goods and services did not make it possible to have an exhaustive value of the ecosystem goods and services provided by the Bagré wetland. The assessment only concerned direct consumer goods. Table 10 presents the overall economic values of the goods and services supplied in the Bagré wetland.

**Table 10:** Direct use value of goods and services of the Bagré wetland (FCFA)

Direct use value	Estimated monetary value (FCFA)
Agriculture	100,958,106,000
Fisheries	40,293,000,000
Vegetable	18,850,537,200
Total	160,101,643,200

This value of more than 160 billion FCFA is considered minimal. All the direct-use ecosystem goods and services offered by the Bagré wetland could not be estimated in monetary value. This is the case for the potential of pastoral resources. The available statistics on livestock and fodder in the area studied do not cover a third of the 30 years required for a study that considers climate change. In addition, the difficulty of evaluating the price/cost of certain goods and services has led to missing statistics. This is the case for drinking water supply or water withdrawal for purposes other than agricultural irrigation. It appears that agricultural land resources, which represent 63% of the total value, contribute considerably to food security and the socio-economic development of populations. Also, this representative rate approves the primary vocation of the development of the agricultural site. The share of fishery resources in the total monetary value is 25%, followed by forestry resources, 12%. Despite all the limitations, these results can reassure and be useful to all physical and moral actors involved in the sustainable management of the site's natural resources.

### **3. Discussion**

The results highlighted that the Bagré wetland still has great potential for the socio-economic development of the population and even the country. The exploitation and development of these potentialities must be done with wise political will while not marginalizing the needs of future generations. The discussion of evaluating the direct use values of the said zone will be structured around four pillars: social, economic, environmental, and political.

#### **3.1. Socio-economic issues in the development of the Bagré wetland**

Establishing the Bagré site as an agricultural growth pole, a hydroelectric production station, and a PHIE demonstrates its multifunctionality and social and economic importance for Burkina Faso. The evaluation of the direct use values of the Bagré wetland from 1989 to 2019 gives a minimum value of 160,101,643,200FCFA. This value is generated from production resulting from the exploitation of its land resources (100,958,106,000 FCFA), water (40,293,000,000 FCFA), and forestry (18,850,537,200 FCFA). This implies that a minimum value of more than 5.3 billion FCFA per year can be obtained from agricultural, fishery, and forestry production in the country's wetlands alone. It is a source of information for building and developing the said wetland. Many scholars estimated the annual value of goods and services of some wetlands in Burkina and concluded that those areas' economic importance is high. These are Somda and *al.* (2010), who estimated the economic value of the Sourou Valley at over 10 billion

CFA, and Tapsoba (2015), who assessed the use values of seven sites<sup>11</sup> in Ramsar at more than 85 billion FCFA.

The development of natural resources in the wetlands of Burkina Faso can encourage job creation initiatives and improve the value of its gross domestic product (GDP) and the food self-sufficiency of its population. This corroborates the results of Goyal and Nash (2017), who examined public spending priorities for African agricultural productivity growth. They concluded that the economy of most Sahel countries depends on African agriculture, which contributes to GDP and employs two-thirds of the active population. Furthermore, by exploring the state of poverty, food insecurity, and the vulnerability of agricultural households in the irrigated area of Bagré, Tapsoba (2021) affirms that the development of irrigation is a means used by States to eradicate poverty: poverty and food insecurity. Mévanly and *al.* (2020) assessed the economic value of some ecosystem services<sup>12</sup>, including the “Assinie Navigation Canal” wetland on the Ivory Coast. They confirm the socio-economic importance of the said canal and reveal that the minimum monthly income of a palm leaflet weaver is 29,480 FCFA, and that of a fisherman is 59,357 FCFA.

### **3.2. Environmental impacts of the development of the Bagré wetland**

The uncontrolled and sometimes clandestine water, land, and forest resources exploitation in the Bagré site generates much-criticized environmental impacts. These results corroborate the investigations of Limoges (2009) on biodiversity, ecological services, and human well-being, as well as the work of Mévanly and *al.* (2020) on the economic evaluation of the ecosystem services offered by the Assinie Canal (Ivory Coast). They claim that socio-economic activities degrade approximately 60% of the ecosystem services offered by watercourses, particularly wetlands. Indeed, local populations develop socio-economic activities<sup>13</sup> as well as tourism and leisure activities based on the goods and services of these natural ecosystems (Failler and *al.*, 2010; Require-Desjardins, 2021). The gradual increase in the volume of irrigated water from the Bagré Dam from 1989 to 2019 reflects the intensification of agricultural practices over time. It is not without damaging consequences for the ecosystems in the area. Consumption and natural resource needs that increase with population could negatively influence the sustainability and even the existence of this wetland of international importance, which reinforces the opinion of Turpie and *al.* (2010), who attest

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<sup>11</sup>Lake Bam, Lake Higa, Lake Tingrela, Banh spreading cone, Lake Dem, Kompienga Dam, Tapoa Dam.

<sup>12</sup>Raffia palms, fish, firewood and service.

<sup>13</sup>Water supply, fishing, energy, transport, etc.

that the factors of wetland degradation are land conversion, overexploitation of natural resources, and pollution.

Furthermore, the downward trend in rainfall observed over the three decades could have a downward influence on the stock (or volume) of water in the Bagré Dam and lead to negative consequences on agricultural and electricity production. Dubreuil (2012) reports that overexploitation, pollution, and reduced rainfall are gradually degrading water resources, and the constant increase in demand could affect 60 million people in 2025.

In the Bagré wetland, the overexploitation of goods and services considered common goods remarkably modifies the structure of habitats and ecosystems. On the other hand, knowledge of the area's economic value can contribute to finding solutions to the phenomenon of degradation of these ecosystems, which supports the statement of Bonin and Antona (2012) and Wallis and *al.* (2011). These authors assert that the degradation of wet ecosystems can be contained by awareness of the economic benefits they bring and the costs of their degradation. Turpie and *al.* (2010) further assert that evaluating wet ecosystem services can contribute to decision-making that leads to sustainable results <sup>14</sup>in the sense that it allows for real costs and benefits from the use and degradation of ecosystems.

### **3.3. Political implications for sustainable development of the Bagré Wetland**

The economic value of the natural resources of the Bagré wetland allows managers, especially the public authorities, to understand development policies better. Some ecosystem goods and services production and income generation capacity now deserve special attention in exploitation and valorization. Knowledge of the economic value of goods and services directly used in the Bagré wetland constitutes an advocacy instrument in favor of sustainable investment, exploitation, and development actions.

The management and planning policy for actions to develop land, water, and forest resources in Burkina Faso should be updated to consider the convergences in their exploitation processes. The exploitation of these three resources is interrelated. The policy for the development of irrigated valleys must also be re-examined. Revising these policies implies adopting a concerted and integrated management approach for the three resources, which makes it possible to limit the actions of their irrational exploitation and slow down the degradation process. It must align with the national socio-economic development policy and decentralized natural resources management policy. Such an approach contributes to building inclusive management that considers the social, economic, and environmental dimensions to ensure a sustainable

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<sup>14</sup>ecologically sustainable, socially equitable and economically rational outcomes

development policy. Indeed, dependence on natural resources has increased over the years, but the results of restoration and preservation efforts are not tangible enough. A new national policy<sup>15</sup> on wetlands that integrates measures to preserve natural resources and conserve ecosystems in its planning framework deserves to be developed.

## Conclusion

This study evaluated the direct use values of the ecosystem goods and services of the Bagré wetland based on secondary quantitative data collected from 1989 to 2019. The results obtained from the data analysis made it possible to globally identify the benefits, socio-economic and environmental issues, and political implications linked to the exploitation and valorization of natural resources in the area. Considering land, water, and forest resources, the minimum value in monetary terms estimated in the Bagré wetland is 160,101,643,200FCFA. The assessment showed that this humid ecosystem can provide significant income to the population and foreign exchange to the country through irrigated agriculture, fishery production, and forest products. However, agricultural production increased over the three decades studied while fish production gradually declined. The socio-economic issues linked to the economic development of the Bagré wetland revolve around (i) its contribution to the country's GDP, (ii) food self-sufficiency of the population, and (iii) opportunities for the creation of jobs. The environmental impacts are negative and linked to the modification of ecosystems and the degradation of natural resources. Effective socio-economic development based on wetlands depends on the existential sustainability of their natural resources. The assessment of the economic value of these areas provides both qualitative and quantitative data that contribute to this development and calls for more efforts to preserve resources. Political implications must be considered for better use and development of land, water, and forest resources in the Bagré wetland and other Burkina Faso wetlands. Adopting a concerted and integrated policy approach to management and planning allows for inclusive management of natural resources, considering the three dimensions of sustainable development. A new national policy deserves to be adopted to consider the economic values of wetlands for socio-economic development that preserves natural resources and conserves ecosystems.

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<sup>15</sup>The vision of Burkina Faso's national wetlands policy is limited in 2015 and there is a need to revise it. We need an updated policy for the exploitation and development of natural resources which makes it possible to fight, among other things, against poverty, food insecurity, unemployment of the population.



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## Appendix

**Table 3:** Useful plants for populations in the Bagré area

No.	Species	Leaves	Fruits	Seeds/ Kernels	Flowers	Roots	Barks	Rubber	Branches
1.	<i>Acacia (dudgeonni and laeta)</i>	X	X			X	X	X	X
2.	<i>Acacia gourmaensis</i>	XX	X		X	X			
3.	<i>Anogeissus leicarpus</i>	XXX	XX	X		XX	XX	X	X
4.	<i>Azadirachta indica</i>	XXX		X	X		X		
5.	<i>Balanites aegyptiaca</i>	XX	X	X	XX	X	X		
6.	<i>Bombax costatum</i>	X		XXX	XXX		X		
7.	<i>Capparis corymbosa</i>	XXX	X		X	XX			
8.	<i>Combretum (glutinosum, fragens, mole)</i>	XXX				X	X	X	
9.	<i>Dichrostachys cinerea</i>	XX	XX	X			XXX		
10.	<i>Diospyros mespiliiformis</i>	XX	X			X	X		
11.	<i>Khaya senegalensis</i>	XX		X		X	XX	X	
12.	<i>Lannea acida</i>	XX				X	X		X
13.	<i>Lannea macrocarpa</i>	XX	X			X	X		X
14.	<i>Leptadenia hastata</i>	X			X	X			
15.	<i>Mimosa pigra</i>	X			X	X			
16.	<i>Parkia biglobosa</i>		X	X			X		
17.	<i>Piliostigma (reticulatum, thonningii)</i>	X				X			X
18.	<i>Sclerocarya birrea</i>	X	X	X		X	X	X	
19.	<i>Terminalia avicennioides</i>	XX	X		X	X	X		
20.	<i>Terminalia laxiflora</i>	X				X	X		
21.	<i>Vernonia colorata</i>	XX			X	X	X		
22.	<i>Vitellaria paradoxa</i> (SEEN)	X	X	XX			X		
23.	<i>Waltheria indica</i>	XX				X			

**Legend:** X (medicinal use), X (veterinary use), X (edible), X (fodder), X (other use)

Source: author, adapted from (Adouabou, 2009; Ouédraogo, 2012; Thiombiano et al., 2012)

**Table 4:** Wood potential in the nine municipalities contiguous to the Bagré Dam

Municipality	Firewood		Service wood and potential timber		Exploitable timber		Wood from the main species providing NTFPs		Domestic fruitwood		Other woods		The general average of woods	
	Total existing volume	Density (m3/ha)	Total existing volume	Density (m3/ha)	Total existing volume	Density (m3/ha)	Total existing volume	Density (m3/ha)	Total existing volume	Density (m3/ha)	Total existing volume	Density (m3/ha)	Total volume	Density (m3/ha)
Bagre	272,402	6.76	3,172	0.08	1,878	0.05	369,295	9.16	4,861	0.12	81,214	2.01	732,822	18.18
Bane	437,575	9.54	6,553	0.14	4,131	0.09	421,882	9.2	3,640	0.08	99,438	2.17	973,218	21.21
Beguédo	23,804	5.10	424	0.09	374	0.08	42,784	9.16	802	0.17	8,488	1.82	76,675	16.42
Bittou	1,052,428	8.42	12,792	0.10	6,757	0.05	1,147,809	9.19	11,169	0.09	267,834	2.14	2,498,789	20
Boussouma	176,002	6.73	1,733	0.07	785	0.03	238,018	9.1	2,997	0.11	53,740	2.05	473,275	18.08
Garango	338,175	6.33	4,339	0.08	2,937	0.06	489,195	9.74	7,108	0.19	104,799	1.96	946,553	17.73
Tenkodogo	730,632	6.10	9,042	0.08	5,534	0.05	1,142,637	9.27	18,105	0.12	237,408	2.04	2,143,358	18.21
Zone	111,919	6.69	1,053	0.06	6,045	0.03	155,109	9.54	1,964	0.15	34,200	1.98	304,725	17.89
Gomboussougou	660,591	8.57	11,767	0.15	8,265	0.11	659,112	8.55	11,705	0.15	141,863	1.84	1,493,302	19.38
<b>Total Average</b>	<b>3,803,528</b>	<b>7.14</b>	<b>50,875</b>	<b>0.09</b>	<b>36,706</b>	<b>0.06</b>	<b>4,665,841</b>	<b>9.21</b>	<b>62,351</b>	<b>0.13</b>	<b>1,028,984</b>	<b>2.00</b>	<b>9,642,717</b>	<b>18.57</b>

Source: Adapted from MEEVCC (2018)

**Table 6:** Agricultural and fishery production in the Bagré wetland from 2010 to 2019

Years	Rice		Corn		Market garden products		Fruits		Fish
	Area (ha)	Average production (tons)	Area (ha)	Average production (tons)	Area (ha)	Average production (tons)	Area (ha)	Average production (tons)	Production (tons)
2010	5,678	26,204	114	190	40	550	15	450	493.8
2011	3,262	14,331	41.5	91.25	76.15	785.4	36	549	449.66
2012	3,323	15,666.6	400	150	80	814.6	64	220	471.73
2013	4,836.75	26,265.06	341	1,023	91	2,448	43	1,290	460.70
2014	4,716.73	27,514.9	335	950	71	2,066	161	4,200	386.33
2015	5,855.07	28,176.8	530.5	1,426.13	286.42	4,689.65	36	859.9	320
2016	5,855.07	30,264.55	480	1,176	320.75	4,847.41	136	3,595.5	952
2017	5,974.6	27,626.3	617.5	930.9	422.5	6,263.75	134	2,297	586.58
2018	5,967.78	30,602.22	410	948.5	393.8	6,557.69	134	3,500	797.25
2019	5,322.2	28,999.8	830.408	2,055.01	337	5,076.2	135	3,284	698.43
<b>Sum</b>	<b>50,791.2</b>	<b>239,984.63</b>	<b>4,099.908</b>	<b>8,940.785</b>	<b>2,118.62</b>	<b>29,251.29</b>	<b>894</b>	<b>20,245.4</b>	5,616.473
<b>Average</b>	<b>5,079.12</b>	<b>26,664.96</b>	<b>409.99</b>	<b>894.08</b>	<b>211.62</b>	<b>3,250.14</b>	<b>89.4</b>	<b>2,024.54</b>	<b>561.65</b>

Source: adapted from reports of Bagrépôle (2013, 2014, 2015, 2016, 2018, 2019); MOB (2011); PHIE-B (2011, 2016, 2018)

## The Impact of Aligning Kolb's Experiential Learning Theory with a Comprehensive Teacher Education Model on Pre-service Teachers' Attitudes and Teaching Practice

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### Abstract

Since its inception, experiential learning has been a foundational tenant of teacher education. However, it is questionable to what extent authentic experiential learning practices are actually taking place. Based on Kolb's Experiential Learning Theory Model, this paper presents an approach to addressing this issue. This exploratory manuscript further examines Kolb's Experiential Learning Cycle (ELC) and considers its implications for Experiential Learning Theory (ELT) in teacher education. A description of the teacher education program in the CRMEF (Centre Régional des Métiers de l'Éducation et de la Formation) is provided, followed by results from a quantitative and qualitative survey triangulated with teacher trainees' reflection journals to evaluate the training program in terms of the teacher trainees' developing confidence and competence in teaching. This paper focuses on exploring the implementation of this approach for teacher education in the CRMEF. Results indicate that a large majority of the participants developed confidence in teaching through this approach, subsequently changing their perceptions and attitudes toward teaching English. Specific learning experiences that contributed to their confidence and competence include in-person, experiential, and hands-on approaches to learning relevant skills and knowledge, confirming the importance of using Kolb's ELC as the foundation for teacher education programs. The study



recommends that teacher educators should enhance their programs by providing pre-service teachers with instruction in authentic experiential learning pedagogy. Therefore, a comprehensive model for teacher education is proposed to demonstrate the role of experiential learning.

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**Keywords:** Experiential learning, teacher education model, Kolb's ELC, attitudes, teaching competence/confidence

## Introduction

Experiential learning has been a foundational tenant of teacher education since its inception. However, the theory of experiential education has received limited attention in the permanent teacher education literature base. Moreover, it is questionable to what extent authentic experiential learning instructional practices are actually taking place. Based on Kolb's Experiential Learning Model, this paper presents an approach to addressing this issue. It further explores the tenets of experiential learning and considers the application of true experiential learning pedagogy in teacher education programs.

The study examines the theories that view experience as the key to meaningful learning and link learning to personal development. It also demonstrates ways in which experiential learning Theory (ELT) provides a valuable framework for strengthening the critical synergy that can and must be developed among education, work, and personal development (Kolb & Lewis, 1986).

With special attention to teacher education at the CRMEF and workplace learning through practice teaching in the classroom (the practicum), we provide examples of current applications and conclude by examining the benefits of experiential learning for promoting teacher trainees' skills and competencies. The present research, however, explores the implementation of this approach for teacher education in the CRMEF. Teacher trainees' self-reflections, observations, questionnaires, and interviews will assess the extent to which the process and outcomes have influenced their beliefs and equally changed their classroom practices.

This exploratory study further examines Kolb's experiential learning process and considers its implications for ELT in teacher education. A description of the teacher education program in the CRMEF is provided, followed by results from a quantitative and qualitative teacher trainee's survey, triangulated with their reflective journals to evaluate the training program in terms of teacher trainees' developing confidence and competence in teaching, based on their learned skills and knowledge.

The paper is organized into four sections. The background section provides context for the study and outlines the aims behind conducting it. The

methodology section presents the research questions and describes the research tools. The findings are then revealed in the following section. Finally, the discussion section addresses the findings and offers related recommendations.

## **Review of the Literature**

### ***What is/Why Experiential Learning?***

The present paper seeks to discuss the specific role experiential learning plays in teacher education through the lens of Kolb's Experiential Learning Theory (ELT) (1984). As the name suggests, experiential learning relates to learning from experience or learning by doing. First, experiential education immerses learners into the experience and then encourages reflection about that experience to develop new skills, new attitudes, or new ways of thinking and, hence, plan for innovative practices. As an approach that is considered fundamental to meaningful learning, and for many reasons, experiential learning has moved from the periphery of education to the center.

First, there has been a move away from the behaviorist conception of learning, which emphasizes the teacher's role as the primary source of knowledge and positions the learner in a passive, recipient role. The shift towards current cognitive, humanistic, social, and constructivist learning models stresses the importance of meaning formation that is based on a cyclical interplay between the learner's previous experiences and their current and future learning. Second, in the last few decades, responsive teachers to the unprecedented influx of adult learners in higher education have been able to capitalize on their adult learners' prior experience to enhance their current and future learning. Third, in today's rapidly changing environment, educators are being held accountable for drawing upon their students' wealth of prior experience and background knowledge as a catalyst for new learning. Fourth, the challenge to assess the transfer of training to the job and, thus, reconsider the critical linkages between learning and employability requires the design of competency-based measures of learning and experiential techniques for assessing learner outcomes and evaluating their achievements. However, experiential approaches prove to be more effective in promoting communication skills, teamwork spirit, and workplace literacy as the main job-related skills traced in the labor market (Kolb & Lewis, 1986).

### ***Experiential Learning Theory: Historical Background***

In this section, we begin by tracing the origins of ELT which dates back to the experiential learning movement of the mid-nineteenth century. This movement represented an attempt in the United States to shift from formal, abstract, and teacher-centered education to experience-based approaches to education that were more learner-centered. During this period,

laboratory sciences, applied studies, and clinical experiences were introduced on college campuses. Early in the twentieth century, Jhon Dewey published *Experience and Education* (1983) highlighting the importance of learning by doing and demonstrating its applicability. Dewey's publication coincided with cooperative education which referred to various kinds of off-campus experiences and which was introduced as a complement to classroom instruction.

According to Dewey, experiential learning means a cycle of "trying" and "undergoing" that involves a series of steps, namely becoming aware of a problem, getting an idea, trying out a response, experiencing the consequences, and either confirming or modifying previous conceptions. This process has the potential to result in a person's cognitive reconstruction of experience and significant personal learning. Such ongoing meaning reconstruction over time culminates in learning to learn through practice. All this suggests that, for Dewey, creating new knowledge and transforming oneself through learning to perform new roles is more fundamental than simply learning how to do something.

In the realm of transformational learning theory, Freire (2000) stresses the role of education in promoting the critical consciousness of learners. In fact, for Freire, educating people provides more experiential interaction opportunities for learners and exposes them to the realities of their culture. Consequently, Freire conceives transformational learning as social change.

Other writers interested in adult learning also stressed on the pivotal role of experience. Mezirow (1981, 1991) adopted Habermas' conception of knowledge and demonstrated its role in promoting critical reflection. The different horizons through which people perceive themselves and the way they structure their lives and the world around them are influenced by all the cultural and psychological assumptions. Critical reflection has been an effective means to raise people's awareness as to the relevance of these assumptions. Mezirow (2000) believes in transformational learning and perceives it as a means to personal development.

From the foundation laid by each of the aforementioned theorists over the past fifty years for experiential learning, new experiential approaches continue to evolve, enabling us to respond and adapt to the dramatic changes that require more commitment and incorporation of innovative experiential approaches to ensure relevance and to respond to the needs of diverse groups.

### ***Kolb's Experiential Learning Theory: Analysis and Synthesis***

Many theorists and practitioners made a significant contribution and acceptance of experiential learning. This section seeks to discuss the specific role experiential learning plays in teacher's education through the lens of Kolb's ELT (1984). In meeting that purpose, this section outlines the

theoretical tenants of Kolb's ELT and examines publications within Kolb's comprehensive ELT bibliography (Kolb & Kolb, 2005a). This is with the aim of gleaning an in-depth theoretical framework of ELT that is relevant to teacher education. As such, an analysis of Kolb's ELT and a synthesis of those tenants in the context of teacher education follows.

In his ground-breaking book on ELT (Experiential Learning as the Source of Learning and Development 1984), Kolb perceives learning as the process by which knowledge is created through the transformation of experience. He defines experiential learning as a "*holistic integrative perspective on learning that combines experience, cognition and behavior.*" (p. 21)

As a way of linking theory to actual practice, Kolb's ELT model, also known as Experiential Learning Cycle (ELC), identifies four stages of grasping experience. These stages are:

**Stage 1: Concrete Experience (CE):** According to Akella (2010), the Concrete Experience stage represents the basis of the learning process. It is the stage where lessons are learned through "*adaptability and open-mindedness rather than a systematic approach to the situation or problem*" (p. 102) as the learner actively experiences an activity rather than passively observes or reads about it (Meiners, Schiller & Orchard, 2004).

**Stage 2: Reflective Observation (RO):** In this stage, learners reflect on their experiences by observing and examining them from a variety of perspectives and articulating the learning processes they went through, how they learned, and what they have learned. Reflection represents a vital part of learning, problem solving, and creativity that can be included in a teacher education course in the professions (Schon, 1995). Through reflection, the learner internally analyzes the learning experiences and then encourages his/her own personal meaning and understanding about these experiences (Liddell, Hubbard & Werner, 2000).

**Stage 3: Abstract Conceptualization (AC):** This stage involves the learner's use of logic and ideas as opposed to feelings to understand the situations and problems (Akella, 2010, p. 102). The reflective observations to which learners are exposed in the above stage of the ELC engage them in abstract conceptualization, thus, creating generalizations or principles that integrate their observations into theories. In other words, the learner uses their practice, observations, and reflections to create a theory or model to conceptualize their experience-based learning.

**Stage 4: Active Experimentation (AE):** Learners then use these generalizations as guides to engage in further action, called active experimentation, where they test the theory or the model they have developed in other more complex situations and put them into practice and/or plan for a forthcoming experience. Testing their learning allows them to "*make*

*predictions about reality and then act on them*” (Akella, 2010, p. 102). Through the ELC, Kolb theorizes that the learning cycle is transformed into a learning spiral of ever-increasing complexity since each learning experience leads to another set of concrete experiences and another round of learning at a more sophisticated and complex level. All this makes learning “*a continuous process grounded in experience*” (Akella, p. 41), thereby increasing in complexity throughout the process.

Kolb identifies two dialectically related modes of grasping experience or taking information (**Concrete Experience versus Abstract Conceptualization**) and two dialectically related modes of processing that information or transforming experience (**Reflective Observation versus Active Experimentation**). Kolb suggests that one’s learning style can be identified through a combination of preferred means of grasping and transforming experience information. He also believes that learning in this cycle can be entered at any point. However, he considers any one learning style to be an incomplete form of processing information. For meaningful learning that fully transforms one’s understanding to take place, all four stages of the cycle must be negotiated by the learner. According to Kolb, an experience that is not reflected upon represents unrealized learning.

In his ELT, Kolb (1984) also developed a Learning Style Inventory to assess the learning styles of the different learners so that the theory can create a better fit for each student. Each of the four learning styles (i.e., (a) Conceiving – Abstract Conceptualization and Active Experimentation, (b) Diverging – Concrete Experience and Reflective Observation, (c) Assimilating – Abstract Conceptualization and Reflective Observation, (d) Accommodating – Concrete Experience and Active Experimentation) match the different stages of the ELT as learners learn better if the content presented to them meets their preferred learning style.

Kolb’s Learning Styles and how they relate to ELT is not part of this paper. However, this paper examines how Kolb’s four stages of his Experiential Learning Cycle (ELC) has been used to respond to the challenges of pre-service teachers entering their teacher education programs with little confidence and competence in English language teaching. Yet, there is the need to be prepared to teach once they are in the real classroom context.

### ***Teacher Education in the CRMEF: Background to Context***

To assist in understanding the mechanisms necessary to support teacher trainees’ training institutions, as well as the lack of coordination between them, the teacher training system in Morocco has faced remarkable changes. This has had negative repercussions on the quality of the educational system and its ability to adapt to a rapidly changing society. The training was distributed according to the school education cycles across 34 Teacher

Training Centers (TTC), 13 Regional Educational Centers (REC), 7 Normal Superior Schools NSS, and 2 NSS technical education (Lahchimi, 2015; Ouasri, 2019).

As advocated in the National Charter for Education Training (Superior Counsel of Education and Training, 2000), the need to strengthen the linkage between the teacher's commitments and school reconstruction was based on three main strategies, namely teacher training quality, training institution affiliation to the university, and the need for professional development through in-service training. Meanwhile, the establishment of teachers training, as advocated in the National Charter for Education and Training (Superior Counsel of Education and training, 2000), has been delayed by about ten years. The different political and ideological trends have equally manipulated the Charter's agenda.

In Europe, and elsewhere, the training of teachers within the higher education system is organized by a faculty in an education department within a university. European countries, within the framework of the Bologna Declaration (1999), have undertaken to make comparable their university qualifications. Therefore, teacher training has undergone a movement towards the "universitarization/professionalization" of teacher training professions. What about Moroccan context?

As for the Emergency Plan (2009-2012), it adopted four measures: the definition of criteria and selection process, the establishment of University Education Courses (UEC), the creation of the CRMEFs by bringing together TTC and REC following the ministerial decree (2011), and the implementation of a continuing training strategy.

The professional training systems in the CRMEF as well as the initial university training programs as two entities are developing each other without being integrated into one identity. Within both training spaces, the provided activities, the methodological benchmarks, and the skills targeted for initial training and professional training have not contributed to complementarity between university and professionalization of teacher training. Thus, this denies any tendency towards the beginning of a rapprochement between the two entities.

As opposed to Europe, Morocco was involved in two parallel but diphasic movements of teacher training: professionalization (CRMEF) and universitarization (UEC). The dysfunction of coordination between the establishments concerned by the training poses serious challenges that are mainly related to the degree of complementarity existing between university and professionalization of teacher training.

Unfortunately, the lack of a fully-structured educational research in the CRMEF, as well as the absence of the LMD system, prevents CRMEF professor-researchers and teacher trainers from carrying out educational

research. Therefore, the professional knowledge present in these programs is characterized by the absence of effective contributions of professor-researchers. Actually, only the CRMEFs have professor researchers-trainers qualified to apply scientific and educational research to professional training, in order to build professional knowledge and identify the knowledge base that is essential for teacher training.

The decree creating the CRMEFs (February 2011) set a training engineering that delineated the duration of training for one year in the two spaces of the CRMEFs and schools, at the rate of 26 hours per week (at the CRMEF). Based on the skills and alternate approach according to the “practice-theory-practice” paradigm as well as the alternance “work-study-training”, as fundamental concepts in professional training, the training system was modular (40%) and alternated with practice (60%) conducted in schools. This structure allowed for the articulation between theoretical and practical knowledge as basic and essential concepts in teacher training.

In the Moroccan CRMEFs since 2017, qualifying training for teachers lasts two years, and it is divided into two main phases. The first phase lasts for seven months and takes place in two complementary spaces, the CRMEF and the school at a rate of 24 weeks per year at the CRMEF (1 week for the reception, 3 weeks for the first and second semesters’ exams, including the resit exam) and 6 hours per week in the school along the 20 weeks of training. The second phase is devoted to the following missions: total responsibility for the class, benefiting from field monitoring, face-to-face training (at the CRMEF) and online training, preparation of an interventional educational project (action research) under the supervision of a teacher trainer from the CRMEF, and preparation and discussion of the personal portfolio.

The CRMEF training system (pedagogical guidelines framework document) has several skills to be developed during teacher training by adopting the typology of Tardif and Borges (2009). Therefore, the training skills can be classified according to the following areas of knowledge that are presented as main and sub-modules within the CRMEFs:

- Educational Sciences (a 30-hours module): Educational Sciences Field (ESF)- Didactics (a 30-hours module).- The Planning of the Teaching and Learning Process (a 30-hours module).- TICE (a 30-hours module).- The Management of the Teaching and the Learning Process 1 and 2 (two modules of 60 hours).- The Evaluation of the Teaching and Learning Process (a 30-hours module).- Complementary training (four modules of 120 hours): Reference Discipline Fields (RDF), which includes the content of the knowledge to be taught.- Professional situations in a school environment represent 60% of the training duration, with the internship reports: Practical Training and Internships (PTI).

Beyond the areas defined by Tardif and Borges (2009), other skills are part of the training system adopted at the CRMEF:

- Educational Research spread over the research methodology (a 30-hours module) and the completion of an end-of-study project- Legislation and Ethics of the Profession (a 30-hours module)- School Life (a 30-hours module) - Practice Analysis and Activities (a 30-hours module)- Didactic Production (a 30-hours module).

Therefore, teacher trainees must develop skills related to consolidating their knowledge of concepts and notions, approaches and methods, as well as acquiring didactic and pedagogical knowledge in terms of planning, managing, implementing, and evaluating the teaching and learning process.

They are also required to develop skills related to undertaking research to identify and analyze teaching/learning deficiencies, correcting and managing the conduct of the class, and taking into account the diversity of students, authority, didactical /pedagogical relationship, and classroom management strategies.

Since training is based on a back and forth method, according to the reflective and dynamic paradigm of practice /theory / practice logic, the Practice Analysis and Activities and Didactic Production modules have been adopted in training since 2017-2018. The two modules take place within the framework of “workshop presentations”. Hence, these modules with internship reports (portfolio) aim to further consolidate the professionalizing dimensions of teacher training in the CRMEF. They formalize practice, and this can also be requisitioned in view of lived experiences. In this respect, the practice /theory / practice logic is rooted within the main principles underlying Experiential Learning Theory.

Therefore, the training system in the CRMEF is inspired by the professional training model which offers a vision of professional practices as an original and relatively autonomous space for learning and training for practitioners (Tardif et al., 1988). It is oriented towards training teaching professionals capable of building their identity and equally using their critical thinking and creativity to respond to different professional situations in an autonomous and responsible manner.

## **Methodology**

The research is based on a mixed method approach, with questionnaires administered at the end of the training year at the CEMEF-Fez. The results from the survey are triangulated with the qualitative data compiled from the comments that the teacher trainees wrote in their reports, reflective journals, synthesis response papers, learning statements, and professional development projects. Other comments are extracted from the participants’



assignments and reflective papers, which are main components of their portfolios, after the first year of input focusing on teacher education that target all essential skills and competencies required for a successful teaching and learning process.

### ***Aim***

The main aim of the present study is to identify the pre-service teachers' level of confidence and teaching competence, as well as their attitudes towards the teaching of English language at the start and end of their training in the CRMEF. It also aims to investigate the range of the learning experiences offered to them to better understand the value and effectiveness of their training.

### ***Research Questions***

This paper addresses the following research questions, focusing more particularly on English language teaching.

1. Were the teacher trainees exposed to any learning experience throughout their training in the CRMEF?
2. Did the teacher trainees develop their confidence and sense of competence in teaching English language throughout their training in the CRMEF?
3. What learning experience affected their attitudes and perceptions as well as their sense of competence in their teaching practices?
4. To what extent is the range of learning experiences offered to them during their training at the CRMEF effective in developing their teaching skills?

### ***Research Instruments***

The questionnaires are developed significantly for the teacher training program to ascertain the pre-service teachers' perceived development in confidence and identify the learning experiences within the training program that have affected their sense of competence in teaching. They are comprised of 20 questions. Some questions with a 5-point Likert scale for responses are close-ended (e.g., at the start of this training program, how confident did you feel about teaching English? (Very confident, Confident; Not sure, Not confident; Scared stiff)). Other questions are open-ended (e.g., General comments about how you feel your sense of competence has developed in teaching English as a result of completing their teacher training program in the CRMEF).

The survey includes questions about how confident the participants felt about teaching English at the start and at the end of their training; which learning experiences helped them develop this confidence and change their

attitudes toward English language teaching; how effective were the integration of learning experiences and why; how they developed both their professional and personal skills for teaching; and any general comments about how they developed their sense of competence in teaching English language throughout their training in the CRMEF.

### ***Research Participants***

The participants of English language teacher trainees that enrolled in the teacher education program in the CRMFE-Fez were 112 during the training years 2020-2021 and 2021-2022. It was noted that 48% of the participants are females and 52% are males. Most of them live in the city of Fez including its suburbs. The other participants are originally from Meknes, Khenifra, Beni Mellal, Taza, Taounate, and Boulmane. They took their time to complete the entire survey including the open-ended questions. Since the interviews were conducted after the final assessment session of the training, only 25 participants living in the city of Fez accepted to participate. In-depth interviewing, as a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents, was carried out. They provide much more detailed information than what is available through other data collection methods, such as surveys. They also provide a more relaxed atmosphere in which to collect information because people generally feel more comfortable having a conversation with you about their program as opposed to filling out a survey. As a result, the interviews were carried out to explore the participants' perspectives on the training program in the CRMEF. They include questions about their experiences and expectations related to the program, the thoughts they had concerning program operations, processes, and outcomes, and about any changes they perceived in their attitudes and teaching competence as a result of their involvement in the program. The interviews were conducted face to face to provide a better opportunity to read the body language of the respondents and match the responses. They represented purely a conversational method and provided opportunities to gather details from the informants.

The participants who took part in the research belong to different age group. The majority of the participants (89%) are in the 22-30 age groups, while 11% of them are more than 25 years. Among the respondent, only 8% have some experience in teaching (1 to 12 months), while the rest have no teaching experience prior to their training in the CRMEF.

### ***Procedure***

The questionnaires were administered in the final assessment sessions of the first years training in the CRMEF (2020-2021 and 2021-2022). The participants were asked to complete and return them by the end of the sessions.

Of the 112 participants, 100 completed and returned the questionnaires. Only 12 participants provided incomplete responses, perhaps due to lack of time or interest. However, majority of the participants took time to complete the entire questionnaires, including the open-ended questions. The teacher trainees' portfolios, which include their reflective journals, observation reports, synthesis response papers, learning statements and professional development projects, in addition to their assignments, were also used for collecting data about their attitudes and in developing confidence in the training program. The questionnaires had a tear-off sheet on which the participants put in their names and agreed or disagreed that their portfolios could be used as part of the research. All reflective portfolios were de-identified prior to results being collected and analyzed. The research data was collected from the questionnaires, which included both close and open-ended questions, in addition to the interviews as well as the participants' portfolios as reflective papers.

The quantitative data was analyzed to ascertain percentages of the participants responding to each question. The qualitative data from both the interviews and the reflective portfolios was collected and classified into themes in relation to participants' perceptions of their development of confidence in teaching English as well as their explanations for this development.

## **Results**

The quantitative data from the questionnaires analyzed in terms of percentages of responses to the different questions is triangulated with the qualitative data collected from the teacher trainees' interviews and portfolios. The interviews and the reflective papers in the portfolio are analyzed in relation to common themes arising from the participants' responses and comments. The themes include how the teacher trainees' confidence developed during the training; how the theoretical as well as the practical sessions assisted in their understanding and building their sense of competence in teaching English; the value of the videos and classroom observations; peer-teaching and micro-teaching sessions; the problem solving situations and case studies; the training workshops, as well as the importance of experiential learning and their change in attitudes towards the teaching of English language in general and towards their teaching practices throughout the training in particular.

A considerable number of the participants reflected extensively on the different learning experiences that affected their attitudes and sense of competence in teaching English. Selected comments from the different themes are included in this paper along with the quantitative data.

***Research Question 1: Did the teacher trainees change their attitudes and develop their sense of confidence in teaching throughout their training in the CRMEF?***

When asked how confident they felt at the start of the training year about teaching English, 6% of the respondents report that they felt Very Confident, 9% felt Confident, 7% were Unsure, 58% were Not Confident, and 20% felt Scared Stiff. Overall, 78% of the participants did not feel confident to teach English at the start of their training in the CRMEF when compared with 15% who felt confident.

When asked the same question in relation to the end of the training year, only 8 of the participants indicate that they did not feel confident (1% Scared Stiff and 7 % Not Confident) compared with 92% who report that they felt confident to teach English (60% Confident and 32% Very Confident).

All this indicates a considerable increase in confidence between the start and end of the training year. The teacher trainees' comments in the questionnaires, the interview, and their reflective portfolios confirm this change of attitudes and increase in confidence. Thus, these include statements such as:

- “I entered the first week of training with a large amount of apprehension and dislike towards teaching English. As a student, I was led to believe that English was something difficult to be taught and I have been fearful of it ever since. That was, until the first time when I was given the opportunity to teach English and observe my colleagues as well as my host teacher in the practicum sessions I got a lot out of the lectures and the practical sessions which made me excited to teach English instead of being petrified of it I was initially very skeptical of the training program's effectiveness Nevertheless, after a few weeks of training, I became very enthusiastic about being a teacher who designs fun and engaging lessons scaffolded in a way that the students feel a sense of accomplishment in the lectures, tutorials and video viewing sessions, I now feel more confident that I have the required skills to implement an effective learner centered approach in the classroom My knowledge of the didactic and teaching strategies has increased from bare minimum to a level of competency I didn't expect after only a few weeks of classes training.”

Overall, the participants increased their confidence and competence in relation to English teaching after eight weeks of training activities and learning experiences. The next research question examines which of these learning experiences helped their competence in English teaching.

**Research Question 2: What learning experiences affected the teacher trainees’ sense of competence in English teaching?**

The participants were provided with a list of learning experiences they were involved in throughout their training. Therefore, they were asked which ones specifically affected their sense of competence in teaching English. Table 1 indicates the percentage of the participants selecting the different learning experiences as those that helped their sense of competence in teaching English. Most of them which ranked highest (peer-teaching and micro-teaching, delivering presentations, simulations and role-plays) dealt with problem solving situations, case studies, observation, and video-viewing sessions. Hence, they are related to the first stage of Kolb’s ELT, i.e., “Concrete Experience.”

**Table 1.** Learning Experiences affecting teacher trainees’ sense of competence in teaching English as related to Kolb’s Experiential Learning Theory

Teaching English as a Learning Experience		Percentage of Teacher Trainees selecting this Learning experience
Kolb’s ELT: Stage 1: Concrete Experience (CE)	Peer-teaching	12%
	Micro-teaching	14%
	Role-plays	10%
	Simulations	10.34%
	Teaching a sequence during the teaching practicums sessions	15.5%
	Teaching the whole lesson and taking the whole class responsibility during the practicum sessions	22.5%
	Participating in workshops	8.66%
Kolb’s ELT: Stage 2: Reflective Observation (RO)	Video viewing and observing	7%
	Reflective journals on practice teaching (peer/micro-teaching, practicums)	53.5%
	Reflective journals on lectures, video viewing and observing sessions	25.22%
Kolb’s ELT: Stage 3: Abstract Conceptualization (AC)	“My favourite Ten Items Collection” activity	21.28%
	Synthesis response paper	62.76%
Kolb’s ELT: Stage 4: Active Experimentation (AE)	Learning statement	37.24%
	Action plan and Personal Project	43%
	Professional development project	30.5%
	“Dear Future Me Letter” activity	26.5%

### ***Kolb's ELT Stage 1: Concrete Experience***

#### ***Practice Teaching, Micro-teaching, Peer-teaching and Practicum Sessions***

As noted in Table 1 above, participating in practice teaching (38%) (teaching a sequence during the teaching practicum sessions; teaching the whole lesson and taking the whole class responsibility during the practicum sessions) and micro/peer teaching (28%) rate highest in relation to the set of concrete learning experiences that assisted in developing the participants' sense of competence in English language teaching. Sample comments of the participants about the value of these learning experiences include the following:

- “I believe that practice teaching through micro-teaching, peer-teaching, as well as the practicum sessions is very effective in modeling and inspiring ideas for teaching English language. Practice teaching makes me realize that it can actually be quite simple and that students can learn the concepts through engaging that put them in the center of the teaching and learning process.”
- “Initially teaching a sequence during the first practicum, then teaching the whole lesson and taking full class responsibility along the remaining practicum sessions allowed me to go through the different textbook units; I felt a little overwhelmed by the activities, pictures, texts, graphical representations, etc. Actually, I feel that I have learned a great amount about English language teaching and learning.”

#### ***Participating in Workshops: Simulations, Role-plays, Problem, Case Studies***

Among the sampled participants, 8.66% note that participating in workshops (Kolb's Stage 1) affected their sense of competence in teaching English. Teacher trainees' comments to confirm this include:

- “Within the workshops, the trainers reinstated the need to do as the students will. We interacted with our trainers by answering and asking questions, repeating after our trainers (drills), sitting and standing up, rearranging our seats, passing to the board, creating some critical moments during the lesson (discipline issues, technical problems, interruptions of class, healthy/unhealthy noise, etc.). We were involved in the most exciting workshops we have ever attended. I cannot explain how refreshing it was to learn content in such engaging activities and varied techniques that shaped our positive attitudes towards learning and going through new experiences. The trainers were very informative and resourceful as they inspired us with important ideas and provided us with effective techniques and strategies that we could implement in our classroom.”

- “I thought teaching English language would be extremely difficult and challenging. The workshops helped us realize the importance of diversifying one’s teaching methods and strategies. Simulations, role-plays, dealing with problem situations and case studies as main activities in the workshops represented a fantastic opportunity to clear some of my worries when it came to teaching English.”

### ***Video Viewing, Observation, and Lectures***

In regards with Kolb’s Stage 1, 7% of the sampled teacher trainees indicate that viewing the videos prove to be important in assisting them to develop their competence in English language teaching. The videos were suggested and presented by the trainer and was put online so that the teacher trainees could see English language lessons being taught in a real-life situation – something many of them may have never seen. Their comments revealed that they appreciate being able to view these authentic teaching situations. In this respect, one participant states that:

- “It was inspiring to watch, so impressed that the students were engaged during these lessons as I had imagined that English language lessons involving fun and interactive activities (e.g. ice-breakers, warm-up activities, games, dialogues, role-plays, simulations, etc.) in any classroom would be noisy and chaotic. The videos were useful for demonstrating English lessons in action. They highlighted not only how to put English language lessons into practice, but also how to implement behavioral strategies in a way that would ensure a successful lesson. I found that the videos were a great aid in gaining a view of how to implement affective teaching and learning strategies into the classroom. By providing examples of different teaching styles, methods and techniques, it was easier to grasp how English was taught in the classroom and how students made use of different learning strategies”.

Although the quantitative results indicate that practice teaching was ranked first (84.34%), many teacher trainees comment in the reflective journals on how the combination of the lectures and the video viewing sessions helped to develop their confidence in teaching English.

One of the participants confirms:

- “Overall the lectures and videos provided a great foundational basis for me in being able to teach English in the classroom in a fun and interactive way, allowing students to express themselves in an environment where their creativity is nurtured and encouraged. I was very apprehensive about teaching English as I had no English teaching background; I was quite linguistically gifted but for me, teaching

English to students was a challenge; however, I am astounded on how much I did learn from attending the lectures and watching the suggested videos.”

Another participant added:

- “Before the practicum, I felt a bit uneasy knowing that I would have to teach English language when having my own students because my only relationship with English language was learning and using it for communication purposes. The lectures, and videos, inspired me and allowed me to feel more confident.”

### ***Kolb’s ELT: Stage 2: Reflective Observation***

In the second stage of reflective observation, the learner reflects on the new experience in light of their existing knowledge, with particular attention to identifying any inconsistencies between experience and understanding.

Over half of the sampled teacher trainees (53.5%) reported that reflecting on their practices and learning proves to be very helpful (reflective journals on practice teaching (peer/micro-teaching, practicums). Their learning experience is related to Kolb’s ELT Stage 2 (Reflective Observation). Subsequently, the participants were given the opportunity to provide their opinion on reflection as an effective technique of learning that was practiced through their “reflective journals” on practice teaching (Peer/micro-teaching, practicums), and through “my ten favorite items” activity (21.28%). This, however, were the first reflection assignments the participants were required to complete from the beginning of the training year. Moreover, majority of the participants stressed the importance of reflecting on their learning in the open-ended questions in the questionnaires (91%) and the interviews (93%).

- “90% of my learning was greatly influenced by teaching English and reflection on my teaching practices (learning by doing).”
- “I feel I have a natural understanding of the main strategies of language learning, which has been only achieved but the act of ‘doing’.”
- “Having attended the lectures, the training workshops and video-viewing sessions, I feel that I have learned a great amount about language learning and teaching. The videos I viewed allowed me to reflect on my own teaching/learning strategies and identify the amount of information absorbed from the lectures, the training workshops, as well as the micro/peer-teaching and practice teaching sessions.”
- “As I reflect on what I have experienced, read, viewed and listened to over the whole training year, I can say that we have been exposed to a variety of teaching and learning experiences and amalgam of reflective practices that have proven to be well structured, systematic, consistent, constructive, and at the same time, very simple, and engaging.”



### ***Kolb's ELT: Stage 3: Abstract Conceptualization "Synthesis Response" Paper***

Reflection gives rise to a new idea, or a modification of an existing abstract concept the person has learned from his/her experience (Abstract Conceptualization/Generalization). In this stage, the teacher trainees' learning involves using theories, logic and ideas, rather than feelings to understand problems or situations. Typically, they rely on systematic planning and develop theories and ideas to solve problems.

The "synthesis response" paper represents the main assignment in this stage. The teacher trainees were required to reflect on the themes or patterns raised in lectures, articles, presentations, group discussions, whole class debates, video-viewing and observation sessions, workshops, macro/micro peer-teaching, practicum sessions, problem-solving situations, case studies, etc. (62.76%).

Among the participants, 35.40 % claim that through the synthesis response paper, they learned how to make links between previous experience of teaching and learning and any theories or knowledge they can apply. Other respondents (27.36) report that this assignment stands as an effective strategy to reflect on what helps/hinders learning and teacher development. About this point, one participant comments,

- "We did not need to be comprehensive, but rather, we were required to use this space to add insights, build connections, or raise additional questions about "English Language Teaching and Learning", which has, undoubtedly, shaped our understanding of learning and boosted our teaching skills and competence."

However, only 6.36% of the participants revealed that the difference between the previous stage of reflection (Reflective Observation) and the Abstract Conceptualization stage using the synthesis response paper is not clear. They reported that they need more practice and examples to further understand the difference between the two concepts and get a deeper understanding of the two stages of reflection.

### ***"Learning Statement" Paper***

Through the learning statement, the teacher trainees were required to write an essay by exploring the following set of leading questions to write a synthesis of learning on the training course:

- What were your key learnings from the course (consider yourself, your teaching, learners, learning, etc.)? Why are these learnings important to you? How will you apply these learnings in your own classroom?

- What are the two areas you hope to improve or explore more in the future? What is your action plan to do this (remember SMART actions (Specific, Measurable, Achievable, Relevant and Time-bound))?

When asked about the effectiveness of this assignment as a means to conceptualize their learning throughout this stage within the ELC, 37.24% of the participants assert that it allows them to come up with generalizations and theories about their learning as well as students' learning that are linked to specific events or experiences in a lesson. The following comments are extracted from the participants' learning statement essays:

- “The course has endowed me with the ability to develop a flexible mindset and use all reflective skills for providing and receiving feedback from my colleagues and trainers throughout the ELC stages (describe, analyze, interpret, generalize, and plan action). It has allowed me to exchange my reflections with my colleagues on our teaching practices and base my action plans or further steps that could be explored through new experiences, hypotheses and experimentation. The reflection on my teaching practices proves to have a strong impact on my own perceptions and beliefs about teaching and learning in general”.
- “These reflections have enabled me to develop my reflection skills and made me keen on rethinking both the most successful and puzzling moments in my future lessons. All this will equip me with the necessary tools to critically analyze my teaching practices and improve my reflective as new avenues for any personal growth and professional development”.
- “The reflective practices that I experienced throughout the LC required me to be alert to every moment and every stage of the lesson. This suggests that in my future teaching, I will take into account the main objectives of my lesson (instructional objectives; SMART), the classroom environment, the types of students I will be teaching as well as the teaching approach, methods, strategies and techniques I will be adopting. Most importantly, students' output should be crystal clear in the Fluency stage (ECRIF framework) as well as during the production stages language skills (PPP/PDP) as a proof of effective teaching/learning.”
- “The training experience in the CRMEF has provided us with a time for planning and practice, an outlet for creativity, a space for reflection and debriefing and a home base to build community and support each other.”

Unfortunately, among the participants, 21% argue that writing the learning statement remains challenging as the line between the second stage (Reflective Observation) and the third stage (Abstract Conceptualization) of the ELC remains blurred. Therefore, they contend that they cannot readily identify the difference between the two stages.

#### ***Kolb's ELT: Stage 4: Active Experimentation***

The newly created or modified concepts lead to experimentation. The learners apply their ideas to the world around them to see what happens. In this respect, the participants engaged in the fourth stage of the ELC using different strategies as demonstrated below.

#### ***"Professional Development Project"***

This assignment is a plan for how the teacher trainees intend to use their experiences and learning from the training course to impact education in Morocco once the course is finished. They were required to submit the written portions of this assignment with their course portfolio and share some elements of it with their peers late in the final week of their training at the CRMEF.

Through the professional development project, the teacher trainees were to come up with realistic and specific ideas about things they thought they would be doing after the training course in the CRMEF. Therefore, the different and specific actions they planned to take were guided through the following questions:

- How can you share your learning in ways that will directly impact your student?
- What are you considering with your peers and colleagues about your learning?
- How can you share your learning with the authorities above?
- What barriers and obstacles do you think you may encounter?
- What elements of your training in the CRMEF do you think will be most useful to the people you come in contact with?
- Which elements do you think will be most challenging?
- What elements of the course might you choose not to share, or not share right away?

As regards professional development, 30.5% of the participants assert that it remains an effective technique to bridge the gap between their past/present experiences (the first, second and third stages of the ELC) and their future learning experiences (the fourth stage of the ELC). It allows them to plan specific actions for their future teaching practices based on their

teaching and learning experiences. In relation to this view are the following comments that represent the participants' attitudes and perceptions.

- "Given the importance of the program, I would assert that our mission as teachers is to share, transmit and cascade such a huge learning experience with our colleagues and implement this accumulated knowledge in our EFL classrooms."
- "Implementing our learning should not be limited to the classroom as a private space of the individual teacher, who will probably preserve it to his/her classroom, but it should transcend it to reach all people concerned with the field of teaching and learning."
- "As a novice teacher, I have a strong endeavor to share my learning at different levels, in different contexts, throughout different mediums and with different people. Therefore, I will deploy a variety of techniques and strategies to demonstrate, contextualize and make their learning meaningful. Blending theory with practice and learning by doing will be an effective way to help my colleagues learn about the ECRIF and PDP models in different occasions (workshops, demo-lessons, etc.) In this respect, I plan to introduce them to Kolb's outstanding reflection cycle (ELC) as soon as I leave the CRMEF training course. This will certainly enable them to reflect on their own teaching practices in a more structured and systematic way."
- "I believe that university students, especially the ones enrolled in the MASTER and PhD programs on education, teaching/learning, training pedagogy and communication are to be also targeted and introduced to all folds of our accumulated knowledge throughout the training course in the CRMEF."
- "This learning will be better shared when it is documented and when it conforms to the standards of the academic and scientific fields. This suggests that I will publish articles in different magazines, national and international journals that will enable me to share this experience and knowledge and reflect on it."
- "I would admit that, as novice teachers, we would be the right persons in the right position to cascade our accumulated knowledge throughout the CRMEF training course to the future generations of teachers and hand them the torch that will enlighten their ways towards the implementation of this learning."

Other respondents (8.5%) contend that though they have been exposed to different learning experiences throughout their training course, they will need more teaching practice that will qualify them to cope with a comprehensive professional development project to plan specific actions for their future teaching practices.

### ***“Action Plan and Personal Project”, “Dear Future Me Letter”***

In this stage, after reflecting on the practical and learning experiences in which they had been involved, the participants were asked to write an integrated plan for teaching English. They were required to complete different assignments, namely, “Action Plan”, “Personal Project”, “Dear Future Me Letter”, and “Action Plan” to test out the pedagogical theories to which they had been exposed to in the previous stages of the ELC and subsequently experiment with new ones.

### ***“Action Plan and Personal Project”***

Through the “Action Plan and Personal Project” assignment, the teacher trainees were asked to plan their SMART actions by thinking about everything they had experienced throughout the previous stages within the ELC. They were required to write an action plan for what they would do in future lessons or workshops (if required to facilitate one) using what had been learned from their training experience. For example, they would need to undertake SMART actions (Specific, Measurable, Achievable, Relevant and Time-bound) in the classroom, school, and environment to implement the Learner-Centered Teaching (LCT) approach and promote autonomous learning in their students.

It is worth mentioning that action research topics are proposed during the last weeks of training in the CRMEF; however, the teacher trainees are required to undertake their action research along the second year of their training. Hence, this provides more opportunity for them to identify some teaching/learning issues and intervene by using the necessary strategies to deal with them.

Of the sampled teacher trainees, 43% claim that writing an action plan and personal project affect their sense of competence in teaching English language. Throughout the second year of training, they will be implementing all what they have been exposed to within the training program, which will allow them to complete the fourth stage of ELC. In this stage, they will put what they have planned into practice and, thus, experiment with new experiences by undertaking action research and implementing their action plans and personal projects.

### ***“Dear Future Me Letter”***

Change takes time. Even if the teacher trainees have identified some areas to work on, they will not see a difference overnight. For this practical task, they were required to write letters to their ‘future self’.

Writing a letter to their ‘future self’ serves as a way of checking in and seeing how it is all going. It is also an exercise to ensure consistent personal growth, a way to hold themselves accountable to their perceptions, beliefs, and

values in regards “English Language Teaching and Learning’. Furthermore, it also serves as a means of preserving and protecting what is important today well into the future.

The following suggestions were provided for the teacher trainees to consider:

- Summarize your current self. Start with a reminder of where you currently are in your research journey within the field of ‘English Language Teaching and Learning’.
- Identify your key values and beliefs. Ask yourself what guides the current you.
- Note your skills in your learning (as a teacher trainee)/teaching practices (in case you teach or have a teaching experience) relating to ‘English Language Teaching and Learning’. Pick out a few skills or practices you can clearly identify.
- Define your goals and hopes. Write about things that are important to you now and what you would like to accomplish in the future for yourself in terms of your goal within the fields of “English Language Teaching and Learning”.
- Add things you want to stop, continue, and start doing.
- Give yourself advice. Think about what advice you want to give your future self. Your advice can be simple or complex.
- Ask yourself questions. These questions should make the future you reflect on. So, reflect on what you have done to reach the point you will be at and how you feel about it.
- You are writing this letter to yourself, so be casual. Write as though you are talking to your best friend. When talking about your current self, use ‘I’ language. When talking about your future self, use ‘You’ language. The letter is for you only and nobody else. Please write your letter in the language that works best for you. All we will do with the letter is to schedule it to be sent back to you. You will automatically receive your letter in six months’ time

As noticed above and reported by 26.5% of the participants, the casual aspect of the letter allows the teacher trainees to express themselves freely, define their hopes and goals, and draw their action plan. About this point, one respondent claims:

- “I believe it is the most effective strategy I have ever use for identifying my goals, displaying my hopes, drawing my action plan and providing advice to my ‘future self’. It helps me understand the difference as well as the relation existing between the two stages of “Abstract Conceptualization” and “Active “Experimentation””.

### ***General Comments and Changing Attitudes towards Experiential Learning throughout the Pre-service Training***

The different reflection tools and reflective teaching techniques to which the participants were introduced, and which are in line with Kolb's ELC model, are summarized in the following chart that represents the main components of the Teacher Training Portfolio.

### ***Experiential Learning: Changing Attitudes and General Comments***

In addition to the quantitative results presented above, the participants commented in their portfolios about other aspects of their pre-service training that helped develop their confidence and competence in teaching. Below are some selected comments about the importance of the use of experiential learning and practical learning experiences.

#### ***Experiential Learning***

- "I believe that 90% of my learning has been greatly influenced by teaching English language and reflecting on my teaching practices. I feel I have a natural understanding of the teaching and learning strategies, which has been only achieved by the act of 'doing'. The way that the training workshops, the micro/peer-teaching and practice sessions are run in terms of actually being in hands on experience allows me to gain a deeper knowledge of all the strategies involved in the teaching and training proves and how to implement them in the classroom through different managerial techniques."
- "I find this concrete way of learning very stimulating as it engages the whole class to realize and experience how innate language learning predispositions and teaching competence are within every person. Due to the practical input in the lectures, training workshops, peer/micro/practice teaching and video viewing sessions, I am now enthusiastic to teach English on a daily basis in my classroom. I will also ensure that the lessons always have practical, engaging and fun activities imbedded within them to encourage involvement and ensure that my student enjoy themselves."

#### ***Changing Attitudes and Perceptions***

- "I have overcome the apprehension that I once had towards this area of teaching English language teaching and I have adopted a positive attitude, which I hope that I can transmit to my class of more than students in the near future Throughout the lectures and training workshops, we have been introduced to a variety of teaching methods and strategies. We have been also equipped with different reflective

techniques that go beyond our imagination and transcend our expectations.”

- “I was engaged throughout the entire training workshops and practice training sessions I learned that, as a future teacher, it is important to be daring to explore with English language teaching and learning Going out of the box and taking the risk is the key element in this respect, I want to be a positive and enthusiastic teacher who uses effective communication strategies and various teaching techniques to engage students so that they can appreciate the importance of English language learning for communicative purposes and for personal development Any pessimistic attitudes I had before disappeared for I have realized how exciting teaching English language can be.”

All the above comments revealed how the participants value the experiential and practical approach adopted in the pre-service training program. In addition, they equally indicate the extent to which this experiential learning has changed their attitudes in relation to English language teaching.

## **Discussion**

The overall results from the questionnaires, the interview, as well as the reflective journals indicate that the majority of the teacher trainees started the training with very little confidence in English teaching. After the training received throughout the different modules along the two semesters of their first year of training in the CRMEF, the majority of the participants have developed their knowledge, skills, and understanding of English language teaching and learning, changed their attitudes, and they have equally increased their confidence in relation to teaching English. This was not only evident in the quantitative data, but it was also confirmed through their comments about each specific aspect of their experiential learning during their training in the CRMEF.

The results indicate that 78% of the participants were not confident to teach English at the start of the first semester, compared with 92% of the participants admitting they were confident to teach it at the end of their first training in the CRMEF. Confirming this are their responses and attitudes when asked if they are ready to teach English after their training. Thus, 89.5% of the teacher trainees revealed that they are well equipped with the necessary techniques and strategies that will help them to teach English. This correlated with what has been advanced in the literature asserting that if learners are confident in the subject, then they are more likely to teach it (Lazer, 2007; Russell-Bowie, Roche & Marsh, 1995; Welch, 1995).

Through developing their confidence in teaching English, both the quantitative and qualitative results indicate that the participants’ attitudes to



English teaching have changed significantly over the whole training year. As suggested in the literature, both experience and the opportunity for reflection are significant factors in changing learners' attitudes (Bondy, Schmitz & Jhonson, 1993; Groulx, 2001; Deering & Starnutz, 1995). In fact, the participants were involved in a variety of learning experiences and reflective practices. Therefore, these seem to be significant factors in changing their attitudes and shaping their perceptions.

The two aspects of experience and reflection are also important stages in Kolb's Experiential Learning Theory (1984). The first stage (Concrete Experience) proves to be the most important element of the teacher trainees' experience leading to developing their confidence and competence in teaching English language. As seen in the table, the participants rank the face-to-face and experiential learning highest in developing their sense of competence in teaching English. These include participating in lectures and training workshops, role-plays, simulations, peer-teaching, micro-teaching, teaching a sequence during the teaching practicum sessions, as well as teaching the whole lesson and taking the whole class responsibility during the practicum sessions.

The second stage (Reflective Observation) is more important to more than half of the participants (63.5%) in developing their sense of competence to teach English. At the end of their first year of training in the CRMEF, they were required to think about what they had experienced, what and how they had learned during that year. The participants' comments reflect their excitement about what they have learned, how their skills and knowledge have developed, and how their attitudes have changed. As confirmed in the literature, reflection proves to be an effective tool to facilitate the learning process and increase learners' knowledge and skills (Conrad & Hedin, 1990; Hatcher & Bringle, 1997; Liddell, Hubbard & Werner, 2000). Thus, this study proves to be an important factor in building teacher trainees' confidence and changing attitudes towards English language teaching.

The third stage of Kolb's ELC theory is that of "Abstract Conceptualization". During the training year, the participants were required to think about how the English language pedagogy and skills learned in the CRMEF and in the school practicum, in addition to the online resources, could shape their perceptions of teaching and learning and their understanding of professional development. They were also asked to write a synthesis paper about all strategies, techniques, and challenges involved within the teaching and learning process. Ultimately, throughout this stage, the participants were required to draw general conclusions about teaching and learning in their personal statement.

Given the abstract nature of this stage which is difficult to be approached through quantitative research, the questions in the questionnaires did not specifically cover this stage. The main questions related to abstract

conceptualization stage were left to the interviews conducted with the participants.

Abstract Conceptualization of the methods and strategies required for English techniques and learning leads to Kolb's fourth stage, which is that of "Active Experimentation". In this stage, after reflection on their practical experience and, thus, drawing their general conclusions about teaching and learning, the participants were asked to write an integrated plan for teaching English through different assignments, namely, "Action Plan and Personal Project", "Dear Future Me Letter", and "Action Research" to test out the pedagogical theories and practices to which they had been exposed in the previous stages and subsequently experiment with new ones.

Among the sampled teacher trainees, 43% report that writing an action plan and personal project has improved their sense of competence in teaching English language. Throughout the second year of training, and as part of the fourth stage of ELC, they will be implementing their action plans. In fact, undertaking action research and implementing action plans and personal projects will allow the teacher trainees to put what they have planned into action and, thus, experiment with new teaching methods and strategies. All this suggests that since each learning experience leads to another set of concrete experiences and another round of learning at a more sophisticated and complex level, the learning cycle is transformed into a learning spiral of ever-increasing complexity throughout the process.

### **Conclusion and Implications of the Study**

Both the quantitative and qualitative results from this survey triangulated to confirm that experiential learning, as well as the reflective nature of the training program in the CRMEF, have been effective in developing the participants' competence in relation to English language teaching and, thus, changing their perceptions and attitudes towards the teaching of English language. These results can be used by education experts and practitioners and all actors involved within the field of curriculum to design pre-service teacher training programs, taking into account the teacher trainees' attitudes, needs, as well as their degree of confidence and background experience in English language teaching.

In this respect, diagnostic evaluation can serve as an effective tool to identify teacher trainees' needs, attitudes and perceptions, and gauge their predisposition to promote their teaching skills and competence and, thus, boost their self-confidence. The training program should include a variety of experiential learning activities (Kolb's Stage 1: Concrete Experience) along with the opportunity for the teacher trainees to reflect on their learning (Stage 2: Reflective Observation). Moreover, teacher trainees should be challenged to relate their observation, experiences, and reflections to generalize new

concepts and relevant ideas about classroom and English language pedagogies (Stage 3: Abstract Conceptualization). Ultimately, they should have the opportunity to test their generalizations in relation to an authentic classroom situation by designing action plans and professional projects, and undertaking action research. The main objective in this respect is to experiment with their newly general perceptions about teaching (Stage 4: Active Experimentation).

In the current climate of basic skills testing where the soft skills are de-prioritized, providing teacher trainees with adequate training that highlights the importance of both experience and reflection alike has become significantly important. Moreover, inspiring them to use their analytical and critical thinking, equipping them with the necessary skills to teach creatively, changing their attitudes, and developing their competence through experiential learning is vital for the future of teaching languages to the third millennium student.

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## The Impact of ESG Ratings on Investment Decisions in the Energy Sector During Uncertain Times

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### Abstract

With increasing global awareness of sustainability, the financial sector must inevitably adapt. Our research investigates the role of Environmental, Social, and Governance (ESG) ratings in investment decision-making, particularly in the energy sector, by examining their impact on portfolio performance. The study aims to assess the impact of ESG integration on portfolio risk and returns. Using data from the SP500 index, econometric models and Monte Carlo simulations are employed to evaluate how ESG considerations influence portfolio optimization and risk management. The study reveals that integrating ESG criteria into investment strategies, especially during market volatility, may not always directly affect returns, they provide significant benefits in terms of risk mitigation and ethical investment alignment.

**Keywords:** ESG, Financial Crisis, Investment Decision, Energy Sector, Portfolio Risk

## Introduction

"History teaches us that, over the centuries, there has always been something new for every generation. From the industrial revolution a few centuries ago, to aviation in the early 19th century, to the internet (and e-commerce) in the 80s and 90s and, more recently, social media, facilitated by massive access to connectivity and innovation. And now comes the ESG. Like all these great things, they respond to a particular challenge of the time or to anticipated future problems in society (...) Any company or government that wishes to be relevant in the medium or long term cannot ignore [the preferences or opinions of today's millennials and post-millennials, who make up tomorrow's electorate and customers]"<sup>1</sup>.

The social and environmental dimension of business is at the heart of new economic and financial guidelines. Faced with the challenges of international regulation, compliance standards linked to international investment directives have been tightened, and governance has become a key indicator for assessing investment compliance and performance. It is against this backdrop that ESG criteria, "developed by the financial community to designate criteria of interest to environmental, social and governance aspects (independence of the board of directors, management structure and presence of an audit committee)", have taken their place as essential elements of extrafinancial analysis.

Based on the United Nations Framework Conventions and the Sustainable Development Goals (SDGs), ESG criteria are essential indicators. These criteria oblige companies to report on non-financial factors influencing their performance, future cash flows and any associated risks. As a result, 57% of financial advisors believe that adopting these criteria offers an additional dimension of risk management for their client's investments.

In the current context, the indicators adopted are evolving in parallel with contemporary dynamics. These dynamics, shaped by global issues, require the development of mechanisms that are both anticipatory and forward-looking. These tools must also provide flexible assessments in response to changing concerns. For example, terrorist threats are altering companies' procurement patterns, while meeting contractual obligations to their employees. In addition, the Covid-19 pandemic underlined the imperative of developing effective resilience strategies, demonstrating the need for industries and investors to adjust in the face of potential crises. This reality underscores the importance of government bodies in establishing regulatory frameworks that guarantee the rigorous application of these indicators.

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<sup>1</sup> PWC, "ESG - The great next challenge of our generation. Africa cannot afford to be left behind", available at: <https://afrique.pwc.com/fr/actualites/decryptages/esg-afrique.html>

In this context, the energy sector is an ideal field for analysis. The need for a thorough understanding of the parameters central to this study will guarantee results that are both relevant and adaptive.

- What impact have the recent Russian-Ukrainian tensions and the COVID-19 pandemic had on the implementation of ESG ratings for companies in the energy sector?
- Is it worth sticking to these ratings in times of uncertainty?
- What is the measured impact of including or not including ESG ratings in investment decisions?

To answer these questions, we begin with the context surrounding ESG by exploring the literature on ESG. This will be followed by a discussion of the theoretical underpinnings, before presenting the methodological framework. In particular, we will detail the data studied in relation to the questions posed. The last two points will focus on the analysis of our study and its possible constraints, paving the way for recommendations for future studies.

## **1. The ESG context: conceptual approach, history and current situation**

### **1.1. The ESG concept**

Assessing sustainability poses complex challenges, leading to the emergence of multiple theories and concepts. Sustainable investments, which seek to combine long-term financial returns with positive impacts, are a case in point. The acronym ESG refers to environmental, social and governance criteria, serving as an analytical tool to measure how a company integrates sustainable development and anticipates future challenges.

### **1.2. The emergence of SRI and ESG and their gradual mainstreaming**

As understanding of sustainability and ESG issues has evolved, the terminology used has diversified, sometimes creating ambiguities among financial players, fund managers, and researchers. Several terms, such as "socially responsible investment" (SRI), "impact investment," "green investment," and "ESG investment," refer to this approach (Schueth, 2003). The rise of sustainable investment has historical roots in religious convictions dating back to the 18th century. Religious groups, including Quakers, Methodists, and Muslims, established ethical guidelines for financial investments. In the 21st century, the sustainable investment approach continues to gain momentum.

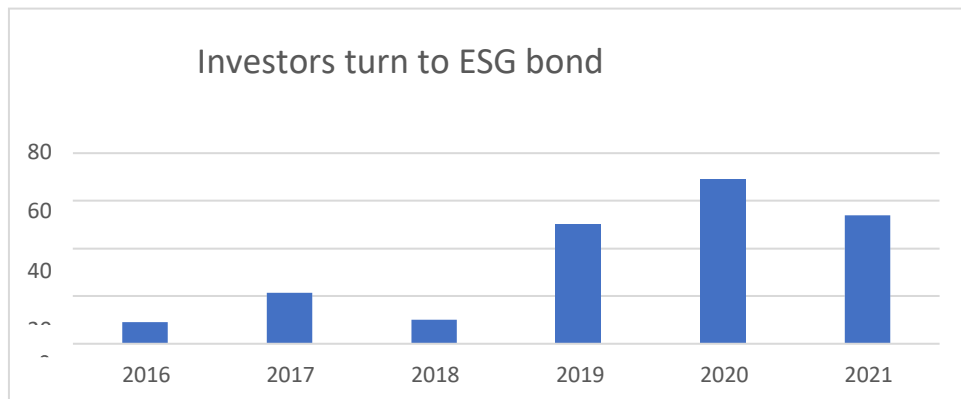
Today, faced with growing demand from investors eager to combine social concerns with financial choices, there has been a proliferation of entities offering assessments based on ESG criteria. The field of ESG ratings is vast



and diverse, comprising over 600 "products" from 150 organizations that provide ESG information (Hawley, 2017). These agencies enjoy considerable flexibility regarding their assessment criteria and methods, given the absence of uniform regulatory standards for the presentation and assessment of non-financial data (Chatterji et al., 2015). This leads to wide variations in ESG ratings from different sources (Berg et al., 2019), potentially creating uncertainty for investors.

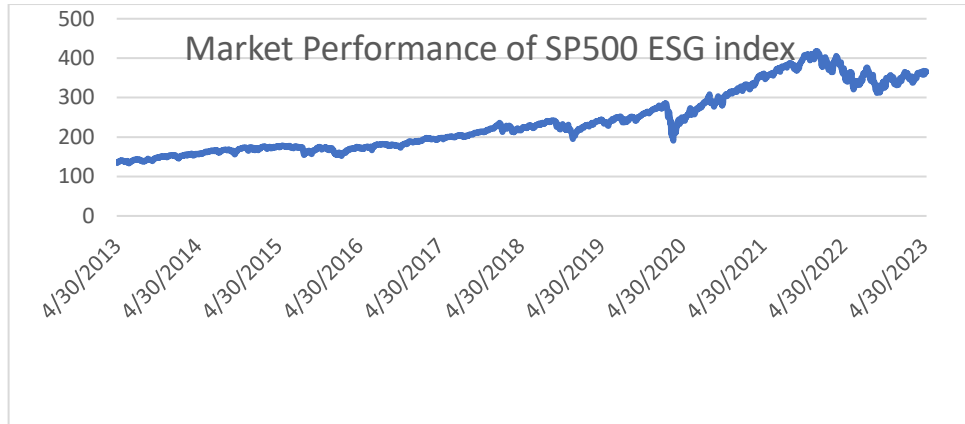
### 1.3. ESG fund performance and investment growth

ESG funds face several challenges. Some investors prioritize financial performance over ecological considerations, putting these funds under pressure. Tensions in Ukraine, the impact of technology, inflation, and rising interest rates complicate the situation. In 2022, ESG funds fell by 18%, compared to a decline of 15.8% for non-ESG funds. Only 31% of ESG funds met their objectives in the first half of 2022, compared to 41% of non-ESG funds.



**Figure 2:** Investors invest in ESG funds  
Source: Morningstar, 2022

Investor reactions to uncertainty and crises are nuanced and often depend on the type of investor. In fact, investor reactions are not uniform. While some seek security, others may view crises as buying opportunities. As such, the rise of sustainable finance raises a fundamental question: is it a genuine commitment based on ethical principles, or simply a reaction to market trends? Recent events, such as the COVID-19 pandemic and the Russian-Ukrainian tensions, offer an opportunity to observe and analyze investor behavior. Will these crises reveal whether sustainable finance is a true conviction or merely a "fair-weather strategy"?



**Figure 3:** 10-year performance of the SP 500 ESG index  
Source: SP 500 Global

## 2. Literature review

It should be noted that most of the literature on uncertainties focuses on the COVID-19 pandemic, while data on the Russian-Ukrainian war remains limited. For the sake of clarity and organization.

### 2.1. ESG investment during crisis (in particular COVID 19).

In their study, Díaz, Ibrushi, and Zhao (2021) analyzed daily data for companies listed on the U.S. stock market between January and April 2020. Regression models were used to assess how ESG ratings affected the returns of different sectors during the COVID-19 pandemic. The authors incorporated control variables, such as the Fama-French factors and an ESG factor, which measured the difference in returns between companies in the top and bottom quartiles based on their ESG ratings.

The analysis highlights the importance of ESG ratings in determining sector returns during the COVID-19 crisis. The ESG factor, reflecting the difference in ESG performance between companies in the top and bottom quartiles, was found to be significant. When integrated with the Fama-French variables, it becomes evident that ESG is a key determinant of sector performance (Díaz, Ibrushi, & Zhao, 2021). Furthermore, they examined each of the three ESG components individually: environmental, social, and governance. The results indicate that the environmental and social dimensions had the greatest impact on corporate performance (Díaz, Ibrushi, & Zhao, 2021).

The COVID-19 pandemic has heightened the importance of ESG investment strategies. The major trends identified in the literature suggest that the environmental and social aspects of ESG are driving the majority of current investment trends.

During this period, ESG played a dominant role in industrial portfolio returns, as noted by Díaz, Ibrushi, and Zhao (2021).

Finally, they suggest that investors must integrate the specific E, S, and G rankings in addition to the overall ESG rankings when formulating their investment plans.

Other study by Broadstock, Chan, Cheng, and Wang (2020) conducted an event-driven analysis using data from companies listed on the CSI300 in China. Their findings indicate that portfolios with higher ESG (Environmental, Social, and Governance) ratings demonstrated greater resilience during crises compared to those with lower ESG ratings. Moreover, amid the COVID-19 pandemic, they identified a positive correlation between ESG performance and short-term cumulative returns, suggesting that companies with favorable ESG ratings may exhibit greater resilience to financial disruptions, potentially influencing future investment decisions. The authors also examined the impact of ESG ratings specifically during the financial crisis triggered by the COVID-19 pandemic. Given this unprecedented context, their inquiry focused on whether investors perceived ESG scores as indicators of future stock performance or as risk-reduction mechanisms. Their analysis revealed that (i) portfolios with high ESG ratings tended to outperform those with low ratings, (ii) positive ESG ratings could help reduce financial risks during times of crisis, and (iii) the influence of ESG ratings was less pronounced in 'normal' times, underscoring their heightened importance during crises.

## **2.2. The impact of ESG investments on financial returns**

Nevertheless, there is ongoing debate about the impact of ESG investments on portfolio performance. On one hand, studies such as Cortez et al. (2009) suggest that ESG integration could limit diversification and lead to opportunity costs. This view is based on the study by Merton (1987) who argues that ESG stocks, being less preferred, tend to have a lower price but higher expected returns.

Pedersen, Fitzgibbons, and Pomorski (2020), however, contend that although socially responsible stocks may offer lower returns, investors are willing to tolerate this because these stocks are more socially responsible. Pastor, Stambaugh, and Taylor (2019) add that high-ESG-impact stocks typically have a lower cost of capital and lower returns due to investor preference for socially responsible investments.

Conversely, some authors, including Pedersen, Fitzgibbons, and Pomorski (2020), argue that ESG stocks could outperform if excellent ESG performance is associated with future earnings not yet reflected in the market. They observe this trend particularly in the ESG governance dimension, where it predicts an increase in corporate earnings. Mnescu (2011) points out that

investors often misjudge ESG-related costs, leading to inaccuracies in the valuation of these factors.

Ipsa facto, other analysis reveals a divergence of opinions on the impact of ESG investments. Under these circumstances, it is crucial for investors to stay informed and adapt their strategies accordingly (Lina Nassar, 2022).

### **3. Methodology**

This study will employ a combination of econometric modeling and Monte Carlo simulations to evaluate the integration of Environmental, Social, and Governance (ESG) criteria in portfolio optimization within the energy sector. Historical data from the S&P 500 index, including ESG ratings from Sustainalytics, will serve as the primary data source for the analysis. Additional consideration will be given to alternative ESG data providers such as MSCI, Bloomberg, and Dow Jones Sustainability, with Sustainalytics chosen based on its frequent use in empirical studies and the robustness of its scoring methodology.

The portfolios will be constructed using mean-variance optimization techniques derived from Modern Portfolio Theory, aiming to achieve an optimal risk-return balance along the efficient frontier. Key performance indicators such as expected returns, volatility, and the Sharpe ratio will be calculated to assess portfolio performance under various scenarios.

Monte Carlo simulations will be applied to evaluate portfolio performance across a range of market conditions, generating numerous random scenarios to account for uncertainties and market volatility. Different ESG scenarios—comprising portfolios with high, low, and mixed ESG risk levels—will be tested to analyze the impact of ESG integration on risk management and portfolio selection. Given the challenges associated with ESG data standardization and the variability in reporting across companies, the study will account for data inconsistencies and potential biases. Comparative analysis of ESG ratings from Sustainalytics with other data providers will also be considered to validate the findings.

Python programming will be utilized for statistical modeling, simulations, and visualizations, ensuring a rigorous examination of the trade-offs between risk, return, and ESG factors. This approach will allow for a comprehensive analysis of ESG integration, highlighting both the benefits and limitations of incorporating ESG criteria in portfolio optimization within the energy sector.

## 4. Theoretical approaches

### 4.1. Mean-variance analysis

Harry Markowitz's conceptual theory outlines how to select securities to form an optimal portfolio, aiming for the highest return with the lowest risk, with a focus on diversification. To illustrate this theory, we concentrate on financial principles and the associated mathematical equations. For investors, portfolio optimization is crucial, as portfolios should not be substituted if another offers the same or better performance with less risk (Fama & MacBeth, 1973). Thus, risk and return are essential in investment decisions. In this regard, Markowitz emphasizes that, in certain situations, an investor's choices are centered on two pillars: expected return and the risk associated with the portfolio.

#### Mathematical formulation

$$E [Rp] = \sum_{k=0}^n W_k \times E[R_k]$$

**Formula 1:** Expected portfolio return

Where:  $W_k$  is the weight of asset k

$$Var [Rp] = \sum_{k=0}^n W_k \times Cov [R_k R_p]$$

**Formula 2:** Portfolio variance

Where:  $W_k$  is the weight of asset k

$Cov [R_k R_p]$  is the covariance between the expected return on asset k and the expected return on the portfolio

#### Explaining the theory

There is a positive correlation between risk and return. The more risk an investor is willing to take, the higher the expected return. Conversely, a low level of risk is often associated with lower rewards. This relationship between risk and return is fundamental.

A rational investor aims to maximize return for a given level of risk, or to minimize risk while achieving a target return.

Diversification plays a central role in portfolio theory, particularly in risk management.

#### Portfolio selection

According to Markowitz, an investor should choose a portfolio that maximizes return for a specific level of risk, or minimizes risk for a defined level of return. However, several authors have developed more appropriate

mathematical formulas to describe portfolio efficiency. Sharpe's ratio and Treynor's ratio are two important performance measures.

### Sharpe ratio

In 1966, William F. Sharpe formulated the Sharpe ratio, which measures the risk-adjusted return on a financial portfolio (Sharpe, 1966). It measures the extra return an investor receives in exchange for the increased volatility incurred by holding riskier assets.

### Mathematical formulation

$$SR = \frac{E(R_p) - R_f}{\sigma_p}$$

#### Formula 3: Sharpe ratio

Where  $E(R_p)$  expected portfolio return

$R_f$  return on assets at risk-free rate

$\sigma_p$  Portfolio standard deviation

### Treynor ratio

The Jack L. Treynor ratio is used to assess risk, by establishing the risk-adjusted value of an investment and analyzing market volatility. This approach evaluates returns above those possible on a risk-free investment, for each unit of market risk. Like the Sharpe ratio, the Treynor ratio assesses the efficiency of the portfolio under review; a higher value indicates that the investor has generated high returns for each level of market risk assumed.

### Mathematical formulation

$$TR = \frac{E(R_p - R_p)}{B_p}$$

Where

$E(R_p)$ : Expected portfolio return

$R_p$ : Return on risk-free assets

$B_p$ : Portfolio beta

### 4.3. Regression methods

Econometric methods, including simple and multiple linear regression, are used to analyze relationships between variables. Simple linear regression examines the relationship between two variables, providing a straightforward model for prediction. In contrast, multiple linear regression accounts for several independent variables, offering a more comprehensive understanding of how various factors influence a dependent variable. These methods are

essential for making informed decisions based on empirical data. The aim of simple (resp. multiple) regression is to explain a variable Y using a variable X (resp. several variables X1,..., Xq). The variable Y is called the dependent variable, or variable to be explained, and the variables Xj (j=1,..., q) are called the independent variables, or explanatory variables.

### Simple linear regression

In statistics, simple linear regression is a model involving a single explanatory variable. It is represented by the equation  $y_i = \beta_0 + \beta_1 x_i + \epsilon_i$ , where y is the dependent variable, x is the independent variable,  $\beta_0$  is the intercept,  $\beta_1$  is the slope and  $\epsilon_i$  is the error term. It is generally assumed that  $E(\epsilon) = 0$  and  $E(\epsilon x) = 0$ .

The value  $\beta_1$  measures the change in y in response to a one-unit change in x, and can be calculated as  $\Delta y / \Delta x$ .

The aim is to estimate the values  $\hat{\beta}_0$  and  $\hat{\beta}_1$  that give the best possible fit to the data. We also wish to test the statistical significance of the parameters, in particular  $\beta_1$ , which quantifies the impact of x on y.

A common method for estimating simple linear regression is the least squares approach, which minimizes the sum of squares of the residuals. This translates into the equation  $\min \beta_0, \beta_1 \sum_i (y_i - \beta_0 - \beta_1 x_i)^2$ .

### Multiple linear regression

Normally, we can run a multiple linear regression (main variables + control variables) to control for the effect of confounding variables.

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_m x_{im} + \epsilon_i$$

There are m independent (explanatory) variables. We can also write multiple linear

regression in matrix form (more compact and easier for further derivation).

$$Y = X \beta + \epsilon$$

$$Y = X \beta + \epsilon$$

where  $Y = [y_1 \ y_2 \ y_n]_{n \times 1}$ ,  $X = [1 \ x_{11} \ x_{12} \ 1 \ \dots \ x_{21} \ \dots \ x_{22} \ \dots \ 1 \ x_{n1} \ x_{n2} \ \dots \ x_{1m} \ \dots \ \dots \ \dots \ x_{2m} \ \dots \ \dots \ x_{nm}]_{n \times (m+1)}$

$$\beta = [\beta_0 \ \beta_1 \ \dots \ \beta_m]_{(m+1) \times 1}, \quad \epsilon = [\epsilon_1 \ \epsilon_2 \ \dots \ \epsilon_n]_{n \times 1}$$

$$\beta_j = \frac{\partial y}{\partial x_j} \quad \forall 1 \leq j \leq m$$

$\beta_j$  measures the change in y in response to a one-unit change in  $x_j$  after controlling for other confounding factors (i.e.  $x_1, x_2, \dots, x_{j-1}, x_{j+1}, \dots, x_m$ ).

We can also estimate the  $\beta$  matrix by minimizing the sum of squared errors. The minimization program is as follows.

$$\begin{aligned}
 \epsilon &= Y - X\beta \\
 \min_{\beta} \epsilon^T \epsilon &= (Y - X\beta)^T (Y - X\beta) \\
 &= (Y^T - \beta^T X^T)(Y - X\beta) \\
 &= (Y^T Y - Y^T X\beta - \beta^T X^T Y + \beta^T X^T X\beta) \\
 &= (Y^T Y - 2Y^T X\beta + \beta^T X^T X\beta)
 \end{aligned}$$

The last step is because  $(Y^T X\beta)^T = \beta^T X^T Y$  and they are both  $1 \times 1$  matrix ( a scalar). Therefore  $Y^T X\beta = \beta^T X^T Y$

### Logistic regression

In logistic regression, the dependent variable (outcome variable) is binary (i.e. 1/0). In real life, many outcomes are binary, such as whether or not to invest, or whether the price will rise (or fall). In our case, we can analyze whether the company will have a high environmental risk or not.

$$\begin{aligned}
 E(Y | X = x) &= X\beta \\
 E(Y | X = x) &= P(Y = 1 | X = x)
 \end{aligned}$$

However, this linear probability model (LPM) has certain drawbacks. The predicted probability  $P(Y = 1 | X = x)$  may be  $< 0 >$  or  $< 1 >$  if the new  $x$  is not in the estimation (learning) sample.

Impossible to model "diminishing returns - changing the probability  $p$  by the same proportion requires a greater change in  $x$  when  $p$  is already large (or small) than when  $p$  is close to  $1/2$ .

Let  $Y^*$  be a latent (unobserved) variable that is continuous  $Y^* = X\beta + \epsilon$

### 4.4. Monte Carlo simulation

Monte Carlo simulations are a statistical technique that uses random sampling to model the probability of different outcomes in complex processes. By generating a large number of random inputs based on defined probability distributions, this method allows researchers to assess risks and forecast potential scenarios effectively. Here, we discuss the use of Monte Carlo methods to solve integration problems, while examining sampling techniques, convergence concepts and variance reduction strategies. To improve uniformity, the points of a quasi-random sequence are interconnected. This approach, known as quasi-Monte-Carlo quadrature, has a high convergence rate (Caflisch, 1998).

In our simulation, we calculate the efficient frontier of different portfolios. The aim is to determine the impact of various ESG variants on investment decisions; the risk-return trade-off is the primary factor influencing investment choices. For this reason, calculating the efficient frontier of each



portfolio is crucial for understanding the real impact on investors' decision-making.

### **The efficient frontier**

Portfolios that maximize returns for the taken-on risk are represented by the efficient frontier. Returns are determined by the portfolio's investment combinations. Risk is equated with a security's standard deviation. In an ideal world, a portfolio would be filled with investments that not only offer great returns, but also have a cumulative standard deviation that is lower than the standard deviations of the individual investments.

In our case, we calculate the efficient frontier for randomly selected energy companies in the stock market. To do this, we use the standard S&P 500 index as a benchmark. By calculating the risk-return trade-off, we aim to assess the impact of introducing the S&P 500 ESG index as a replacement for the standard index. Then we use Sustainalytics' ESG ratings in the energy sector to create various stock portfolios with different ESG ratings and examine the impact of these ratings on investment decisions, particularly concerning the risk-return trade-off.

## 5. Empirical Analysis and Results Presentation

### 5.1. Descriptive statistics

**Table 1:** Descriptive statistics for all variables used

	FRU, TO	TPZ, TO	VNOM	^TNX	CNQ	REP, HM	TTE, PA	BP	CVX	SHELL, AS	2222, SR	NOG	XOM	SP500ES G	SP500ENE RGY
Count	328	328	328	328	328	328	328	328	328	328	328	328	328	328	328
Mean	10,260	16,804	20,698	2,072	39,180	10,392	40,057	25,730	119,763	19,523	29,217	18,164	60,489	356,74	472,253
Std	3,793	3,506	7,391	0,955	13,857	2,2472	8,2680	4,613	33,567	4,983	3,136	7,299	17,531	29,800	133,254
Min	3,196	11,45	5,853	0,801	13,434	4,566	21,240	13,35	61,042	9,318	25,348	3,251	27,480	280,11	216,41
25 %	6,932	13,244	14,96	1,369	27,197	9,069	33,299	22,628	93,423	15,137	27,083	12,163	50,782	332,725	369,945
50 %	10,554	16,498	20,227	1,639	37,80	10,187	39,637	25,711	107,602	18,571	27,472	18,560	57,175	356,36	433,405
75 %	13,649	20,048	27,478	2,886	52,439	12,001	46,459	29,255	153,212	24,531	31,829	23,614	76,034	379,52	588,8
Max	16,775	23,595	33,016	4,234	63,085	15,278	58,192	35,167	182,474	27,950	36,710	34,923	101,09	418,01	720,16

### 5.2. Data summary

**Table 2:** Summary of selected data

Data	Source	Sampling (Dates <sup>o</sup> )	Specifications
SP500	SP500 GLOBAL	2011-2022	-
INDICE SP500ESG	SP500 GLOBAL	2011-2022	-
SP500 ENERGYIND EX	SP500 GLOBAL	2011-2022	-
SHARE DATA	YAHOO FINANCE		USE DATA SCRAPPING IN PYTHON
ESG ratings	Sustainable development		Only companies in the energy sector are concerned by ESG risk.

In our study, we will use multiple linear regressions and simple linear regressions to assess the persistence of the statistical model, as well as logistic regression (with a binary output of 0 or 1) to examine the direct impact of the ESG score on return on equity as a measure of performance. We will adopt a quantitative research approach for our analysis. When researchers attempt to quantify social phenomena and the relationships between them, they typically use a quantitative research methodology (Bell, Bryman, and Harley, 2019). In our case, the tools employed include the Python Spider, a tool dedicated to data analysis, and Excel analysis tools.

### 5.3. Econometric model

First model: Multiple linear regression model Addition  $Y = aX_1 + bX_2 + cX_N + \dots + nX_n + e$

Multiple regressions are run to study the relevance of ESG data and to extract possible relationships between variables. The first regression uses SP500 variant analysis:

Y is the standard SP500; this variable is used because of its importance on the stock market, as it gives an idea of the market trend. The SP500 is widely used as a benchmark for equity investments. It is therefore relevant to use it as the dependent variable.

X1: The SP500 offers the possibility of filtering its components. For this reason, there are many variants of the SP500, the most important in our study being the SP00 ESG index; this variant is derived from a negative filtering method<sup>2</sup> by filtering the standard SP500 and retaining only the "good stocks".

⇒ X2: SP500 Energy index, following the same logic of filtering the overall SP500, and as our study focuses more on the energy sector, we'll take the SP500 Energy index as the second variable for our model.

Note that the data is filtered using Power Query, and the regression is run as a first test in Excel, using the full set of analysis tools. The data runs from 2011 to 2022, the idea being to take account of crises that have caused market collapses, in particular the pandemic of COVID-19 and the war between Russia and Ukraine.

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<sup>2</sup> Negative and positive screening: Companies from "controversial" sectors such as oil and gas could be screened favorably if they can demonstrate that they have made significant ESG commitments and are in a position to improve.

**Discussion of results**

**Table 3:** Regression statistics

<i>Regression statistics</i>	
Coefficient of multiple determination	0,999 074 472
Coefficient of determination R <sup>2</sup>	0,998 149 801
Coefficient of determination R <sup>2</sup>	0,998 148 335
Standard error	37,635 140 77
Observations	2528

The results of this tables emphasis on the strong relationship between variables, the R squared is almost one which implies that the model is strong and the two variables explain statistically the dependent variable Y.

**Table 4:** ANOVA<sup>3</sup> test

	Degree of freedom	Sum of squares	Average square	F	Critical value of F
Regression	2	1 929 415 359	964 707 680	681 096,496	0
Residues	2525	3 576 419,65	1416,403 82		
Total	2527	1 932 991 779			

This table satisfies the normality hypothesis. If all the variables in the model are normally distributed, we can accept H0 (the null hypothesis), because if we reject the normality test, the study will not be significant. Thus, the P-value is 0, perfectly respecting the null hypothesis.

**Table 5:** Regression model coefficients

	Degree of freedom	Sum of squares	Average square	F	Critical value of F
Regression	2	1 929 415 359	964 707 680	681 096,496	0
Residues	2525	3 576 419,65	1416,403 82		
Total	2527	1 932 991 779			

In Table 5, we summarize the regression equation. Writing it as a mathematical formula, we obtain:  $Y = 11.079X_1 - 0.182 X_2 + 269,672$

**Interpretation:**

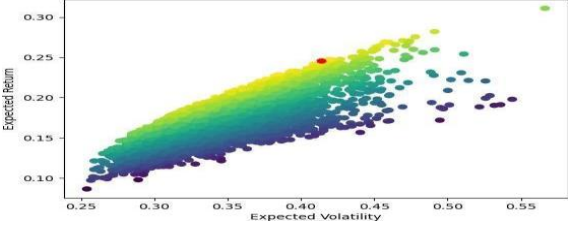
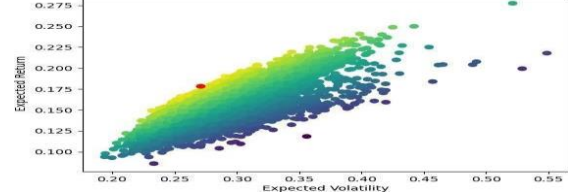
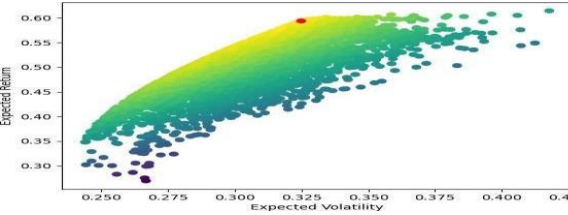
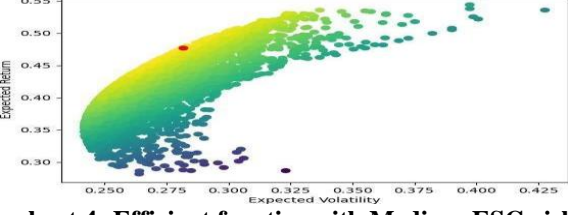
The impact of the S&P 500 (X1) is positive, as an additional unit of the S&P 500 leads to an increase of approximately 11.1 units in the standard

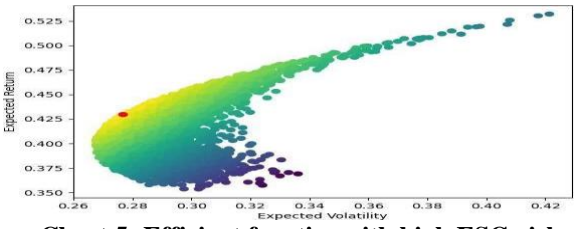
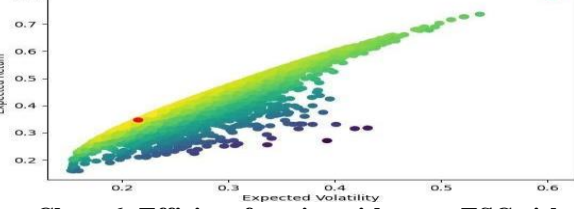
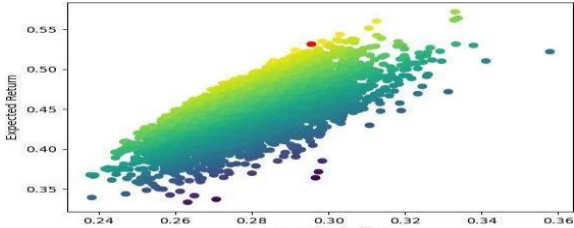
<sup>3</sup> ANOVA is a statistical analysis technique that divides systematic components from random factors to account for the overall variability observed within a data set.

S&P 500. Conversely, the S&P 500 Energy index (X2) has a negative impact, reducing the standard S&P 500 by 0.2 units for every additional unit increase. Overall, the influence of the S&P 500 is significantly greater than that of the S&P 500 Energy index in this model.

This result confirms the literature studying this relationship, particularly in areas related to ESG investment, such as the relevance of ESG data to the stock market.

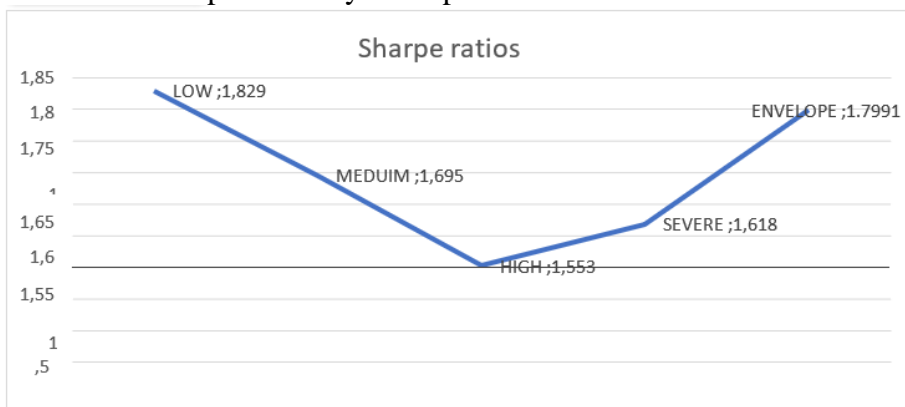
### 5.4. Results of Monte Carlo Simulations and the Efficient Frontier Analysis

 <p><b>Chart 1: Efficient frontier without ESG variant</b></p>	<p>This graph shows the risk and return parameters for a portfolio of energy stocks. The optimal portfolio is represented by a red dot, with an approximate volatility measure of 0.40 and an expected return of 0.25. If we take into account the number of returns per unit of risk (simple division of risk and return), we obtain approximately 1.6.</p>
 <p><b>Chart 2: Efficient frontier with ESG variant</b></p>	<p>For each additional unit of yield, there are 1.6 units of volatility. The ESG variant is important for hedging risk but does not clearly affect returns. This graph shows the risk and return parameters for a portfolio of energy stocks. The optimal portfolio is represented by a red dot, with an approximate volatility measure of 0.27 and an expected return of 0.18</p>
 <p><b>Chart 3: Efficient frontier with low ESG risk</b></p>	<p>This chart displays the risk and return parameters for a portfolio of energy stocks. The red dot represents the optimal portfolio, with an approximate volatility measure of 0.32 and an expected return of 0.60. If we take into account the returns per unit of risk (simply dividing risk by return) or calculate the maximum Sharpe ratio using Python code, we obtain a Sharpe ratio of 1.829.</p>
 <p><b>chart 4: Efficient frontier with Medium ESG risk</b></p>	<p>The portfolio consists of stocks from the energy sector, including companies like Total Energies and the Canadian National Energy Company, all with an average ESG score. Considering the returns per unit of risk, the Sharpe ratio is calculated to be 1.695.</p>

 <p><b>Chart 5: Efficient frontier with high ESG risk</b></p>	<p>This graph shows the risk and return parameters of a portfolio of shares in the energy sector for companies with a high ESG risk, i.e., a poor ESG rating according to Sustainalytics. The optimal portfolio is represented by a red dot; the Sharpe ratio of this portfolio that is equal to 1,553</p>
 <p><b>Chart 6: Efficient frontier with sever ESG risk</b></p>	<p>This graph illustrates the risk and return parameters for a portfolio of stocks within the energy sector. The red dot represents the optimal portfolio, which, in the worst-case scenario, comprises solely companies with a high ESG risk and consequently a very low ESG rating. By considering the returns per unit of risk (calculated through a simple division of risk and return).</p>
 <p><b>Figure 7: Efficient boundary of the envelope scenario</b></p>	<p>This chart shows the risk and return parameters of a portfolio of equities in the energy sector. This represents an envelope scenario, subsequently developed in the form of proposals. The optimal portfolio is indicated by a red dot and includes companies with both high and low ESG risk. Taking into account the returns per unit of risk (calculated by the simple division of risk and return), the Sharpe ratio for this portfolio is 1.799.</p>

## 6. Analysis of results/data

ESG investing consists of proposing portfolios that meet certain ethical investment standards. As such, rating agencies provide ratings to facilitate the selection of portfolios for "responsible" investors. If we see ourselves as investors who are aware of this investment scheme, we will look directly at the risk and return provided by these portfolios.



**Figure 8: Sharpe ratios for the different portfolios**

In general, a higher Sharpe ratio is preferable, as it indicates a greater return relative to the risk assumed. However, it is important to remember that the Sharpe ratio is not the only factor to consider when choosing an investment. Factors such as investment objectives, time horizons, and personal risk tolerance should also be taken into account.

The low ESG risk portfolio has the highest Sharpe ratio (1.829), making it the best portfolio in our investment decision schema. Finally, the medium-risk portfolio lies between the low- and high-risk portfolios, with a Sharpe ratio of 1.695, while the high-risk portfolio has a Sharpe ratio of 1.553.

The issue with the order lies with the severe portfolio, which is an outlier with a better risk/return trade-off compared to the high-risk portfolio. Descriptively, both are poor portfolios with little difference when their Sharpe ratios are compared.

In fact, ESG ratings are dissociated from any financial criteria and, therefore, do not directly influence risk and return. As a result, ESG investment aligns more with an ethical approach than a purely financial one.

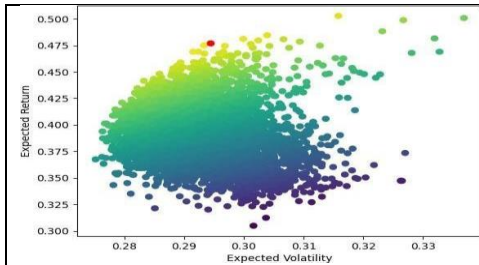
## **7. Limits and proposals**

Nevertheless, our study has intrinsic limitations related to the methodology adopted and the availability of data:

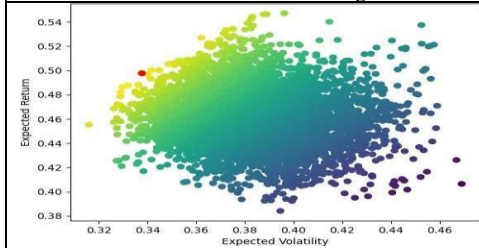
The model we use is based on a positive/negative selection approach specific to responsible investment. Despite its often "naïve" criticisms, this methodology is still widely used in investment decision-making.

- ⇒ We suggest a more rigorous selection of countries to enhance the relevance of our study; however, this improvement is highly dependent on data availability.
- ⇒ We observe that small-cap stocks, perceived as riskier, present interesting opportunities. Indeed, they are often considered more volatile than large-cap stocks. This is because the latter, typically held by well-established firms, do not generally aspire to rapid growth, as noted by Investopedia.

In our study, the size factor plays a central role. By considering this factor, we could provide significant additional information. Separate research on the size factor would be particularly beneficial and would enrich the literature on the subject. As part of our approach, we conducted a test to evaluate this hypothesis. By applying the positive/negative selection methodology to our study and evaluating efficient frontiers, then comparing Sharpe ratios, we arrived at specific results.



**Chart 9: Efficient frontier for the 5 companies with the worst ESG ratings**



**Chart 10: Efficient frontier for the top 5 ESG-rated companies**

In analyzing the efficient frontiers and associated metrics, we observe a notable gap between the Sharpe ratios of the highest-ranked and lowest-ranked companies. The top-ranked companies, primarily small- and mid-cap stocks, have a Sharpe ratio of 1.474, while the bottom-ranked companies, largely large-cap stocks, have a ratio of 1.623. This difference underscores the need to examine this feature in greater detail.

Additionally, a sharper focus on the energy sector could provide a better understanding of the observed disparities. We could consider using industry sub-codes to refine the model and specifically target those branches of the sector most impacted by ESG investment decisions. It should be noted that our research focuses primarily on companies in the oil and gas sector. In the future, exploring the renewable energy sector could prove promising for our research.

## Conclusion

In this paper, we explore the relevance of ESG ratings in the investment decision-making process, particularly in the face of uncertainties in the energy sector. There's no denying that, when it comes to investing, the risk/return trade-off is at the heart of investors' concerns. The first reflex is often to review the various portfolios available and assess their respective risks and returns.

Our research was based on data from the global SP500 index. The aim of our econometric model was to assess the usefulness of the SP500 ESG index as a benchmark. The results show a strong correlation and statistical convergence between these two indices. What's more, integrating ESG data into a portfolio by substituting the SP500 with the ESG SP500 index generates a significant reduction in risk and a higher Sharpe ratio.

In addition, our risk/return analysis, carried out by calculating the efficient frontier for various equity portfolios based on ESG scores, confirms the relevance of the scoring method.

Specifically, we found a more favorable Sharpe ratio for low ESG risk portfolios than for high ESG risk portfolios.

However, our conclusions must be tempered by the intrinsic limitations of this study, notably those associated with data availability and the constraints of the model employed. We have suggested improvements to make this study even more relevant, including a more rigorous selection of countries and a more thorough consideration of the size factor.



An "envelope scenario" has also been established to further explore this ESG investment opportunity. With the limitations identified and improvements suggested, we are convinced that there is still much to discover and learn in the vast field of ESG investing.

**Conflict of Interest:** The authors reported no conflict of interest.

**Data Availability:** All data are included in the content of the paper.

**Funding Statement:** The authors did not obtain any funding for this research.

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## Réactivité des Employés face à la Culture de Sécurité du Travail dans l'Entreprise Minerals and Metals Group/Kinsevere RDC

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### Résumé

Cet article vise à analyser la réactivité des employés face à la culture de la sécurité au travail. Elle a été réalisée dans les ateliers de l'entreprise MMG/Kinsecere, RDC, durant la période allant de 2015 à 2021. Elle s'est servie de la méthode d'enquête et la méthode descriptive accompagnées des techniques documentaires et de questionnaire. Le traitement des données a été fait grâce à l'analyse du contenu et du test statistique Chi-deux. Les résultats montrent que les employés de l'entreprise susmentionnée manifestent de la réactivité face à la culture de sécurité grâce à l'intériorisation dans leurs pratiques des règles et valeurs de la culture de sécurité partagées au sein de l'entreprise, qui est facilitée par la série de formation et les réunions de sécurité organisées chaque jour dans les différents ateliers. C'est pourquoi dans une entreprise, il ne suffit pas seulement de mettre en place une politique de sécurité au travail. Mais il convient de se rassurer que cette politique soit intégrée dans la conduite des employés au travail.

**Mots-clés:** Réactivité, culture de sécurité et employeur

## **Employee Responsiveness to the Work Safety Culture at Minerals and Metals Group/Kinsevere DRC**

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### **Abstract**

This article aims to analyze the responsiveness of employees to the workplace safety culture. It was carried out in the workshops of the company MMG/Kinsevere, DRC, during the period from 2015 to 2021. The survey method and the descriptive method were used with the documentary and questionnaire techniques. Data processing was performed by content analysis and chi-square statistical testing. The results show that the employees of the above-mentioned company demonstrate responsiveness to the safety culture thanks to the internalization in their practices of the rules and values of the safety culture shared within the company, which is facilitated by the series of training and safety meetings organized every day in the different workshops. This is why in a company, it is not enough to simply implement an occupational safety policy. However, it is important to be sure that this policy is integrated into the conduct of employees at work.

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**Keywords:** Responsiveness, safety culture, and employer

### **Introduction**

La réactivité n'est pas seulement un ensemble de leviers d'action mis en œuvre consécutivement à un choc externe. Simon, (1960). La prise de décision est fonction non seulement de critères plus ou moins rationnels de choix, mais aussi de l'état des motivations et de la perception de l'environnement.

Sanchez, (1996, p.35), considère la réactivité comme la capacité de l'entreprise à associer, à coordonner et à déployer des ressources pour accomplir des tâches.

Pour Durand, (2006, p.261) « la compétence ne s'échange pas sur un marché, elle relève d'une véritable alchimie entre les connaissances et les savoirs, les pratiques et le savoir-faire, les attitudes et le savoir-être ».

Dans le cadre de cette étude, la réactivité est considérée comme la capacité ou les aptitudes qu'ont les employés de MMG/Kinsevere pour s'adapter à la culture de sécurité au travail. Cette adaptation doit se mesurer par rapport au temps.

OIT (2021), l'expression «au travail » renvoie à ce qui a trait à la vie professionnelle. La «sécurité» est le fait d'être à l'abri de toute souffrance, blessure ou perte.

Dans le secteur industriel, la culture de sécurité est essentielle pour prévenir les accidents et protéger les travailleurs. Elle repose sur des valeurs, des attitudes et des comportements partagés par tous les acteurs de l'organisation. Elle implique aussi une collaboration entre les différents départements et une communication efficace sur les informations essentielles pour la sécurité. <https://www.fullmark.fr/fr/news-43-ameliorer-la-culture-securite-en-entreprise.html>

Selon BST (2021), la culture de sécurité a une incidence marquée sur les gestes posés par les employés et la direction sur le plan de sécurité et, conséquemment, sur le niveau global de sécurité au sein d'une organisation. Toutefois, on néglige souvent l'importance de la culture de sécurité, comme il ne s'agit pas d'un concept tangible. Le concept de culture de sécurité est ressorti après l'accident de Tchernobyl, en 1986.

D'après Simard, M. (2010) « la culture de sécurité est l'ensemble des pratiques développées et appliquées par les principaux acteurs concernés pour maîtriser les risques de leur métier ». Selon cette définition, la culture de sécurité dépend donc des acteurs et des pratiques. On peut distinguer deux groupes d'acteurs : le personnel exposé et le management : ceux qui sont au plus près du danger et ceux qui les encadrent. La culture de sécurité est donc le résultat d'une dynamique qui repose sur une confiance entre ces acteurs. Concernant les pratiques, celles-ci sont largement dépendantes des systèmes de croyances et des règles qui régissent les comportements habituels des salariés. Il distingue plusieurs âges de la culture de sécurité :

- La culture fataliste (faible implication des opérateurs/faible implication du management).
- Les deux acteurs ne font rien, car les accidents sont le résultat de la fatalité. La culture de métier (forte implication des opérateurs/faible implication du management).
- Les gens de métier établissent leurs propres règles de sécurité, car ce sont eux qui savent, ce qui peut aboutir à une forte déresponsabilisation de l'entreprise sur le plan de la sécurité ;
- La culture managériale (faible implication des opérateurs/forte implication du management). Dans ce cas, le management prend en charge la sécurité et formalise des procédures dans lesquelles s'inscrivent les salariés dépossédés de cette question.
- La culture intégrée (forte implication des opérateurs/forte implication du management). Dans ce stade, le plus achevé de la culture de

sécurité, il y a une construction de la culture qui implique un management participatif.

Hale, (2000, p.1-14) « tente de synthétiser certains aspects qui seraient symptomatiques d'une bonne culture de sécurité :

- L'importance que lui donnent les salariés et particulièrement le top management ;
- Les aspects de la sécurité au sens large du terme qui sont inclus dans ce concept et dans la priorité qu'on leur donne ;
- L'investissement de chacune des parties dans l'organisation ;
- Le fait que le personnel n'est jamais certain que la culture de sécurité de son organisation est idéale ;
- La notion de responsabilité partagée ;
- La possibilité de communiquer sur les erreurs ».

Wiegmann, D., et Wilson, L. D(2007, p.54) « Précisent brièvement qu'au niveau des façons de penser en rapport avec la sécurité, on se réfère à des choses comme la valeur ou l'importance relative que les acteurs accordent à la sécurité (Par exemple : sécurité d'abord), les croyances, convictions et principes que les gens développent concernant les « bonnes façons » de s'occuper de la sécurité (Appliquer les règles de sécurité établies est le meilleur moyen d'éviter les accidents, par exemple.), et enfin les normes, formelles ou informelles, qui sont établies dans le milieu comme devant être appliquées dans telle ou telle situation concrète (par exemple instruction de porter la protection auditive dès l'entrée dans telle zone de travail). Tous ces éléments (valeurs, croyances, normes) forment un dispositif collectif qui fournit aux individus des schémas d'orientation, de représentation et d'action pour déterminer leurs conduites habituelles dans les diverses situations perçues à risque ». Pour Rosan,M.(2007, p.2) « la culture de sécurité au travail est essentiellement la somme des valeurs, des croyances, des attitudes et des comportements, ainsi que des rituels intégrés à tous les niveaux de l'organisation qui déterminent la façon dont l'ensemble du personnel, de la haute direction jusqu'aux employés de production, pensent et agissent par rapport à la sécurité. Les éléments qui font partie de la notion de culture sont :

- Les valeurs ;
- Les croyances ;
- Les attitudes ;
- Les comportements et les actions. La partie visible de la culture comprend :
- Les comportements, les actions et attitudes. Et la partie invisible de la culture comprend : les valeurs, les croyances, et les attitudes ».

## **Les acteurs de la culture de la sécurité du travail**

Pour Daniellou.F, Boissières.I et Simard,M.(2010,p.99), « il est courant de dire que « la sécurité est l'affaire de tous » dans une entreprise. Néanmoins, certains sont plus directement sollicités par les enjeux de sécurité de leur travail ou de l'entreprise, en l'occurrence le management et les employés reliés à l'exploitation.

Ces deux acteurs clés sont généralement les principaux artisans de la culture de sécurité dans une entité industrielle. Par conséquent, c'est une erreur de réduire les problèmes de culture de sécurité aux seuls comportements des opérateurs. Selon le centre **canadien d'hygiène et sécurité du travail** (C.C.H.S.T) (1998, p.23), pour rendre concrète la culture de la sécurité du travail, la définition des principaux éléments qui concrétisent la notion relativement abstraite s'avère importante. Les voici :

- Les valeurs ;
- Les gardiens des valeurs ;
- Les rites et rituels ;
- L'imputation.

### **a. Les valeurs en culture de sécurité du travail**

La valeur est une conviction ou une croyance constante dans le temps. La culture est un ensemble des valeurs collectives. Ainsi, si dans l'organisation il n'y a pas les valeurs clairement définies en culture de la sécurité au travail, ou si ces valeurs sont inconnues ou que le sens n'est pas compris par l'ensemble du personnel, il convient de recourir aux gardiens des valeurs.

### **b. Les gardiens des valeurs**

Les gardiens des valeurs sont les employés dans l'entreprise qui veillent à préserver les valeurs définies. Ces gardiens s'assurent que ces valeurs soient intégrées dans les différentes activités de l'entreprise au fil des années. Ce sont les prêcheurs de la sécurité au travail. Qui peut exercer le rôle de gardien des valeurs ?

1. les membres de la haute direction (dirigeants) ;
2. Le directeur d'Usine ;
3. le service de ressources humaines et le coordonnateur en santé et sécurité au travail ;
4. les superviseurs ;
5. les membres du comité de santé et sécurité au travail. Et lorsque l'entreprise atteint un niveau de culture en santé et sécurité élevé, tous les membres du personnel, et la haute direction jusqu'aux employés, deviennent des gardiens des valeurs.

### **c. Les rites et rituels**

Comment parler de culture en l'absence de rites ? Les rites et rituels sont des habitudes ou des routines systématiques. Ce qui forme les habitudes,

ce sont des gestes fréquents et réitérés. Ces gestes s'effectuent machinalement. Il s'agit des routines programmées. Lorsque ces rites et rituels deviennent une seconde nature, on parle de la culture. Il est important d'implanter des rites et rituels en matière de santé et sécurité au travail. Par exemple, tous les matins, tenir une réunion éclair de cinq minutes avec les employés. Et, une fois par mois, une inspection. S'il survient un accident, enquêté, etc.

En fait, cela consiste essentiellement à adopter des bonnes pratiques en matière de santé et sécurité au travail et à les intégrer dans le quotidien de l'entreprise.

#### **d. L'imputabilité**

Le terme « imputabilité » est utilisé dans le sens de rendre chaque membre de l'entreprise responsable des actes. L'imputabilité n'est pas en soi un élément qui caractérise une culture. Mais cela démontre toute l'importance que l'entreprise accorde à ses valeurs en santé et sécurité au travail. En fait, il faut plutôt que si la santé du travail est une valeur dans l'entreprise, le personnel doit être imputable de ses actions.

Des valeurs bien définies, des gardiens pour promouvoir ces valeurs et assurer leur continuité, des rites et rituels instaurés dans les façons de faire, et immuabilité de l'ensemble du personnel. Ces caractéristiques sont, en fait, des éléments qui forment une culture. Nous pouvons dire dans le cadre de notre travail que la transgression de procédures de sécurité par des opérateurs ne peut devenir « une façon de faire » habituelle et considérée comme « normale », que si la pratique est acceptée par le collectif de travail et bénéficie d'une tolérance parmi ceux qui encadrent ces opérateurs. La réalisation de cette étude se justifie par le fait que les entreprises aujourd'hui sont en pleine évolution, et le bien-être ainsi que la sécurité du travail constituent un enjeu capital pour les conduites au travail. C'est pourquoi dans les entreprises minières, les salariés doivent intégrer les normes de sécurité, pour travailler en subissant moins d'accidents grâce à l'appropriation des éléments de la culture de sécurité du travail. Raison pour laquelle en allant à MMG/Kinsevere, nous avons voulu voir comment la sécurité du travail est organisée.

#### **e. Les leviers pour renforcer la culture de la sécurité**

Pour agir de façon pérenne sur la culture sécurité et réduire les accidents de travail de façon continue sur le long terme, il est nécessaire de mettre en place un programme structuré qui comprendra différents axes de travail :

- Sensibilisation des travailleurs : c'est un axe essentiel. « Sensibiliser », c'est bien plus que « communiquer ». Cela nécessite réellement de convaincre et d'inciter à changer d'attitude et de comportement. Des politiques doivent être élaborées pour encourager les employés à effectuer correctement leurs tâches et à ne pas suivre de mauvaises pratiques. La communication et la coopération entre les personnes doivent être encouragées, ce qui implique qu'il vaut mieux signaler les



problèmes et les incidents plutôt que de les cacher. On sait qu'une erreur détectée rapidement peut faire gagner beaucoup de temps et d'argent à l'entreprise.

- Implication de la direction : la promotion d'une culture de sécurité forte nécessite la participation, l'engagement et le support de la direction de l'entreprise. Le top management doit montrer l'exemple en matière de prévention et de bonnes pratiques. La Direction doit mettre en place et soutenir personnellement un système de valorisation des bons comportements et de recadrage des négligences. C'est ce que l'on appelle une « culture juste ».
- Formation : la meilleure façon de s'assurer que les activités sont menées correctement et en toute sécurité sera de dispenser une formation de top niveau à tous les employés. Pour un impact maximal, convient d'adapter le contenu (le fond et la forme) à chaque niveau hiérarchique. Les salariés (ainsi que les intérimaires et sous-traitants) doivent tout d'abord être compétents, mais ils doivent aussi sentir qu'ils ont des responsabilités et être sensibilisés aux conséquences de leurs actions sur le terrain. <https://www.fullmark.fr/fr/news-43-ameliorer-la-culture-securite-en-entreprise.html>

Pour savoir exactement à quel niveau de culture de sécurité se trouve votre entreprise (et même les différentes unités composant l'entreprise), il faut réaliser un diagnostic de culture Sécurité.

En ce qui concerne la recension des écrits, nous avons retenu les auteurs suivants :

Azoh (2014), estime que la culture organisationnelle en Côte d'Ivoire se construit avec les valeurs et les changements de comportements des travailleurs ayant bénéficié de la formation sur la culture organisationnelle et ayant contribué à l'élaboration de la charte de l'entreprise. Parallèlement avec Cliff.D, (2012), qui dit que les systèmes de gestion de la santé et sécurité du travail permettent non seulement d'identifier tous les dangers et risques devant être gérés, mais fournissent des directives quant à la manière dont elles ne doivent pas être gérées. KouabenanD.R. (2008), ajoute que les croyances individuelles, sociétales, les représentations sur les risques et leurs cibles influencent les attitudes à différents niveaux :

- Selon le cas, les croyances peuvent avoir les effets positifs ou des effets négatifs ;
- Les biais induits par les croyances peuvent constituer un facteur de risque parce qu'ils contribuent à déformer l'évaluation du risque et de la capacité à y faire face.
- Mais peuvent également être porteuses d'informations utiles pour le diagnostic de sécurité et la conception des actions de prévention.

Ngueutsa (2006), souligne que les explications causales constituent un facteur critique qui affecte l'effet de la perception du risque sur les comportements de sécurité. Ainsi, si indépendamment des explications causales et de la perception du risque favorisent des comportements sûrs, une forte perception du risque couplée à des explications causales fatalistes induit plutôt des comportements moins sécuritaires. Mugnai, (2005), estime que la gestion de la sécurité du travail réside en quatre niveaux :

- Les règlements dans les activités de travail,
- Les éléments favorisant la sécurité,
- Les facteurs de motivation dans les comportements, et
- Les valeurs qui vont à l'encontre du travail collectif.

La particularité de cette étude est que les études recensées n'ont pas abordé l'aspect de la réactivité des employés.

Chaque année, dans le monde, 2,78 millions de travailleurs meurent d'accidents du travail et de maladies professionnelles et 374 millions sont victimes d'accidents du travail non mortels. Autrement dit, plus d'un million de travailleurs sont blessés au travail chaque jour. Qui plus est, ces chiffres impressionnants traduisent seulement les blessures et les maladies qui se produisent sur les lieux de travail officiels et enregistrés ; l'ampleur réelle du problème est encore plus dramatique. OIT (2013). Raison pour laquelle chaque entreprise doit faire de la sécurité au travail sa priorité.

La réalisation de cette recherche résulte du constat fait à l'entreprise MMG/Kinsevere, où il est déclaré dans la politique de sécurité au travail ce qui suit : *pour la sécurité au travail, nous croyons qu'aucune tâche n'est si importante au point de négliger la sécurité de l'homme, d'où nous nous arrêtons toujours et réfléchissons (stop and think)*. Cette déclaration est accompagnée pour les mentions suivantes :

- Être un champion dans nos principes de prévention contre les accidents ;
- S'assurer toujours que vous êtes aptes à travailler ;
- Arrêter les comportements dangereux pour nos travailleurs, la communauté et l'environnement ;
- Assurer votre propre sécurité ainsi que celle des autres en signalant les dangers, les blessures, les maladies et les incidents et en encourageant les autres à faire de même ;
- Utiliser toujours l'équipement de protection approprié à la tâche que vous effectuez ;
- Pratiquer et promouvoir la sécurité en dehors du travail. Toutes ces pratiques sont s'arriment à la norme australienne 4801, qui place

l'homme au centre de la politique de la sécurité au travail dans une entreprise.

Ce constat nous a permis de nous poser trois questions :

- Existe-t-il une culture de sécurité au travail au sein de l'entreprise MMG/Kinsevere ?
- Quels sont les éléments constitutifs de la culture de sécurité au travail intégrées par les employés de cette entreprise minière ?
- Comment les employés de l'entreprise MMG/Kinsevere réagissent-ils face à la culture de la sécurité au travail ?

La théorie de Bournois souligne que la culture de sécurité au travail englobe les valeurs, les croyances, les postulats, les attitudes et les normes communes de ceux qui travaillent dans une même organisation. A l'instar de la théorie X de (Mc Gregor 1960) qui stipule que les individus doivent être contraints, contrôlés, dirigés, menacés de sanctions, si l'on veut qu'ils fournissent les efforts à la réalisation des objectifs organisationnels notamment en sécurité au travail, nous pensons que :

- Les employés de l'entreprise MMG/Kinsevere partageraient les valeurs de sécurité positives qui réduisent la fréquence et la gravité des accidents au travail ;
- Les règles et valeurs de la culture de sécurité du travail intégrées par les employés de MMG/Kinsevere se fonderaient sur l'intériorisation, l'appropriation des informations et les pratiques de sécurité, notamment : l'induction, la formation professionnelle périodique, la sensibilisation des employés pour la prise de conscience au travail, l'acronyme « s'arrêter et réfléchir », le port de l'équipement de travail approprié, l'analyse de dangers de travail.
- les employés de l'entreprise MMG/Kinsevere réagiraient négativement face à la culture de sécurité au travail et la traiterait de contraignant, car :
  - en travaillant, ils seraient contrôlés régulièrement dans les ateliers pour vérifier s'ils respectaient les normes de sécurité au travail ;
  - ils développeraient une crainte d'être sanctionnés au cas où ils ne respecteraient pas les normes de sécurité au travail.

## **Méthodologie**

### **Milieu de recherche**

Notre étude a été réalisée dans les ateliers de l'entreprise MMG/Kinsevere, RDC, durant la période allant de 2015 à 2021. Cette étude a été réalisée à l'entreprise MMG/Kinsevere, RDC, durant la période allant de

2015 à 2021. La population était constituée de 242 employés répartis, selon le détail dans le tableau ci-dessous.

**Tableau : Relatif à la population de la recherche**

Catégories	III-1	III-2	III-3	IV-1	IV-2	IV-3	Total
<b>Ateliers</b>							
<b>Electricité</b>	12	11	15				38
<b>Peinture</b>	5	4					9
<b>Labo métallurgie</b>	1	4					5
<b>Chaudronnerie</b>	10	5					15
<b>Mécanique et de montage</b>	16	12	3	1			32
<b>Garage</b>	12		9	4			25
<b>D'Electrolyse</b>	12	4	8	4			28
<b>D'Exploitation</b>	5	10					15
<b>Civils</b>	8	6					14
<b>D'Infrastructure</b>	8						8
<b>Mines</b>	20	11	18		4		53
<b>Total</b>	109	66	61	9	4		242

A ce niveau, il sied d'extraire un échantillon de cette population. Dans cette étude, nous avons recouru à l'échantillonnage aléatoire, parce que tous les enquêtés sont tirés dans les ateliers et départements au hasard, où tout le monde a eu la chance d'être choisi. Le nombre des enquêtés variait selon la disponibilité de ces derniers. Ceci traduit la représentativité de notre échantillon.

**Tableau : relatif à l'échantillon**

Catégories	III-1	III-2	III-3	IV-1	IV-2	IV-3	Total
<b>Ateliers</b>							
<b>Electricité</b>	5	5	5				15
<b>Peinture</b>	3	2					5
<b>Labo métallurgie</b>	1	2					3
<b>Chaudronnerie</b>	5	2					7
<b>Mécanique et de montage</b>	7	5	2	1			15
<b>Garage</b>	6		4	3			13
<b>D'Electrolyse</b>	4	2	4	2			12
<b>D'Exploitation</b>	2	4					6
<b>Civils</b>	5	4					9
<b>D'Infrastructure</b>	3						3
<b>Mines</b>	11	6	4				20
<b>Total</b>	109	66	61	9	4		105

Il ressort de ce tableau que la taille de notre échantillon était 105.

## **Outils utilisés**

Pour produire les données, nous avons utilisé les outils suivants : la méthode d'enquête et la méthode descriptive.

Lavarde.A.M (2008, pp.146-147) définit la méthode d'enquête comme une procédure de recherche caractérisée par les techniques diversifiées quant à la collecte des données : questionnaire, entretien, etc. C'est aussi une procédure de choix quand le psychologue chercheur veut mettre en œuvre un dispositif de recherche dont l'objet porte sur des phénomènes psychosociaux naturels (rumeur, violence, intégration sociale, pratiques urbaines, interactions sociales, opinions, attitudes, etc.). Elle se caractérise par les éléments suivants :

- Elle est toujours réalisée sur le terrain (in situ) ;
- le phénomène étudié se produit naturellement sans qu'il ne soit contrôlé (manipulé) comme dans la démarche expérimentale. C'est justement le rôle qu'a joué cette méthode dans notre recherche scientifique.

La méthode descriptive nous a permis de décrire les faits relatifs à la réactivité des employés face à la culture de la sécurité au travail à MMG/Kinsevere, car, « assurer la pertinence d'une méthode, c'est l'ajuster aux questions posées et aux informations accessibles » ( Combessie J-c,2007, p.9).

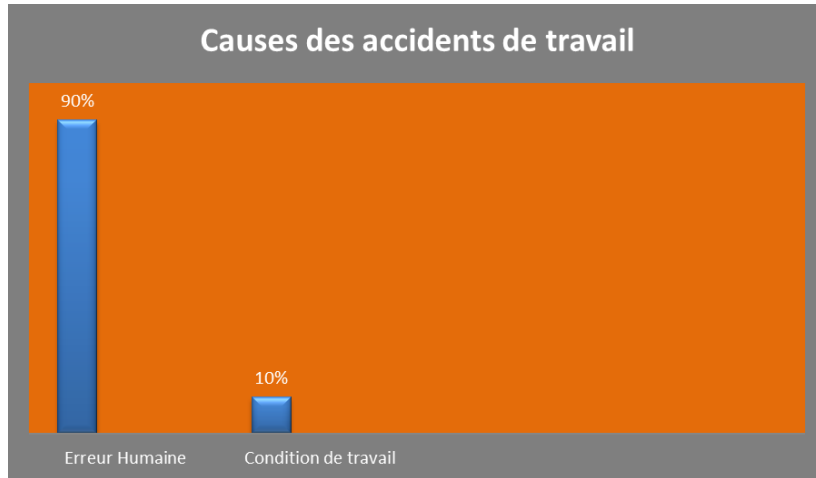
Pour ce qui est des techniques, nous avons utilisé la technique documentaire et la technique de questionnaire. S'agissant des techniques de traitement des données, nous avons recouru à l'analyse du contenu et au test statistique Chi-deux.

## **Présentation et analyse des données**

### ***Les accidents de travail***

Nous avons analysé les statistiques des accidents de travail qui vont de 2014 à 2021, pour obtenir les informations sur les causes des accidents et les mesures de sécurité utilisées.

Nous présentons ces informations dans le graphique ci-dessous.



**Graphique N°1 : Cause des accidents**

Les causes des accidents de travail à MMG/Kinsevere sont réparties de la manière suivante :

Partant ce graphique, nous trouvons que sur 29 cas d'accidents que MMG/Kinsevere a enregistré de 2014 à 2021, 26 soit 90% ont été causés par les erreurs humaines tandis que 3 soit 10% ont été causés par les conditions de travail. Ces propos corroborent celui de Sékiou, L et al (2001, p.633) qui postulent que les accidents de travail sont causés par les salariés dans une proportion variant de 10% à 90%. À l'instar d'Anne-Marie Feyer et Anne M. Williamson (1981, pp 323-330), « les facteurs humains sont une composante majeure des causes des accidents du travail à 90%.

C'est pourquoi l'entreprise MMG/Kinsevere investit beaucoup des moyens (financiers et matériels) pour la formation de son personnel.

### **Les éléments constitutifs de la culture de la sécurité du travail**

A ce niveau, nous mettons en évidence les règles et valeurs qui constituent la culture de la sécurité du travail de MMG/Kinsevere.

Le tableau ci-dessous nous livre ces informations.

**Tableau 1 : règles et valeurs constitutives de la culture de la sécurité de MMG/Kinsevere**

<b>Les valeurs de MMG/Kinsevere</b>
<ul style="list-style-type: none"><li>- S'arrêter et réfléchir ;</li><li>- Etre un champion dans les principes de prévention contre les accidents de travail ;</li><li>- S'assurer toujours que les travailleurs sont aptes à travailler ;</li><li>- Arrêter les comportements dangereux pour les travailleurs, la communauté et l'environnement ;</li><li>- Le travailleur doit assurer sa propre sécurité, ainsi que celle des autres agents en signalant les dangers pouvant conduire aux blessures, maladies, accidents et incidents en encourageant les autres à faire de même ;</li></ul>

- Utiliser toujours l'équipement de protection approprié à la tâche que les agents effectuent ;
- Commencer toutes les réunions avec les questions de sécurité ;
- Être conscient des procédures d'urgence sanitaires et sécuritaires dans le milieu de travail ;
- S'assurer d'avoir le permis, certificat de compétence et autorisation nécessaires pour faire le travail en toute sécurité.

Source : service de MMG/Kinsevere (2015)

L'entreprise MMG/Kinsevere jure sur le respect de ses engagements et agit toujours en accord avec ses valeurs, et ce respect peut être compris dans les points suivants :

- Embrasser la diversité et traiter chacun avec dignité, respect équité ;
- Adhérer et prouver notre code de conduite ;
- S'exprimer clairement, ouvertement et honnêtement ;
- Honorer les engagements en faisant ce que l'on a permis de faire ;
- Utiliser les biens de MMG et les informations aux fins de travail ;
- Comprendre les responsabilités vis-à-vis de l'environnement et chercher des occasions pour améliorer la performance environnementale ;
- Écouter d'abord les autres et reconnaître leur point de vue ;
- Chercher à comprendre et à apprécier les différences culturelles ;
- Impliquer les parties prenantes (intervenant) en comprenant leurs besoins, développer et maintenir des relations productives ;
- Être prêt à recevoir aussi bien les bonnes que les mauvaises nouvelles ;
- Être flexible lorsqu'on travaille dans un environnement différent, et surtout de ne jamais remettre en cause les valeurs de l'entreprise.

### **Réactivité des employés face à la culture de la sécurité du travail à MMG/Kinsevere**

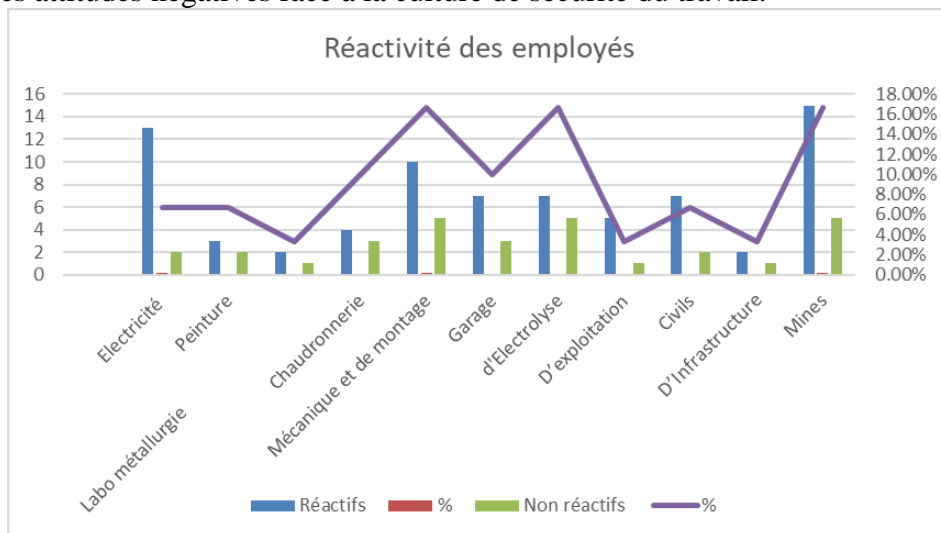
**Tableau :** Réactivité des employés face à la culture de la sécurité du travail

Opinions Ateliers Et Départements	Réactifs	Non réactifs
<b>Electricité</b>	13	2
<b>Peinture</b>	3	2
<b>Labo métallurgie</b>	2	1
<b>Chaudronnerie</b>	4	3
<b>Mécanique et de montage</b>	10	5
<b>Garage</b>	7	3
<b>d'Electrolyse</b>	7	5
<b>D'exploitation</b>	5	1
<b>Civils</b>	7	2
<b>D'Infrastructure</b>	2	1

<b>Mines</b>	15	5
<b>Total</b>	75	30

Eu égard à ce tableau, nous constatons que la plupart d'employés interrogés sont réactifs face à la culture de la sécurité du travail de MMG/Kinsevere.

Avec le  $dl=1$ , le calcul du chi-carré nous donne une valeur calculée  $X^2_{cal}=19,28$  supérieure à la valeur critique égale à 3,84 au seuil .05, ce qui nous amène à rejeter l'hypothèse nulle et à conclure qu'il y a une différence significative entre les employés réactifs, et ceux qui ne sont pas réactifs face à la culture de la sécurité du travail de MMG/Kinsevere. Les employés non-réactifs préfèrent travailler en faisant les raccourcis qui sont considérés comme des attitudes négatives face à la culture de sécurité du travail.



En analysant les données de ce tableau, nous avons trouvé que la valeur de la moyenne générale des enquêtés réactifs à la culture de sécurité au travail est de 6,81 avec l'écart-type de 4,12, et celle des enquêtés non-réactifs est de 2,72 avec l'écart-type de 1,54. Cela nous indique que les enquêtés réactifs sont plus étalés que les non réactifs.

### Les résultats

Nous interprétons les résultats de notre étude sur la réactivité des employés face à la culture de la sécurité du travail dans l'entreprise MMG/Kinsevere, pour leur donner le sens.

Les résultats de notre recherche montrent que 90% des accidents de travail à MMG/Kinsevere relèvent des erreurs humaines. C'est pourquoi l'entreprise investit énormément de l'homme.



## **En ce qui concerne les règles et valeurs (éléments) de la culture de la sécurité de MMG/Kinsevere**

Nous avons trouvé qu'à MMG/Kinsevere, les règles et valeurs qui constituent la culture de la sécurité sont les suivantes :

- **S'arrêter et réfléchir** : avec cette valeur, l'entreprise MMG/Kinsevere veut montrer à ses employés qu'aucune tâche n'est si importante au point de négliger la sécurité du travail, d'où l'importance de s'arrêter et réfléchir. A ce propos la compagnie (Dupont 1999) souligne que l'acronyme stop se base sur le cycle d'observations qui comprend cinq étapes qui sont : décider, arrêter, observer, agir et faire rapport. Le programme Stop correspond aux réactions des employés par rapport à l'équipement de protection individuelle, la méthode de travail, les équipements de travail et la tenue de lieux.
- **Être un champion dans les principes de prévention contre les accidents de travail** : avec cette valeur, MMG/Kinsevere montre à ses employés que les accidents de travail peuvent être réduits.
- **S'assurer toujours que les travailleurs sont aptes à travailler** : pour travailler à MMG/Kinsevere chaque employé doit être apte.
- **Arrêter les comportements dangereux pour les travailleurs, la communauté et l'environnement** : chaque employé doit signaler tout danger susceptible de causer l'accident au service habilité.
- **Le travailleur doit assurer sa propre sécurité**, ainsi que celle des autres agents en signalant les dangers pouvant conduire aux blessures, maladies, accidents et incidents en encourageant les autres à faire de même.
- **Utiliser toujours l'équipement de protection approprié** à la tâche que les agents effectuent.
- **Commencer toutes les réunions avec les questions de sécurité** : c'est pour définir les tâches journalières et attirer l'attention des travailleurs sur la présence des risques et des accidents.
- **Etre conscient des procédures d'urgence sanitaires et sécuritaires dans le milieu de travail** : c'est pour rendre l'environnement du travail propre.

**S'assurer d'avoir le permis, certificat de compétence et autorisation nécessaires pour faire le travail en toute sécurité** : à MMG/Kinsevere pour travailler, les employés doivent être qualifiés, et la qualification s'obtient par la formation dont la validité est de 3 mois, 6 mois et 9 mois. Ensuite, quand il faut effectuer une tâche, il est demandé aux travailleurs de faire l'analyse de danger de travail (ADT) pour découvrir les risques, afin de choisir l'équipement approprié. L'analyse de danger sera déposée en suite au bureau

de livraison de permis de service, où le permis dont le modèle est en annexe leur sera livré pour travailler en toute sécurité.

### **Pour la réactivité des employés face à la culture de la sécurité du travail**

Les résultats montrent que les employés de MMG/Kinsevere sont réactifs à 71,42% à la culture de la sécurité du travail, grâce à l'intériorisation des éléments constitutifs de la culture de la sécurité du travail en passant par la formation régulière en santé et sécurité du travail, et en observant l'acronyme s'arrêter et réfléchir. Par contre, certains employés affichent la non-réactivité à 33,33% par le fait qu'ils s'illustrent dans le raccourci au travail et ils attachent leur protection au travail à des croyances.

Nous trouvons que la réactivité des employés de MMG/Kinsevere réside effectivement dans la formation et dans l'acronyme ou programme de s'arrêter et réfléchir, ainsi que dans l'intériorisation de toutes les mesures de sécurité au travail.

Les employés de MMG/Kinsevere avant d'effectuer une tâche prennent la décision de faire une observation, s'arrêtent pour s'attarder à ce qu'ils ont à faire, puis observent en fonction des cinq thèmes :

- les réactions des employés,
- les équipements de protection individuels,
- la méthode de travail,
- les équipements de travail et ;
- la tenue des lieux, ainsi que l'analyse de dangers de travail.

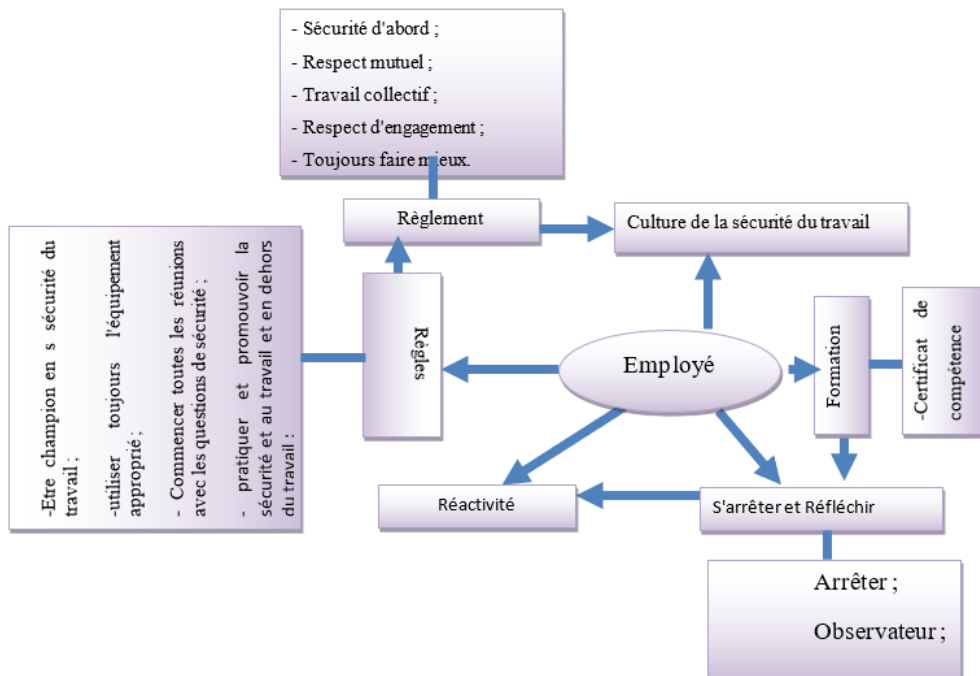
**Tableau : d'analyse Swot**

<b>Atouts de MMG/Kinsevere (Forces)</b>	<b>Faiblesses</b>
L'entreprise MMG/Kinsevere présente des forces en ce qui concerne la promotion des éléments suivants : <ul style="list-style-type: none"> <li>- Sécurité d'abord : l'importance accordée à la sécurité de l'homme du travail ;</li> <li>- Respect mutuel : l'égalité raciale et considération de la dignité humaine ;</li> <li>- Travail collectif : les employés doivent agir toujours de manière à contribuer à la réussite de l'entreprise (<b>Actions</b>) ;</li> <li>- Respect d'engagement : l'entreprise jure sur le respect de ses engagements et agit toujours en accord avec ses valeurs avec ses valeurs (<b>Intégrité</b>) ;</li> <li>- Toujours faire mieux : L'entreprise réalise ses objectifs à travers la planification et l'innovation (<b>Résultats</b>) ;</li> <li>- l'organisation régulière de la <b>formation</b> en santé et sécurité du travail.</li> </ul>	Toutefois, l'entreprise accuse des faiblesses en ce qui concerne : <ul style="list-style-type: none"> <li>- La répression de comportement de raccourcis au travail ;</li> <li>- La paie de la prime quand l'entreprise réalise 180 jours sans enregistrer l'accident de travail ;</li> <li>- L'intolérance de duplicité de langage.</li> </ul>

Opportunités	Menaces
<p>L'entreprise présente des opportunités en ce qui concerne :</p> <ul style="list-style-type: none"> <li>- La protection des employés même à leurs domiciles, c'est-à-dire quand un agent est attaqué par les voleurs la nuit chez à la maison, il peut faire appel à l'entreprise, et celle-ci l'assiste en faisant intervenir la police d'urgence ;</li> <li>- Le voyage dans tous les pays du monde pour la formation professionnelle selon le besoin de l'entreprise ;</li> <li>- L'apprentissage de la langue anglaise sur le site ;</li> <li>- Rendre tout travailleur un bon chauffeur, en le formant sur le site ;</li> <li>- Rendre les employés disciplinés.</li> </ul>	<p>L'entreprise MMG/Kinsevere court les risques de basculer vers les problèmes de sécurité du travail, si elle n'améliore les points suivants :</p> <ul style="list-style-type: none"> <li>- Considérer le raccourcis et la croyance aux pratiques ancestrales au travail comme des attitudes négatives face à la culture de la sécurité du travail qu'il faut changer;</li> <li>- Arrêter de primer les employés lors qu'ils réalisent 180 jours sans enregistrer l'accident de travail. Car les employés peuvent commencer à dissimiler les cas d'accidents pour avoir la prime ;</li> <li>- Le refus strict de blâmer les employés au travail ;</li> <li>- La liberté des employés à demander rendre à la maison quand ils ne se sentent bien pour travailler.</li> </ul>

Source : nous-mêmes

### Notre modèle contributif de la réactivité des employés face à la culture de la sécurité du travail



Source : l'auteur

Ce schéma montre comment les employés peuvent devenir réactifs face à la culture de la sécurité du travail En se référant aux éléments suivants :

- Pour travailler, l'employé doit connaître les **règles** de la sécurité du travail, c'est pourquoi avant de travailler, il doit s'imprégner de la politique de l'entreprise sur la sécurité du travail, l'utilisation de l'équipement du travail, la tenue des réunions de sécurité et la pratique et la promotion de la sécurité au travail ;
- L'ensemble de règles forme **la norme de sécurité du travail** ;
- Quand cette norme de sécurité du travail est intériorisée par les employés, elle devient **une culture de sécurité du travail** ;
- Pour travailler, les employés doivent être **formés** pour avoir de la compétence afin de travailler en toute sécurité ;
- Avant d'effectuer une tâche, les employés doivent **s'arrêter et réfléchir**, pour observer et voir quels sont les risques afin d'envisager l'équipement approprié, décider de la démarche à suivre pour travailler en toute sécurité, et agir avec toute responsabilité ;
- Quand les employés sont formés en sécurité du travail et observent le programme de s'arrêter et réfléchir, ils respectent les règles du travail, la norme du travail et intériorisent la culture de la sécurité du travail, et par conséquent ils deviennent **réactifs** face à cette culture de la sécurité du travail.

## Conclusion

Notre étude a porté sur la réactivité des employés face à la culture de la sécurité au travail à MMG/Kinsevere.

Les objectifs étaient de décrire les éléments constitutifs de la culture de sécurité du travail intégrées par les employés de MMG/Kinsevere et d'analyser la réactivité des employés face à la culture de la sécurité du travail.

Pour atteindre ces objectifs, nous avons recouru aux méthodes d'enquête et descriptive, appuyées par les techniques documentaire, le questionnaire, l'analyse de contenu et de la technique.

Après notre investigation, il convient d'affirmer ce qui suit :

- ***Les règles et valeurs qui constituent la culture de la sécurité sont les suivantes :***
  - S'arrêter et réfléchir ;
  - Être un champion dans les principes de prévention contre les accidents de travail ;
  - S'assurer toujours que les travailleurs sont aptes à travailler ;
  - Arrêter les comportements dangereux pour les travailleurs, la communauté et l'environnement;

- Le travailleur doit assurer sa propre sécurité ;
- Utiliser toujours l'équipement de protection approprié ;
- Commencer toutes les réunions avec les questions de sécurité ;
- Être conscient des procédures d'urgence sanitaires et sécuritaires dans le milieu de travail ;
- S'assurer d'avoir le permis, certificat de compétence et autorisation nécessaires pour faire le travail en toute sécurité.

Les employés face à la culture de la sécurité du travail de MMG/Kinsevere sont réactifs à 71,42% grâce à l'intériorisation des éléments constitutifs de la culture de la sécurité du travail grâce à la formation régulière en santé et sécurité du travail et l'acronyme s'arrêter et réfléchir. Par contre, certains employés affichent la non-réactivité à 33,33% par le fait qu'ils illustrent dans le raccourci au travail et ils attachent leur protection au travail à des croyances.

Ces résultats confirment intégralement notre première hypothèse, tandis qu'ils confirment à 71,42% la deuxième hypothèse. Cette recherche a révélé l'importance de faire de la sécurité au travail une culture, grâce à l'intériorisation de ses pratiques par les employés. Il est important de développer la culture de sécurité, car elle permet de maîtriser les risques les plus importants liés à l'activité d'une organisation. La culture de sécurité ne se décrète pas, mais se construit et s'éprouve au quotidien dans les discours et les actes.

**Conflit d'intérêts :** Les auteurs n'ont signalé aucun conflit d'intérêts.

**Disponibilité des données :** Toutes les données sont incluses dans le contenu de l'article.

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## **Les déterminants de la divulgation des informations RSE : une comparaison entre les pays développés et les pays en développement à travers une revue de littérature empirique**

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### **Résumé**

Le présent article procède à un examen approfondi des facteurs déterminants de la divulgation de la Responsabilité Sociale des Entreprises (DRSE) dans les pays développés et en de développement, en s'appuyant sur une analyse de 89 articles de recherche empiriques. Nous avons effectué des recherches méthodiques dans diverses bases de données, telles que SCOPUS, EBSCOhost, Web of Science, Science Direct, Wiley Online Library et Google Scholar, en utilisant une série de mots-clés. Par conséquent, notre recherche s'est limitée aux études empiriques publiées en anglais et a exclu les livres, les chapitres de livres et les actes de conférences..L'étude révèle que les caractéristiques de l'entreprise, notamment la taille, le secteur d'activités, la performance financière et les mécanismes de gouvernance d'entreprise ; jouent un rôle important dans la détermination de la DRSE. Dans les pays développés, les préoccupations des principales parties prenantes telles que les régulateurs, les actionnaires, les créanciers, les investisseurs, les écologistes et les médias sont considérés comme très déterminantes pour influencer les pratiques de divulgation d'informations sur la RSE. À l'inverse, dans les pays en développement, la DRSE est principalement motivée par des parties



prenantes telles que les acheteurs internationaux, les investisseurs étrangers, les médias internationaux et les organismes de réglementation internationaux. De plus, contrairement à leurs homologues des pays développés, les entreprises des pays en développement perçoivent relativement peu de pression de la part du public pour divulguer des informations en matière de RSE.

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**Mots-clés:** Déterminant de la divulgation RSE, pays en développement, pays développés, revue de littérature empirique, RSE

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## **The determinants of CSR disclosure: a comparison between developed and developing countries through a review of the empirical literature**

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### **Abstract**

This article provides an in-depth examination of the determinants of corporate social responsibility disclosure (CSR) in developed and developing countries, based on an analysis of 89 empirical research articles. We conducted systematic searches of various databases, such as SCOPUS, EBSCOhost, Web of Science, Science Direct, Wiley Online Library and Google Scholar, using a series of keywords. Consequently, our search was limited to empirical studies published in English and excluded books, book chapters and conference proceedings. The study reveals that company characteristics, including size, industry sector, financial performance and corporate governance mechanisms, play an important role in determining of CSR disclosure. In developed countries, the concerns of key stakeholders such as regulators, shareholders, creditors, investors, environmentalists and the media are considered to be very important in influencing CSR disclosure practices. Conversely, in developing countries, CSR is primarily driven by stakeholders such as international buyers, foreign investors, the international media and international regulators. In addition, unlike their counterparts in developed countries, companies in developing countries perceive relatively little public pressure to disclose CSR information.

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**Keywords:** CSR disclosure, developing countries, developed countries, literature review, CSR

## **Introduction**

De nos jours, la question du développement durable est récurrente et pertinente pour la société (Burritt & Schaltegger, 2010), et par conséquent, elle fait de plus en plus partie des décisions de gestion (Elena Windolph et al., 2014), des pratiques comptables (Gray, 2010; Schaltegger & Burritt, 2006) et des pratiques de communication (Guidry & Patten, 2010; Herzig & Schaltegger, 2006), tant dans les pays développés que dans les pays en développement (Elleuch Hamza & Ben Ahmed Hadrich, 2009). La réponse des entreprises à cette question est concrétisée par plusieurs pratiques qui rentrent dans ce qu'on l'appelle la responsabilité sociétale des entreprises (RSE).

La RSE est un ensemble des activités avec lesquelles les entreprises gèrent leur relation entre les opérations commerciales, l'économie et l'environnement. Comme le mentionnent Akanfe, Michael et Bose (2017), la RSE est essentiellement définie comme l'intégration des préoccupations sociales et environnementales dans les opérations commerciales, y compris leur interaction avec les parties prenantes telles que les consommateurs, les investisseurs, les fournisseurs, les actionnaires créanciers, les employés, les organisations non gouvernementales (ONG) et les autorités publiques.

La RSE implique l'idée que les entreprises ont l'obligation non seulement de générer des profits, mais aussi d'agir dans l'intérêt de la société et de l'environnement. Les activités liées à la RSE contribuent à répondre à la demande des parties prenantes en aidant les entreprises à avoir un meilleur impact économique, à être reconnues par le public et à s'identifier davantage (Azman et Mustapha, 2018). En s'engageant dans des pratiques socialement responsables, telles que l'adoption de pratiques commerciales durables et éthiques, les entreprises peuvent démontrer leur engagement à créer un impact social et environnemental positif, ce qui peut améliorer leur réputation et accroître la loyauté des parties prenantes.

L'émergence de nouveaux marchés et d'acteurs diversifiés, au-delà des simples acteurs financiers, requiert des informations inédites sur la responsabilité sociétale des entreprises (Ali et al., 2022). Désormais, les entreprises doivent justifier de leur engagement éthique, social et environnemental, tout en développant de nouveaux outils pour évaluer leur performance dans ces domaines. Cette nécessité de justification ou de rendre compte des pratiques RSE, donne naissance à un nouveau concept qui est la divulgation RSE (Ali et al., 2022).

La DRSE fait référence à la pratique consistant à divulguer aux parties prenantes des informations sur les activités et les performances d'une entreprise en matière de RSE. Il peut s'agir d'informations sur l'impact environnemental de l'entreprise, ses initiatives sociales, ses pratiques commerciales éthiques et ses politiques de gouvernance. En divulguant ces informations, les entreprises peuvent démontrer leur engagement en faveur de la durabilité et de la transparence et permettre aux parties prenantes d'évaluer leurs performances, notamment sociales, par rapport à d'autres entreprises de la même industrie ou du même secteur (Wedari & Shafadila, 2022).

La pratique de la divulgation des activités RSE se fait généralement à travers les rapports annuels ou les rapports sur le développement durable. Elle est considérée comme une stratégie permettant de répondre aux inquiétudes sociales des consommateurs, de construire une bonne image de l'entreprise et de développer des relations favorables avec les parties prenantes. Toutefois, si une entreprise jouit d'une mauvaise réputation en raison d'actions ou de pratiques passées qui ne sont pas conformes aux principes de la RSE, la divulgation de ses activités de RSE peut être considérée avec scepticisme par les parties prenantes. Dans ce cas, l'entreprise peut utiliser la divulgation des activités de RSE comme moyen d'améliorer sa réputation et de regagner la confiance des parties prenantes. Pour ce faire, elle peut mettre en avant ses initiatives en matière de RSE et les efforts qu'elle déploie pour résoudre des problèmes ou des préoccupations antérieures (Ali, 2023).

La divulgation d'informations liées à la responsabilité sociétale a suscité une attention considérable de la part de la communauté des chercheurs. Les recherches sur la divulgation RSE remontent à la fin des années 1970 (Fifka, 2013), notamment avec le travail de (Wiseman, 1982). Toutefois, l'intérêt de la communauté des chercheurs pour la divulgation d'informations s'est considérablement accru à partir de la fin des années 1980 (Belkaoui & Karpik, 1989; Deegan & Gordon, 1996; Gray et al., 1995; Guthrie & Parker, 1989; Hackston & Milne, 1996; Neu et al., 1998; Patten, 1991; Roberts, 1992), avec d'importantes contributions publiées au cours des quatre dernières décennies (Bollas-Araya et al., 2019; Chen et al., 2023; Garcia-Torea et al., 2017; Morhardt et al., 2002; Ortas et al., 2015; Palmer & Van Der Vorst, 1997; Sierra-García et al., 2015). Des méta-analyses et des revues systématiques regroupant les résultats de plusieurs études empiriques ont aussi été développées (Dienes et al., 2016; Fifka, 2013; Gray et al., 1995; Mathews, 1997; Parker, 2014; Parker, 2011; Zamil et al., 2023).

Cet article a pour objectif d'identifier les facteurs déterminants de la divulgation de la RSE dans les pays développés et en développement en examinant la littérature de recherche existante. Étant donné que nous nous intéressons à la divulgation effective plutôt qu'hypothétique, notre étude s'est basée uniquement sur les articles empiriques (plutôt que théoriques). De ce

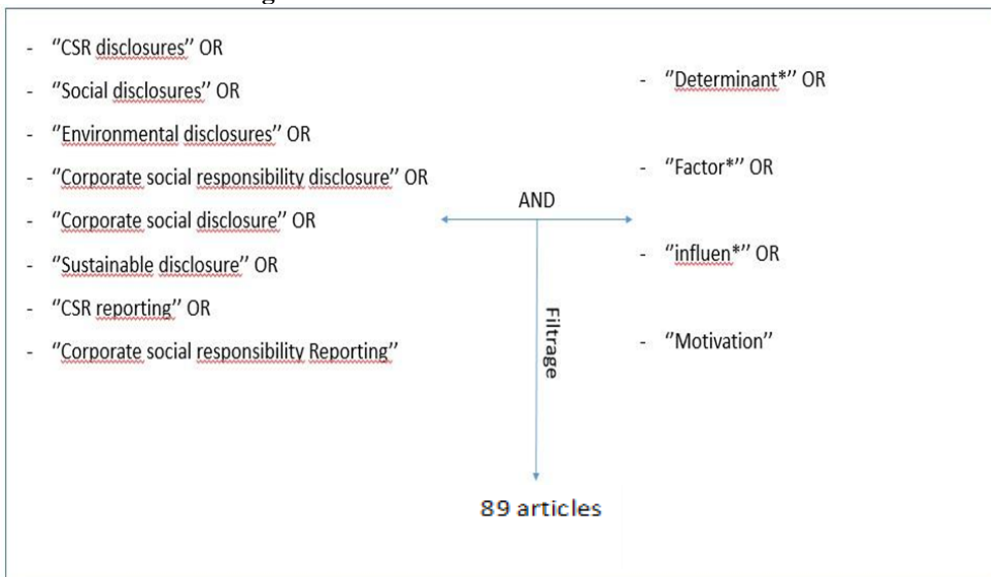
fait, notre recherche s'est concentrée sur une analyse approfondie de 89 articles de recherches empiriques examinant les déterminants de la divulgation de la RSE.

La section suivante aborde la méthodologie suivie pour la recherche. La section principale présente les résultats de la revue la littérature sur la divulgation de la RSE. La dernière section présente une conclusion de notre travail.

## Méthodologie

Pour identifier les articles de recherche pertinents sur les déterminants des divulgations de RSE publiés dans des revues académiques, nous avons effectué des recherches systématiques dans différentes bases de données, notamment SCOPUS, EBSCO host, Web of Science, Science Direct, Wiley Online Library, et Google Scholar en utilisant différents mots-clés, afin de créer une base de données pour l'analyse de la littérature. Ainsi les mots-clés utilisés et le nombre d'articles consultés sont énumérés dans la figure 1 ci-dessous.

**Figure 1** : Processus de recherche documentaire



Source : élaboré par nos propres soins

Notons que notre recherche s'est limitée aux travaux empiriques publiés en langue anglaise, et a exclu les livres, les chapitres de livres, et les actes de conférences. L'échantillon final des articles est retenu sur la base d'une lecture approfondie des résumés et du texte intégral auxquels nous avons accès. Par conséquent, seules les études sur les déterminants ont été prises en compte.

Différents cadres de classification ont été utilisés dans les revues de littérature antérieures pour catégoriser et synthétiser les différentes études empiriques réalisées. Par exemple, Gray et al (1995) ont structuré la littérature en fonction (1) des domaines de divulgation et (2) du volume de divulgation. Mathews (1997) a proposé une catégorisation chronologique pour structurer la littérature existante sur la divulgation de la RSE. Belal et Momin (2009) ont classé les études sur la divulgation de la RSE en trois groupes : (1) l'étendue et le niveau de la divulgation de la RSE et leurs déterminants, (2) les études sur les perceptions des managers et (3) les études sur les perceptions des autres parties prenantes. Dans la même veine, Adams (2002) a examiné les articles sur les déterminants de la divulgation en matière de RSE et les a regroupés en trois catégories : (1) les caractéristiques de l'entreprise, (2) les facteurs contextuels généraux et (3) les facteurs contextuels internes. Pour notre recherche, nous utiliserons le cadre de classification d'Adams (2002) comme guide pour notre recherche.

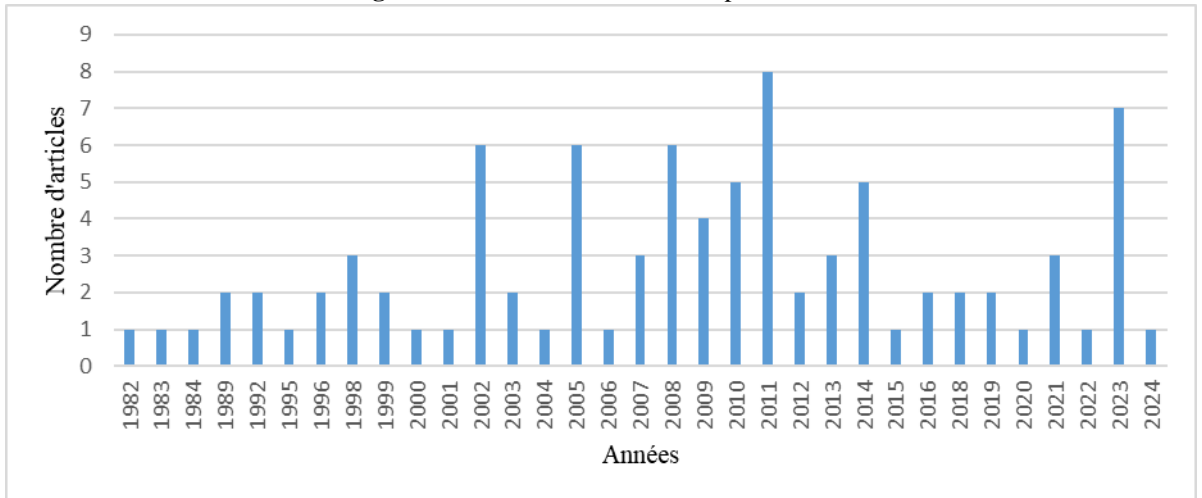
Pour mieux structurer notre recherche et relever les disparités dans les motivations de divulgation, nous avons, dans un premier temps, classé les études en deux catégories : les études axées sur les pays développés (avec un PIB par habitant supérieur à 12 276 dollars) et celles axées sur les pays en développement (Banque mondiale, 2023). Dans un deuxième temps, nous avons classé les articles par nature de déterminants (caractéristiques de l'entreprise, facteurs externes, et internes).

## **Résultats et discussions**

### **Tendance annuelle des publications**

Comme le montre la figure 2 ci-dessous, le premier article sur la divulgation d'informations RSE dans les rapports annuels a été publié en 1982. En outre, le nombre de publications sur le sujet principal n'a cessé d'augmenter. Parmi les études incluses dans notre échantillon final, la majorité des études ont été publiées au cours des deux dernières décennies (2001-2023). Nous avons également constaté une augmentation récente, puisqu'un nombre considérable des études de l'échantillon ont été publiées en 2023, chose qui nous indique les débats actuels et les préoccupations de la communauté des chercheurs sur le sujet, ainsi que les pistes de recherches futures intéressantes.

**Figure 2 : Tendances annuelles des publications**



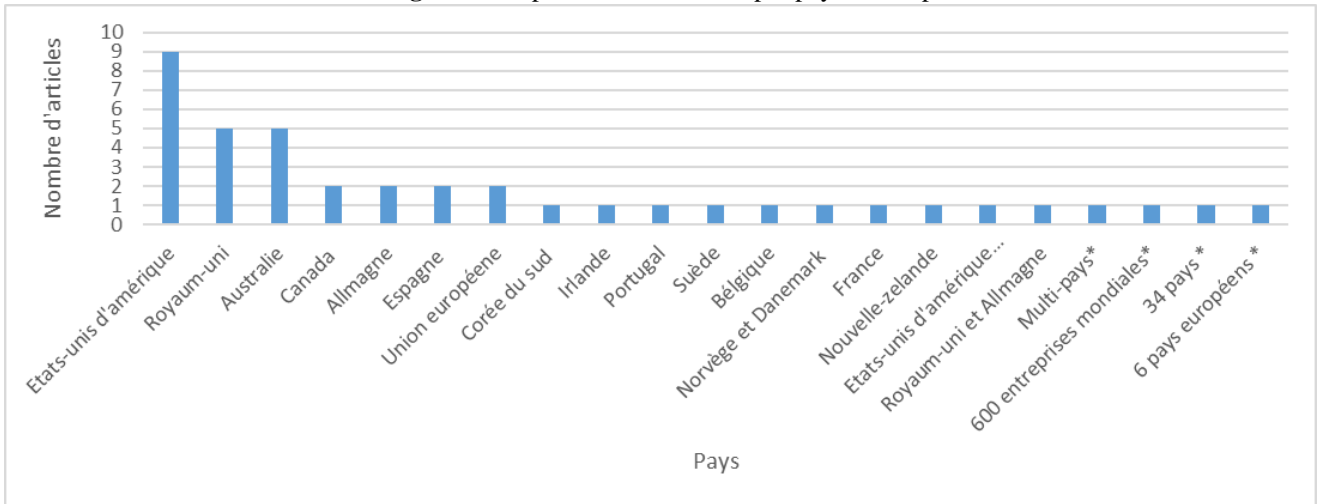
Source : élaborée par nos propres soins

### Répartition géographique des publications

En ce qui concerne le cadre des études, il est très important de faire la distinction entre les pays développés et les pays en développement. Cette distinction est en mesure de donner des indications intéressantes sur les résultats de l'étude. D'un point de vue qualitatif, elle peut nous aider à montrer comment les principales caractéristiques des études empiriques diffèrent entre les études menées dans les pays en développement et celles menées dans les pays développés. Notre étude passe en examen 89 articles empiriques traitant exclusivement les déterminants de la divulgation RSE. Parmi ces études nous identifions 41 articles dans les pays développés et 48 dans les pays en développement.

La figure 3 ci-dessous nous indique que sur 41 articles sélectionnés la majorité des recherches sur la divulgation de la responsabilité sociale des entreprises dans les pays développés se sont principalement concentrées sur l'Amérique du Nord (en particulier le Canada et les États-Unis), l'Australie et l'Europe du Nord-Ouest (y compris le Royaume-Uni, le Danemark et la Finlande). Cependant, l'accent a été relativement moins mis sur l'Europe du Sud (en particulier l'Italie) et l'Europe de l'Est (y compris la Pologne et la Slovaquie). Ce constat concorde avec les conclusions de la méta-analyse de Fifka (2013).

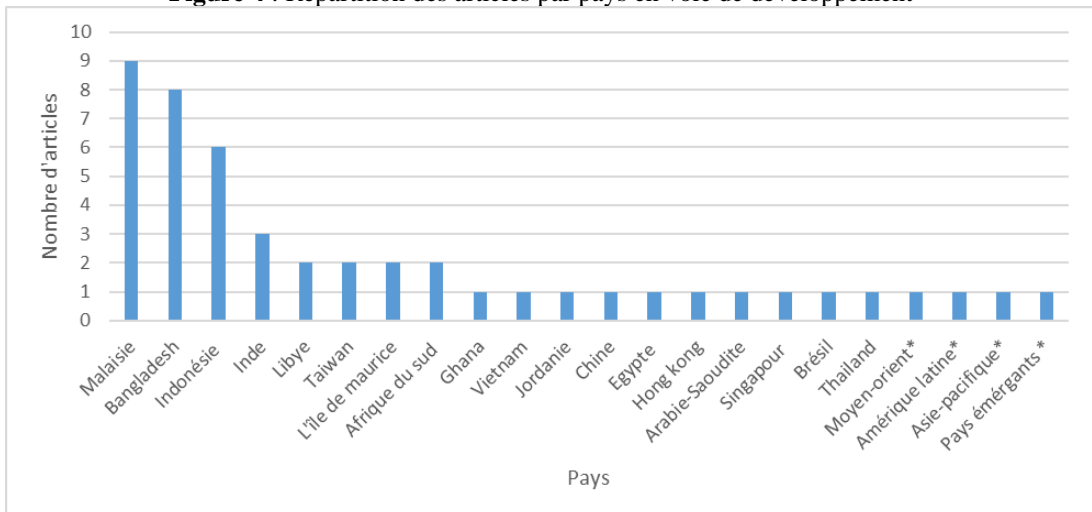
**Figure 3** : Répartition des articles par pays dévelöp



Source : élaborée par nos propres soins

Quant aux pays en développement présentés dans la figure 4, les travaux sur la divulgation de la RSE ces pays se sont principalement concentrés sur quelques économies émergentes, comme la Malaisie, Singapour, l'Afrique du Sud et la Chine. Cela corrobore avec les résultats d'études antérieures explorées dans la littérature (Fifka, 2013; Rahman Belal & Momin, 2009 ; Ali et al 2017).

**Figure 4** : Répartition des articles par pays en voie de développement<sup>1\*</sup>



Source : élaborée par nos propres soins

<sup>1\*</sup> Moyen orient : Arabie saoudite, Qatar, Koweït, Émirats arabes unis, Bahreïn, Syrie, Oman, Égypte, Jordanie ; Amérique latine : Australie, Malaisie, Singapour, Indonésie, Hong Kong, Thaïlande, Philippines ; Pays émergents : Chili, Brésil, Chine, Indonésie, Inde, Thaïlande, Mexique, Afrique du Sud.

## Les caractéristiques de l'entreprise

Les facteurs propres à l'entreprise sont parmi les déterminants les plus examinés dans la littérature. Ces facteurs comprennent la taille, le secteur d'activité, et la performance financière. Le tableau 1 ci-dessous présente les caractéristiques des entreprises identifiées dans notre échantillon de littérature pour déterminer la divulgation d'informations RSE.

**Tableau 1** : Synthèse des caractéristiques de l'entreprise identifiées

Caractéristiques de l'entreprise						
Déterminants de la DRSE	Pays développés			Pays en développement		
	+	-	0	+	-	0
Taille	21	0	0	16	0	1
Secteur	14	0	0	16	0	1
Âge	1	0	0	2	0	1
Performance financière	4	0	2	6	0	4
Performance sociétale	1	0	1	0	0	0
Risque systématique	3	1	0	0	0	0
Cotation	2	0	0	3	0	0

Source : élaborée par nos propres soins

L'analyse des caractéristiques de l'entreprise, nous montre que le facteur le plus étudié est la taille de l'entreprise, 21 études menées dans des pays développés et 16 dans des pays en développement l'identifiant comme un déterminant positif de la divulgation de la RSE. Ces résultats révèlent un consensus significatif sur le fait que la taille de l'entreprise joue un rôle essentiel dans l'influence de la divulgation de la RSE dans les deux environnements (Bollas-Araya et al., 2019; Brammer & Pavelin, 2008; Chih et al., 2010; Hou & Reber, 2011; Reverte, 2009 ; Ahmed Haji, 2013; Ali, 2023a; Buniamin, 2010; Gaol & Harjanto, 2019a; Kansal et al., 2014; Le et al., 2023; Solikhah, 2016; Tagesson et al., 2009; Wedari & Shafadila, 2022) . Les grandes entreprises disposent de plus de ressources à allouer aux initiatives de RSE et sont souvent confrontées à une pression accrue des parties prenantes pour maintenir la transparence concernant leurs pratiques. Le nombre substantiel d'études dans chaque contexte souligne l'importance accrue de la taille dans l'évaluation de la RSE.

Comme deuxième facteur étudié, nous trouvons le secteur d'activités qui est un autre facteur fréquemment étudié dans notre échantillon de littérature, avec 14 études dans les pays développés et 16 dans les pays en développement (Bollas-Araya et al., 2019; Brammer&Pavelin, 2008; Cormier et al., 2005; Hou & Reber, 2011; Reverte, 2009; Tagesson et al., 2009 ; Amran & Susela Devi, 2008a; Buniamin, 2010; De Souza Gonçalves et al., 2014; Gao et al., 2005; Haniffa & Cooke, 2005; Huang & Kung, 2010; Kansal et al., 2014; Le et al., 2023; Suárez-Rico et al., 2018 ). Cela reflète l'importance du



secteur industriel dans la définition des priorités et des pratiques de la DRSE. Les entreprises opérant dans des secteurs à fort impact environnemental ou social, comme l'extraction de ressources naturelles ou l'industrie lourde, sont souvent soumises à plus de pression pour divulguer leurs actions en matière de RSE. L'équilibre entre le nombre d'études dans les deux contextes suggère que ce facteur est pertinent à la fois dans les économies développées et en développement.

Un autre déterminant fréquemment examiné dans la littérature est la performance financière de l'entreprise qui représente des résultats non concluants en terme de sa relation avec la DRSE. La performance financière est étudiée dans, indiquant que ce facteur est considéré comme un déterminant de la DRSE dans les deux contextes. Certaines études ont trouvé une relation positive significative (Cormier & Magnan, 1999; Patten, 1991; Tagesson et al., 2009 ; Chih et al., 2010 ; Haniffa & Cooke, 2005; Khan, 2010; Mandagie et al., 2024; Tagesson et al., 2009 ; Gaol & Harjanto, 2019 ), tandis que d'autres n'ont trouvé aucune relation significative ou une relation négative ( Hackston & Milne, 1996; Patten, 1991 ; Da Silva Monteiro & Aibar-Guzmán, 2010; Le et al., 2023; Mahadeo et al., 2011; Wedari & Shafadila, 2022).

Dans les deux contextes étudiés, les études qui ont prouvé une relation positive entre la performance financière et la DRSE stipulent que les entreprises qui affichent de bonnes performances financières ont tendance à être plus enclines à partager des informations sur leurs efforts en matière de DRSE. Cette tendance pourrait provenir du fait que les entreprises financièrement solides disposent de ressources supplémentaires à allouer aux initiatives de RSE et à améliorer leur reporting RSE.

En outre, ces entreprises sont plus susceptibles de considérer la DRSE comme une stratégie pour renforcer leur réputation, attirer des investisseurs socialement responsables et différencier leurs produits ou services sur le marché. Cette corrélation positive semble être un peu plus forte dans les pays en développement, où l'on compte 6 études positives contre 4 dans les pays développés. Cela peut indiquer que, dans ces environnements, les entreprises considèrent la RSE comme un outil essentiel pour attirer les investissements étrangers ou accéder à des marchés qui exigent des normes de durabilité plus élevées.

Tandis que d'autres études n'ont trouvé aucune relation entre la DRSE et la performance financière de l'entreprise, cela pourrait suggérer que, dans certains cas, la divulgation de la RSE n'est pas intrinsèquement liée aux résultats financiers, mais est influencée par d'autres éléments tels que les exigences réglementaires, les attentes des parties prenantes ou la culture de l'entreprise ( Ali et al., 2022). Par exemple, dans les pays développés, les entreprises peuvent être obligées de révéler des informations sur la RSE en raison de réglementations strictes, quelle que soit leur santé financière

(Alshbili, 2021). À l'inverse, dans les pays en développement, certaines entreprises peuvent mener des initiatives de RSE pour des raisons stratégiques ou de réputation, même si ces actions n'ont pas de corrélation directe avec leurs résultats financiers.

Outre les trois caractéristiques de l'entreprise les plus détectées dans la littérature, d'autres facteurs déterminants comme l'âge de l'entreprise reste un sujet qui n'a pas reçu beaucoup d'attention, comme en témoignent une seule étude menée dans les pays développés et deux dans les pays en développement (Cormier et al., 2005 ; Masoud & Vij, 2021 ; Le et al., 2023). Cela indique que l'âge de l'entreprise n'est généralement pas considéré comme un facteur significatif de la DRSE. Le peu d'intérêt suscité peut provenir du fait que les pratiques de RSE ont tendance à être davantage façonnées par des influences immédiates telles que la taille ou le secteur plutôt que par la maturité de l'entreprise (Le et al., 2023). La rareté des recherches consacrées à cet aspect dans les deux contextes met en évidence son impact considéré comme minime. En plus de l'âge de l'entreprise, nous trouvons aussi le risque systématique. Ce dernier est évoqué dans quatre études, dont trois dans les pays développés (Belkaoui & Karpik, 1989 ; Toms, 2002 ; Cormier et al., 2005) et une étude ayant un impact négatif (Roberts, 1992) avec une absence des études traitants ce déterminant dans les pays en développement, ce qui signifie que le risque économique/la volatilité des marchés est plus fréquemment considéré dans les pays développés comme un facteur déterminant affectant la DRSE. Dans de telles situations, les entreprises peuvent utiliser la divulgation de la RSE pour gérer les incertitudes du marché et signaler la richesse aux parties prenantes concernées. Ainsi, le faible nombre d'études sur ce sujet dans les pays en développement reflète une atmosphère où les préoccupations financières immédiates priment sur la gestion des risques.

Le statut de cotation est étudié dans deux études pour les pays développés (Hackston & Milne, 1996 ; Gamerschlag et al., 2011) et trois pour les pays en développement (De Souza Gonçalves et al., 2014) ; (Haniffa & Cooke, 2005) ; (Da Silva Monteiro & Aibar-Guzmán, 2010) avec un consensus sur la corrélation positive, chose qui montre qu'il s'agit d'un déterminant relativement bien étudié de la DRSE. Les entreprises soumises à la cotation sont tenues de respecter une transparence plus stricte et un contrôle renforcé, ce qui pourrait les inciter à mieux communiquer sur leurs activités de RSE. Le fait même que ce facteur soit pris en compte dans les deux contextes montre que la cotation est un déterminant important de la DRSE à travers le monde, en raison des contraintes réglementaires et des attentes des investisseurs.

Dans l'ensemble, dans les pays en développement comme dans les pays développés, les études se concentrent principalement sur des facteurs

structurels. La taille et le secteur d'activité sont perçus comme des conditions préalables à l'engagement dans la RSE. La relation entre la performance financière et la DRSE reste cependant débattue. Dans les pays en développement, les entreprises adoptent la DRSE en fonction de leur capacité à mobiliser des ressources financières et organisationnelles. La plupart des études montrent un impact positif de la performance financière dans ce contexte.

En revanche, dans les pays développés, la pression institutionnelle et sociétale est plus forte. Les déterminants comme le risque systématique et la performance sociétale y sont davantage étudiés. La DRSE est perçue comme un outil de gestion des risques et de différenciation concurrentielle. Cependant, cette conclusion nécessite encore des études pour être validée.

### Les facteurs externes

Les facteurs externes déterminants de la DRSE identifiés d'après notre échantillon de littérature sont présentés dans le tableau 2 ci-dessous.

**Tableau 2 : Synthèse des facteurs externes identifiés**

Facteurs externes						
Déterminants de la DRSE	Pays développés			Pays en développement		
	+	-	0	+	-	0
<b>Structure de propriété</b>	7	0	0	9	2	4
<b>Pressions des Parties prenantes</b>	9	0	1	6	2	0
<b>Facteurs spécifiques au pays</b>	6	0	0	4	0	0
<b>Réglementation</b>	4	0	0	0	4	0
<b>Endettement</b>	2	1	1	4	1	1
<b>Exposition médiatique</b>	4	1	1	1	0	0
<b>Facteurs macroéconomiques</b>	0	0	0	1	0	0

Source : synthèse élaborée par nos propres soins

Comme un premier déterminant identifié, nous trouvons la structure de propriété. Dans les pays développés, sept études indiquent une corrélation positive entre la structure de propriété et le DRSE (Toms, 2002 ; Cormier et al., 2005 ; Tagesson et al., 2009 ; Gamerschlag et al., 2011 ; Oh et al., 2011 ; Shi et al., 2012 ; Garcia-Torea et al., 2017), et aucune étude n'identifie une relation négative ou neutre. À l'inverse, dans les pays en développement, les résultats sont plus variés : neuf études démontrent une corrélation positive (Saleh et al., 2010 ; Ahmed Haji, 2013 ; A. Khan et al., 2013 ; Rizk et al., 2008 ; Hu et al., 2018 ; P. & K.B., 2021 ; Nugrahani et al., 2023 ; Alkayed & Omar, 2023 ; Kumar et al., 2023), deux révèlent une corrélation négative (A. Khan et al., 2013 ; Nguyen et al., 2021), et quatre ne signalent aucune corrélation (Masoud & Vij, 2021 ; Huang & Kung, 2010 ; Alsaeed, 2006 ; Wedari & Shafadila, 2022). La relation positive concerne principalement la propriété

étrangère, institutionnelle, managériale, et gouvernementale, tandis que la concentration de propriété, et la propriété managériale concerne les relations négatives ou nulles. Ces résultats impliquent que la structure de propriété joue un rôle important dans la détermination du DRSE dans les deux types de pays, même si les pays en développement semblent présenter davantage d'incertitudes ou de complexités.

Un deuxième facteur étudié dans la littérature concerne les pressions exercées par les parties prenantes, ces dernières sont identifiées comme un élément d'influence significatif dans les deux contextes, comme le montre neuf études positives menées dans des pays développés (Belkaoui & Karpik, 1989 ; Guthrie & Parker, 1989 ; Patten, 1991 ; Deegan & Gordon, 1996 ; Adams & Harte, 1998 ; Wilmshurst & Frost, 2000 ; Cormier et al., 2005 ; Nikolaeva & Bicho, 2011 ; Thorne et al., 2014), et 6 dans des pays en développement (Rashid et al., 2020 ; Huang & Kung, 2010 ; Amran & Susela Devi, 2008a ; Nugrahani et al., 2023 ; Rahaman et al., 2004 ; Azizul Islam & Deegan, 2008).

En revanche, deux études menées dans des pays en développement indiquent une corrélation négative (Huang & Kung, 2010) ; Alsaed, 2006), et aucune étude ne suggère l'absence de relation, tandis qu'une seule étude menée dans des pays développés ne fait état d'aucune relation. Cela indique qu'à l'échelle mondiale, les pressions exercées par les parties prenantes sont généralement considérées comme un facteur bénéfique de la DRSE ; cependant, leur impact peut parfois être perçu de manière négative dans les pays en développement, où ces pressions peuvent être plus récentes ou moins clairement articulées. ces préoccupations des parties prenantes dans les pays développés concernent principalement, les régulateurs (Chih et al., 2010; Cormier & Magnan, 1999; Neu et al., 1998; Shi et al., 2012), les actionnaires (Neu et al., 1998; Thorne et al., 2014; Toms, 2002), les créanciers, les fournisseurs et les clients (Oh et al., 2011; Roberts, 1992), les investisseurs (Wilmshurst & Frost, 2000), les écologistes (Deegan & Gordon, 1996; Neu et al., 1998).

Dans les pays en développement, la publication des rapports sur les pratiques RSE est principalement dictée par des forces externes. Il s'agit notamment de parties prenantes puissantes comme les acheteurs internationaux (Azizul Islam & Deegan, 2008; Rahman Belal & Owen, 2007), les investisseurs étrangers (Teoh et Thong, 1984 ; Belal et Owen, 2007 ; Khan et al., 2013 ; Chiu et Wang, 2014) et même les intérêts des médias internationaux (Islam & Deegan, 2008). Ils influencent leurs décisions en fonction des actions des organismes de réglementation internationaux, comme la Banque mondiale. En outre, contrairement aux pays développés, les entreprises des pays en développement perçoivent relativement peu de pression de la part du public en ce qui concerne la divulgation d'informations

sur la RSE (Belal et Owen, 2007 ; Belal et Cooper, 2011 ; Momin et Parker, 2013).

Une autre comparaison concerne l'influence des facteurs propres aux pays sur la DRSE. Notre échantillon montre que la divulgation de la RSE est fortement influencée par des facteurs propres à chaque pays, comme le montrent six études positives dans les pays développés (Gray et al., 1995 ; Adams et al., 1998 ; Adams & Harte, 1998 ; Buhr & Freedman, 2001 ; Van Der Laan Smith et al., 2005 ; Bollas-Araya et al., 2019) et quatre dans les pays en développement (Williams, 1999 ; Haniffa & Cooke, 2005 ; Kamla, 2007 ; Wanderley et al., 2008).

Aucun contexte ne présente de relation négative ou neutre, ce qui indique que les caractéristiques propres à un pays (comme la réglementation locale, les aspects culturels et le paysage économique) ont un impact positif sur la divulgation de la RSE, avec un effet légèrement plus important observé dans les pays développés. Dans le même sens, nous constatons l'influence claire de la réglementation sur la DRSE dans les pays développés, où quatre études indiquent une corrélation positive (Cormier & Magnan, 1999 ; Chih et al., 2010 ; Shi et al., 2012 ; Hąbek & Wolniak, 2015).

À l'inverse, dans les pays en développement, quatre études révèlent une relation négative (De Villiers, 2003 ; Mitchell & Hill, 2009 ; Belal & Cooper, 2011 ; Alshbili et al., 2019), sans qu'aucune étude ne fasse état d'une association positive ou neutre. Cette divergence peut provenir de la croyance selon laquelle les réglementations dans les pays en développement ont tendance à être inadéquates ou mal appliquées, ce qui peut dissuader les entreprises de partager volontairement leurs pratiques en matière de RSE. À l'inverse, des réglementations plus strictes dans les pays développés favorisent une plus grande transparence.

À l'instar de la performance financière, un autre déterminant qui est l'endettement présente des résultats mitigés quant à sa relation avec la DRSE dans les deux contextes. Dans les pays développés, deux études indiquent une corrélation positive (Roberts, 1992 ; Andrikopoulos et al., 2014), tandis qu'une étude a identifié une corrélation négative (Guthrie & Parker, 1989) et une autre n'a révélé aucune corrélation (Reverte, 2009). Cela implique que les entreprises de ces régions peuvent considérer la RSE comme un moyen d'améliorer leur réputation et d'attirer des investisseurs, ou qu'elles peuvent avoir l'impression que l'endettement limite leur capacité à investir dans des initiatives de RSE. À l'inverse, dans les pays en développement, quatre études ont constaté une association positive entre l'endettement et la DRSE (Mahadeo et al., 2011) ; Gaol & Harjanto, 2019 ; P. & K.B., 2021 ; Ali et al, 2023), bien qu'une étude ait indiqué une association négative (Mandagie et al., 2024) et une autre n'ait montré aucune association (Wedari & Shafadila, 2022). L'endettement pourrait motiver certaines entreprises à accroître leur

transparence pour rassurer les créanciers, mais il pourrait également entraver leur capacité à investir dans la RSE, en particulier dans des climats économiques instables.

Un dernier déterminant qui semble avoir une association avec la DRSE, c'est l'exposition médiatique. L'exposition médiatique est un facteur important, comme le montrent quatre études positives (Deegan et al., 2002 ; Reverte, 2009 ; Nikolaeva & Bicho, 2011 ; Branco & Rodrigues, 2008) et une étude négative (Adams & Harte, 1998). Cela souligne le rôle majeur de la couverture médiatique dans ces régions, où les entreprises sont soumises à un examen minutieux et incessant de la part de la presse, ce qui les incite à révéler leurs pratiques de RSE pour préserver leur réputation. Par conséquent, la pression médiatique est essentielle pour promouvoir la transparence. Dans les pays en développement, une seule étude a identifié une corrélation positive entre l'exposition médiatique et le DRSE (Chiu & Wang, 2015). Cela pourrait être attribué à une couverture médiatique moins complète ou à une compréhension plus limitée des questions de RSE dans ces environnements. Contrairement à l'Occident, les entreprises de ces régions ne subissent peut-être pas la même pression médiatique pour adopter des pratiques de RSE transparentes.

Enfin, un dernier déterminant qui trouve ses débuts dans la littérature, porte essentiellement sur les facteurs macroéconomiques tels que le taux d'inflation, le taux de change, les prix de pétroles, que nous les trouvons évoqués dans l'étude de (Chiu & Wang, 2015) et une autre très récente de (Mandagie et al., 2024). Ce type des déterminants nécessite plus d'études dans les deux contextes étudiés pour avoir des résultats pertinents pour notre analyse.

En résumé, les facteurs externes qui influencent la RSE diffèrent considérablement entre les pays développés et les pays en développement. Dans les pays développés, des éléments cruciaux tels que la structure de propriété, l'influence des parties prenantes, la réglementation et la visibilité médiatique incitent les entreprises à adopter des pratiques de divulgation de RSE plus transparentes. À l'inverse, dans les pays en développement, si certains de ces éléments peuvent exister, il est plus courant de rencontrer des relations négatives ou inexistantes, notamment en ce qui concerne la réglementation et l'effet de levier, qui mettent en évidence des paysages économiques et institutionnels plus complexes.

### **Les facteurs internes**

Notre dernière catégorie des déterminants concerne les facteurs internes présentés dans le tableau 3, où nous trouvons plusieurs types comme les mécanismes de gouvernance, la compétitivité, l'attitude managériale et la réputation de l'entreprise.

**Tableau 3 : Synthèse des facteurs externes identifiés**

<b>Facteurs internes</b>						
<b>Déterminants de la DRSE</b>	<b>Pays développés</b>			<b>Pays en développement</b>		
	<b>+</b>	<b>-</b>	<b>0</b>	<b>+</b>	<b>-</b>	<b>0</b>
<b>Mécanisme de gouvernance</b>	2	1	0	9	3	3
<b>Compétitivité</b>	2	0	0	0	0	0
<b>Attitude managériale</b>	3	0	0	2	1	0
<b>Réputation</b>	2	0	0	2	0	0

Source : élaboré par nos propres soins

Dans les facteurs internes, nous constatons que les mécanismes de gouvernance sont les plus présents dans les études des deux contextes. Cependant, ce facteur présente des différences significatives dans son impact sur la DRSE. Dans les pays développés, deux études ont établi une corrélation positive entre les mécanismes de gouvernance et la RSE (Jo & Harjoto, 2012 ; Garcia-Torea et al., 2017), tandis qu'une étude a révélé une corrélation négative (Chen et al., 2023). Des éléments clés tels que la composition du conseil d'administration, les comités spécialisés et la séparation des pouvoirs sont largement considérés comme essentiels pour favoriser la transparence et la responsabilité, ce qui améliore ensuite la divulgation de la RSE. Néanmoins, la présence d'une étude indiquant une corrélation négative qui se concentre principalement sur le mandat du PDG implique que, dans certains cas ce déterminant peut diminuer l'efficacité ou la priorité de la divulgation de la RSE.

En revanche, l'examen des mécanismes de gouvernance dans les pays en développement est encore plus approfondi, avec neuf études démontrant une relation positive (Masoud & Vij, 2021 ; Khan, 2010 ; Ahmed Haji, 2013 ; A. Khan et al., 2013 ; Chiu & Wang, 2015 ; Haniffa & Cooke, 2005 ; Alkayed & Omar, 2023 ; Soobaroyen et al., 2023 ; Kumar et al., 2023), soulignant son importance dans ces contextes. Cependant, trois études ont signalé une relation négative (Suárez-Rico et al., 2018 ; Masoud & Vij, 2021 ; Soobaroyen et al., 2023), et trois autres n'ont trouvé aucune relation (Masoud & Vij, 2021 ; Khan et al., 2013 ; Wedari & Shafadila, 2022). Les études qui ont prouvé des relations positives, se sont concentrées principalement sur la composition du conseil d'administration notamment la présence des femmes et la fraction des administrateurs indépendants, le nombre des réunions du conseil, la présence des comités spécialisés tels que des comités d'audit et de RSE.

Par contre, la taille du conseil d'administration se présente comme un déterminant dominant dans les études qui ont trouvé des associations négatives. Cette variabilité peut provenir de systèmes de gouvernance moins développés ou de structures de gouvernance façonnées par des influences familiales ou étatiques, qui peuvent soit faciliter, soit entraver la divulgation

de la RSE. Les entreprises des pays en développement peuvent parfois avoir du mal à mettre en place des mécanismes de gouvernance efficaces nécessaires pour intégrer la RSE dans leurs stratégies globales, ce qui peut expliquer les résultats négatifs et neutres.

Concernant la compétitivité et sa relation avec la DRSE, les recherches ont été principalement menées dans les pays développés, laissant un vide dans les pays en développement. Dans le contexte des pays développés, deux études ont identifié une corrélation positive entre compétitivité et DRSE (Chih et al., 2010 ; Nikolaeva & Bicho, 2011). Cela indique que les entreprises considèrent la RSE comme un moyen de se différencier et d'améliorer leur avantage concurrentiel sur des marchés où les consommateurs, les investisseurs et les autres parties prenantes accordent de plus en plus d'importance aux pratiques durables. Dans ces environnements, les entreprises ont tendance à considérer la divulgation de la RSE comme une stratégie pour améliorer leur réputation, attirer des investissements socialement responsables et favoriser la fidélité des clients. L'absence de recherche sur la compétitivité dans les pays en développement peut suggérer que les entreprises de ces régions sont moins susceptibles de considérer la RSE comme un facteur de compétitivité, peut-être parce qu'elles opèrent sur des marchés moins sensibles aux préoccupations de durabilité ou parce qu'elles sont plus concentrées sur les défis économiques et opérationnels immédiats.

L'attitude managériale est également un facteur interne important pour la DRSE, avec des résultats similaires dans les deux contextes. Dans les pays développés, trois études montrent une relation positive (Adams & Harte, 1998 ; O'Dwyer 2002 ; Adams, 2002), ce qui indique que les valeurs, la vision, et l'engagement des dirigeants jouent un rôle primordial dans la promotion de la divulgation RSE. Les managers dans ces contextes, sont souvent formés aux meilleures pratiques de RSE et reconnaissent l'importance de la transparence pour la réputation et le succès à long terme de l'entreprise.

Dans les pays en développement, deux études ont également trouvé une relation positive entre l'attitude managériale et la DRSE (Kuasirikun, 2005 ; Rahman Belal & Owen, 2007), mais une étude a trouvé une relation négative (Rashid et al., 2020). Cela peut refléter une diversité d'attitudes parmi les gestionnaires dans ces contextes, où certains dirigeants peuvent encore voir la RSE comme un coût plutôt que comme un investissement. Les différences culturelles, le manque de formation, ou les priorités axées sur la rentabilité immédiate peuvent expliquer cette variabilité.

Un dernier facteur interne identifié dans notre échantillon de littérature est la réputation des entreprises ayant une influence positive dans les deux contextes. Dans les pays développés, deux études ont montré une relation positive. Ces études sont celles de Hasseldine et al. (2005) et O'Donovan (2002). Elles suggèrent que les entreprises valorisent la DRSE pour renforcer



leur image de marque. La DRSE permet aussi d'attirer des clients et des investisseurs socialement conscients. De plus, elle aide à se protéger contre les risques de réputation liés aux pratiques irresponsables.

De manière similaire, dans les pays en développement, deux études ont également trouvé une relation positive entre la réputation et la DRSE (Kansal et al., 2014 ; Momin & Parker, 2013). Cela suggère que, bien que les pressions institutionnelles puissent être moins fortes, les entreprises dans ces contextes commencent à reconnaître l'importance d'une bonne réputation pour accéder aux marchés internationaux, attirer des partenaires commerciaux et établir une relation de confiance avec les parties prenantes locales. Cependant, l'absence de relations négatives ou neutres dans les deux contextes indique un consensus sur le fait que la réputation est généralement perçue comme un atout associé à la divulgation RSE.

En conclusion, les facteurs internes jouent un rôle fondamental dans la variation des pratiques de la divulgation RSE, mais leur impact varie entre les pays développés et les pays en développement. Les mécanismes de gouvernance sont fortement corrélés à la DRSE dans les deux contextes, mais leur influence est plus complexe dans les pays en développement, où des relations négatives et neutres sont également présentes, probablement en raison de structures de gouvernance moins établies. La compétitivité est un déterminant reconnu dans les pays développés, où la RSE est souvent vue comme un avantage concurrentiel, tandis que ce facteur est largement ignoré dans les pays en développement, où d'autres priorités économiques dominent. L'attitude managériale influence positivement la DRSE dans les deux contextes, mais des attitudes variées parmi les dirigeants dans les pays en développement peuvent parfois freiner la divulgation. Enfin, la réputation est un facteur important pour les entreprises dans les deux types de pays, soulignant le consensus selon lequel la RSE est un outil essentiel pour construire et maintenir une image positive.

## **Conclusion**

Sur la base d'un examen de 89 articles de recherche empirique, cet article analyse les facteurs déterminants pour la divulgation d'informations sur la RSE. Cette recherche est basée sur une double classification. Une classification sur la base de niveau de développement du pays (développé, en développement), et une classification par nature de déterminants (caractéristiques de l'entreprise, externes, et internes). Les résultats montrent plusieurs déterminants de la divulgation RSE. Les caractéristiques de l'entreprise, comme la taille et le secteur d'activité, sont importantes. La structure de propriété et la pression des parties prenantes sont des facteurs externes. Les spécificités du pays jouent aussi un rôle. En interne, les

mécanismes de gouvernance influencent également la divulgation RSE. Ces facteurs sont étudiés dans les pays développés et en développement.

Notre recherche révèle aussi qu'il existe des différences importantes entre les déterminants de la divulgation de la RSE dans les pays développés et dans les pays en développement. Dans les pays développés, les préoccupations de certaines parties prenantes, par exemple les régulateurs, les actionnaires, les créanciers, les investisseurs, les écologistes et les médias ; sont considérées comme très importantes pour la divulgation d'informations sur la RSE. En revanche dans les pays en développement, la publication des informations RSE est influencée par les forces extérieures/parties prenantes puissantes, par exemple les acheteurs internationaux, les investisseurs étrangers, les préoccupations des médias internationaux et les organismes de réglementation internationaux tels que la Banque mondiale. En outre, contrairement aux pays développés, les entreprises des pays en développement perçoivent peu de pression de la part du public pour la divulgation d'informations sur la RSE, ce qui suggère que le public des pays en développement est moins informé des questions sociales et environnementales et qu'il a besoin de programmes de sensibilisation mettant l'accent sur les questions sociales et environnementales.

Bien plus, l'analyse de la littérature montre un manque dans les études qui traitent la relation de la DRSE avec les facteurs macroéconomiques, tels que les prix de pétrole, le taux d'inflation, taux de change comme l'étude menée par Mandagie et al., (2024), et ceci bien que pour les économies développées que pour les économies émergentes. Ainsi la nécessité d'avoir d'autres études qui analysent les pratiques et les déterminants de la DRSE au niveau de d'autres organisations autres que les entreprises, comme les organisations du secteur public, car nous estimons que la question de la durabilité et particulièrement la DRSE est une occupation universelle.

Notre examen n'est pas exempt des limitations. bien que nous ayons fait de notre mieux pour inclure la plupart des articles publiés récemment, il se peut que certains articles aient été omis involontairement. Notre étude ne porte que sur les travaux publiés en langue anglaise vu les sources d'articles utilisées. Par conséquent, il se peut que nous ne fournissions pas un examen exhaustif des articles sur les déterminants de la divulgation de la RSE dans les pays développés et en développement.

Le présent article met en évidence des orientations pour les recherches futures. Une observation faite à propos du nombre limité des pays étudiés. Nous constatons que plusieurs pays n'ont pas été étudiés, comme ceux de l'Afrique du nord, en suivant la littérature qui indique que les pratiques RSE sont différentes entre les pays développés et les pays en développement (Alshbili et Elamer, 2020) les chercheurs préconisent que de futures études doivent porter sur ces pays sous-représentés dans la littérature.

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